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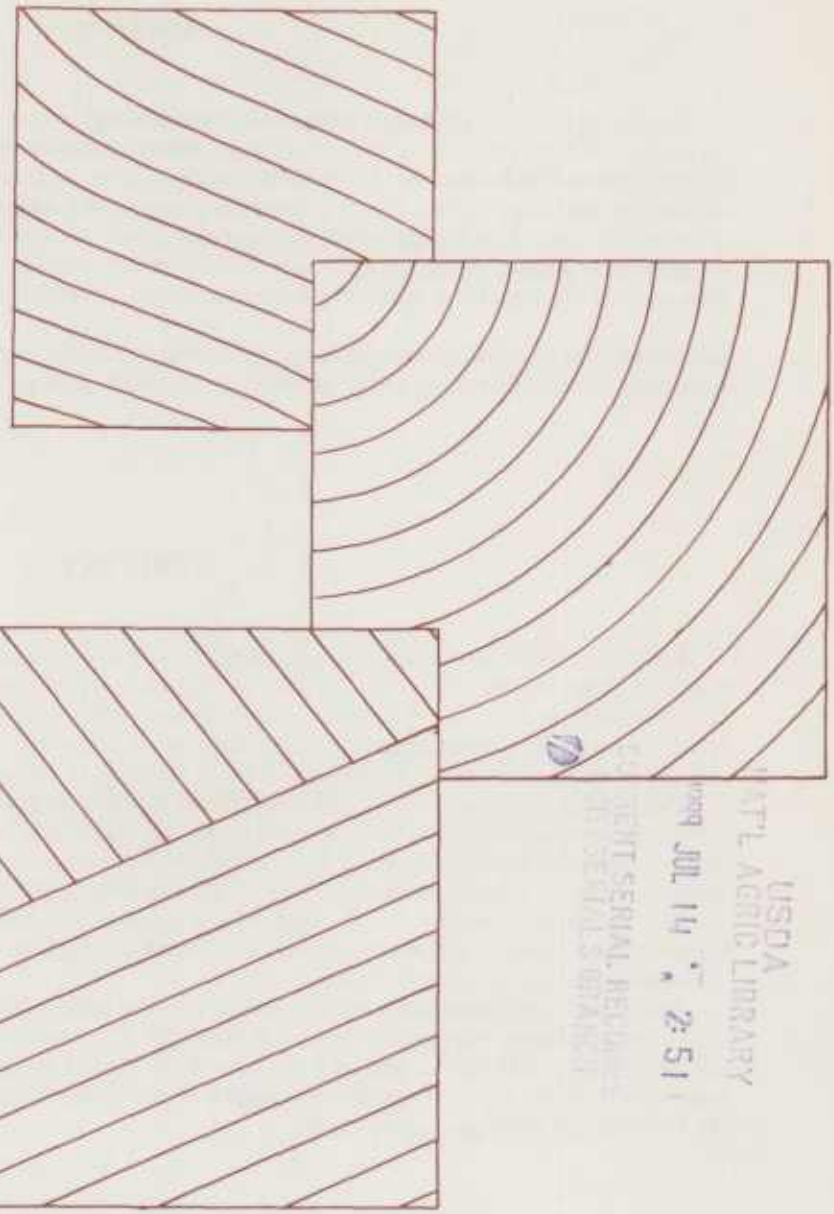

MIDWESTERN CORN FARMS: ECONOMIC STATUS AND THE POTENTIAL FOR LARGE AND FAMILY-SIZED UNITS

ABSTRACT

Buying and selling advantages are greater than internal economies for large versus family-sized Midwestern corn farms. Rates of return on investment both before dnd after income tax costs are considered are greater for the large operations because of (1) economies of size, (2) use of financial leverage, and (3) activities, such as those of purchase and sales agents, that enhance buying and selling advantages. Large units produce a small percentage of total U.S. corn. Family-sized units will probably be the most important units in Midwestern corn production for some time because of their present large number and the difficulty of establishing new large units. Most of the large units of the future will probably evolve from present family-sized units with aggressive growth strategies.

Keywords: *Large corn farms, Midwest, economic potential, internal economies, buying advantages, selling advantages, financial leverage, return on investment, family-sized corn farms.*

PREFACE

Farm production has changed in ownership and size structure in the last several decades. An economy of over 6 million farms mainly owned by families in 1930 has become one of less than half that number with decreased family control in 1970. As farms have decreased in number and grown larger, concern has been expressed that farming may soon be dominated by a few supersized firms. For some specialty commodity sectors, this may already be the case. However, it is not yet true for Midwestern corn production.

The current situation of large Midwestern corn farms is analyzed in part I of this report. Part II focuses on incentives for these farms. Part III highlights economic characteristics of 10 large corn farms selected for intensive analysis from the many analyzed in part II. Part IV discusses the staying power of family-sized corn farms in the Midwest; and part V looks at the future for family-sized and large Midwestern corn farms.

The sample interviewed for this report was purposefully small—about 48 large corn farms and 48 input suppliers and marketing firms. However, the empirical work based on the interviews provides insight into potential incentives for all large farms.

Analysis of large farms is a relatively new activity for agricultural economists. Considerable emphasis was thus placed on developing relevant and workable concepts. The empirical results need the test of additional research and verification both in the aggregate and for more limited geographic areas. Thus, this report may stimulate more such analysis not only for corn production in the Midwest but also for other farm and food commodities in the Midwest and other geographic areas.

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Large Midwestern corn farms can obtain some economic advantages that are generally not available to family-sized corn farms in the region. The large farms use greater financial leverage. They can employ various measures to reduce or eliminate Federal income tax costs. Generally, they choose a form of business organization that allows fullest use of cost-saving advantages. Further benefits are lower interest costs per unit of output on credit and equity and a higher rate of return on investment, which can be competitive with the rate for industrial investment.

Buying and selling advantages include obtaining discounts on inputs purchased in large volume and performing functions normally handled by local marketing firms. Based on synthesized budgets, a large 5,000-acre Midwestern corn farm obtained a discount on purchased inputs, such as petroleum products, machinery, crop chemicals, fertilizer, and seed, that was 20 percent greater than that obtained by a 500-acre family-sized corn farm. And, by drying and storing the corn and assuming some marketing functions, the 5,000-acre unit should net a selling advantage of 5 cents a bushel over that possible for the 500-acre unit.

An offsetting factor for entrepreneurs attempting to form new large units or to enlarge existing smaller ones is the possible difficulty in getting control of enough high-quality land to purchase inputs and produce and sell corn at the advantages available to large units. Unless sufficient land can be put together in an operating unit in a short time, development of the large unit is not financially attractive.

When farm real estate values and operating costs were considered, large corn farms were able to obtain higher net returns than those achieved by family-sized corn farms. In the cost and income models set up for analysis, the large farms achieved a higher rate of net return than the family-sized farms did—whether real estate was considered to increase or decrease 5 percent. (U.S. farm real estate values increased about 6 percent a year during the 1960's.) After an opportunity cost on labor and management and a cost for income tax were considered, and with the equity level at 60 percent, the 5,000-acre farm had a 13.4-percent rate of return and the 500-acre farm a 12.2 percent rate—when farm real estate valued at $500 an acre was increased 5 percent. When farm real estate at the same value was decreased 5 percent, the rates were -0.1 percent for the 1,000- and 5,000-acre units and -0.2 percent for the 500- and 2,000-acre units.

When all costs except an opportunity cost on all investment were considered, net returns per acre were $54.31 for the 5,000-acre farm, compared with $39.35 for the 500-acre farm. Costs per bushel were $0.69 for the 5,000-acre unit and $0.74 for the 500-acre unit.

When the opportunity cost (a competitive market rate of interest) on all investment was considered, net returns per acre were $11.43 for the large corn farm and -$4.51 for the family-sized corn farm. Costs per bushel were $1.04 for the large unit and $1.14 for the family-sized unit. The latter could be considered successful if the operator accepts a rate for investment, labor, or management slightly below the market rate.

Of 10 large Midwestern corn farms selected for more intensive analysis, nine were successful and showed growth during the 1960's. The unsuccessful unit, formed from several small tracts of farmland, operated 4 years before liquidation. It failed primarily because projected results were not obtained in yields, selling price of the corn, and other areas. Five of the nine units—group A—were classified as owned by financially affluent people with extensive nonfarm business interests. The other four units—group B— were owned by people in financial positions that were moderate, compared with those in group A, and with limited nonfarm business interests.

Group A units were owned and operated under a corporate form of business organization. Three of the group B units were owned and operated under a father-son partnership and one was a corporation. Group B units were all family owned and operated; group A units had hired managers.

Corn yields increased on the nine units during the 1960's. Group B units increased their crop acreage 80 to over 500 percent during the 1960's; the other five units showed essentially no growth in crop acreage. Group B units had little increase in livestock production; group A units concentrated much of their growth on beef cattle production and associated activities.

Owners and managers of group A units appeared to move more rapidly in adopting new innovations with profit opportunities. They were able to draw on financial and management resources from other farm and nonfarm segments of their businesses as opportunities developed on the units. Similarly, they transferred resources from the corn units to other farm and nonfarm business interests as opportunities developed in these.

All 10 units had longterm growth plans. Group B owners planned their growth activities around their basic corn production units and essentially limited these plans to farming activities. Group A unit managers and owners had developed alternative growth plans for their corn production units and for other farm and nonfarm business interests. Thus, future growth of these corn farms appears to depend on the outlook not only in the farming sector but in other economic sectors as well.

Despite the economic advantages and incentives existing for the large Midwestern corn farms studied, family farms involving two or more workers have considerable staying power in the region. Based on numbers of such farms with ongoing operations, the continued importance of this size of corn farm seems assured. These farms also produce most of the Midwest's corn and will probably maintain their large share.

MIDWESTERN CORN FARMS: ECONOMIC STATUS AND THE POTENTIAL FOR LARGE AND FAMILY-SIZED UNITS

By

Kenneth R. Krause and Leonard R. Kyle[1]

PART I.–INTRODUCTION

Publicly sponsored farm management research and extension work in the Midwest has been carried on in earnest for about 50 years. During this period, farm management workers have generally conceived of most Midwestern farms–including those with operators, absentee landlords, part-time farmers, and so on–as similar and subject to the same general analysis. Emerging large farms and a changing structure of ownership and operation of Midwestern farm production raise questions about the relevancy of continuing to consider economic problems of all "farmers" as similar.

In addition, several developments during the 1960's suggest a need to restudy the economics of Midwestern corn production. At the farm level, new technology was adopted–single-cross hybrid corn; new insect and weed control chemicals; and new production, crop-drying, and storing equipment, for example. Use of existing technology–such as commercial fertilizer–was stepped up. Changes in farm business technology, management, and entrepreneurship were also important. The number of farms declined during the decade, and those farms remaining have grown to larger size. Most of the farmers with aggressive business growth strategies apparently have taken advantage of technological developments and have adjusted favorably to the changing economic environment.

Taken together, these changes give reason to seriously question results of previous studies that suggest family-sized farms of one to three men exhaust most of the possible economies of size in Midwestern corn production (*1*, pp. 37-41).[2] Although efficient family-sized corn production units may exhaust most of the possible economies in production, very large farms may realize additional savings from reductions in costs of purchased inputs, marketing advantages, financial leverage, and use of strategies that minimize income taxes.

Farmers, farm organization leaders, and legislators are concerned about the potential effects on competition, community business, and social structure of the trend to fewer and larger farm units.[3] Thus far, concentration of farm production on large units has been more characteristic of some areas outside the Midwest, but spokesmen in that region have expressed concern that:

1. A reduction in the number of farm firms and people engaged in Midwest farming could affect the viability of rural towns (*19*, pp. 10,13,95,173); it could also reduce and otherwise considerably affect career opportunities in agriculture for farm youth (*19*, pp. 93,169).
2. Large farm units could buy inputs and market their products through a changed structure of suppliers and marketing firms; for example, through manufacturers and processors instead of local merchants (*19*, pp. 11,12,170,177).
3. Farmland ownership could become concentrated, and managerial functions could become vested in people who are not farm operators (*19*, pp. 92,93,182).

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[1] Kenneth R. Krause is an Agricultural Economist, Farm Production Economics Division, Economic Research Service, U.S. Department of Agriculture (USDA); Leonard R. Kyle is Professor, Department of Agricultural Economics, Michigan State University.

[2] Italicized numbers in parentheses refer to items in References at the end of this report.

[3] Several authors and pages could be cited from a corporate farming hearings publication *(19)* in addition to those cited from it in this report. Interested readers may want to read the additional testimony.

Rural structural change external to farm firms–in agribusiness and community social services, for example–is another research topic and is not treated in depth here. However, this report provides some of the needed information for an analysis of nonfarm rural structural change.

OBJECTIVES AND DATA SOURCES

The central objective of the study was to appraise the potential for additional large corn farms (1,000 or more acres of corn) in the Midwest.[4] Specific objectives were to (1) estimate the current number and importance of such Midwestern farms, (2) develop and test economic and financial models for analyzing incentives for them, (3) determine some parameters of the staying power of family-sized operations, and (4) appraise the future importance of large-scale compared to family-sized corn farms in the Midwest.

Several procedures were followed in obtaining and analyzing available data. Data used to measure the number and importance of large corn farms were obtained from the Agricultural Stabilization and Conservation Service (ASCS), the Statistical Reporting Service (SRS), and the 1964 Census of Agriculture; and primary data was obtained from 24 selected Corn Belt counties of all known corn producers including large-scale units. Other primary data came from interviews with managers or owner-operators of 48 large corn farms, along with about 48 input manufacturers, retailers, and marketing firms. These farms had 1,000 or more row crop acres and were located in Ohio, Illinois, Indiana, Iowa, and Missouri. Farm units were selected for study based on the size of their corn enterprise and their operators' willingness to discuss input and other production costs and to supply financial summaries about their operations. Operators of 28 units with between 1,000 and 2,500 acres of corn were interviewed, as were 15 operators with between 2,500 and 5,000 acres, and five with over 5,000 acres. Two units were at the 8,000-acre size. With one exception, each farm was owned by one or a few individuals, usually related. There were about an equal number of sole proprietorships, partnerships, and corporations.

The smaller of the large farms were specialized crop units producing some wheat and soybeans along with the main crop, corn. Some of the bigger large units had substantial livestock enterprises operated as separate production departments.

Also interviewed were suppliers of inputs such as petroleum products, credit, seed corn, and farm machinery. The interviews were conducted to determine pricing schedules for dealers and potential volume discounts granted to crop producers using varying amounts of the inputs.

A formal questionnaire was not used for all of the interviews. However, a topic outline was used to guide the interviews. All farmers were queried about input costs and buying and financing practices. After completion, the interviews were summarized and recorded on tape. Specific prices that farmers reported paying were checked by reference to filed invoices, letters from suppliers, or dealer price sheets.

Interviews were not conducted with operators of units under 1,000 acres. Input and price data for the 500-acre unit used for comparison purposes in the budgets were obtained from secondary sources. Illinois and Iowa farm business summary data, though not in the exact form needed, were particularly useful (*2, 15*).

Managers and owners of units analyzed in part III, "Salient Economic Characteristics of 10 Large Corn Farms," asked that specific data about their units not be published. The extent and quality of the available data thus varied. When financial management functions were handled by a central office distant from the farm, only farm operating data were available; data on net worth over time were difficult to analyze since the farm section of the businesses was sometimes combined with all other financial interests. Thus, part III does not show precise operating results nor the absolute magnitude of change in financial position over time.

Staying power of family-sized farms was studied by categorizing four types of farm operations and ownership situations: (1) units employing aggressive growth strategies, (2) low-income and minimum-growth units, (3) part-time employment units, and (4) farm real estate owners not directly engaged in farming.

NUMBER OF LARGE FARMS AND CONCENTRATION OF PRODUCTION

Nationally, of course, interest in and development of large-scale farm production is not limited to corn production. The number and importance of large units varies by commodity and area of the country.

[4] Acreages analyzed–500-acre unit, 1,000-acre corn farm, and so on–are only acreages in corn, unless otherwise specified. These units may have additional acreages in other crops. "Corn farm" is used interchangeably with "corn production unit."

The first part of this section analyzes 12 farm types defined by the Bureau of the Census; the latter part focuses more specifically on the number and importance of corn farms.

NUMBER OF LARGE FARMS MEASURED BY VALUE OF OUTPUT

In 1930, there were 6,228,648 farms in the United States, most of them relatively small, unmechanized, and operated by the family. In 1964, the Census of Agriculture enumerated 3,156,000 farms. Of this total, 141,914 were class I farm units (gross sales of $40,000 or more), which provided nearly 44 percent of the value of all products sold (table 1). Class I farms probably produced over half the U.S. output in 1969.

The number of large farms increased 16-fold during 1929-64. R.D. Jennings, using data from the Census of Agriculture for 1929, isolated only 7,875 farms with $30,000 or more in value of products sold in that year. This sales value is equivalent to one of $48,450 per farm in 1964, when adjusted by the index of farm prices received. An estimated 126,000 of the class I units had sales this large in 1964.

A special tabulation of the 1964 Census of Agriculture showed 31,401 farm units with sales of $100,000 or more, an increase of 10 percent a year during 1959-64 (*9*). We have projected that about 45,000 units with sales of $100,000 or more existed in 1969.

There were 919 units with sales of $1 million or more in 1964, an increase of 12.5 percent a year from the number in 1959. Internal Revenue Service data for 1966 show 597 individuals and 676 farm corporations with $1 million or more of business receipts. This is schedule F farm income for individuals and partners, and all corporate income for corporations. When similar data for 1967 are used and the size bracket is lowered to $500,000 or more, 1,479 sole proprietors, 462 partnerships, and 1,843 corporations—a total of 3,784 operations—are reported. When the size bracket is lowered to only $50,000 or more of business receipts, 132,497 tax schedules are reported (*20*).

Table 1.—Number of large farms by type and size, 1929, 1959, and 1964

Type of farm	1929, large[1]	1959, class I[2]	1964	
			large[3]	class I[2]
	Number			
Vegetable	785	2,730	1,590	3,577
Other field crops	699	4,011	2,237	7,334
Poultry	225	11,151	4,744	19,249
Fruit and nut	1,924	6,547	2,511	8,103
Miscellaneous	101	3,830	1,644	5,034
Ranches	1,829	6,757	1,815	5,921
Cotton	441	13,171	3,465	13,033
Livestock	453	29,439	6,692	35,116
General	50	4,775	1,884	8,783
Cash grain	486	10,828	2,141	19,301
Dairy	882	8,538	2,576	15,463
Tobacco	-----	322	102	1,000
Total	7,875	102,099	31,401	141,914

[1]Farms with sales of $30,000 or more in 1929, which is comparable with $48,600 in 1959 and $48,450 in 1964 (*7*).

[2]Class I: Census of Agriculture farms with sales of $40,000 or more (*17, 18*).

[3]Farms with sales of $100,000 or more (*9*). They are part of the total number of class I farms.

CONCENTRATION OF PRODUCTION ON LARGE FARMS MEASURED BY OUTPUT SHARE

Production of several farm products now appears to be concentrated in a few large firms. However, this is not uniform by type of farm (table 2). In 1964, six of the 12 census types of farms had over 60 percent of the output produced by farms with gross sales of $40,000 or more: vegetable farms, 81 percent; other field crops, 74 percent; poultry, 68 percent; fruit and nut, 68 percent; miscellaneous, 65 percent; and ranches, 64 percent. The same types of farms with sales of $100,000 or more accounted for 38 to 67 percent of the production.

All types of large farms (those with sales of $30,000 or more as defined by Jennings), accounted for only 5 percent of total production in 1929 and for 33 percent in 1959. In 1964, class I farms accounted for 44 percent of total production. Farms with sales of $100,000 or more accounted for nearly 25 percent of all commercial farm production in 1964. By type, class I tobacco, dairy, and cash grain farms accounted for less than 25 percent of production in 1964 and those units with sales of $100,000 or more for less than 10 percent. Concentration increased for all types of class I farms from 1959 to 1964; however, farm types with the smallest percentage of concentration in 1959 showed the largest proportional increase in concentration by 1964.

Table 2.–Concentration of farm production by type and size, 1929, 1959, and 1964

Type of farm	1929, large[1]	1959, class I[2]	1964	
			large[3]	class I[2]
	As Percentage of Total			
Vegetable	20.0	73.3	67.1	81.4
Other field crops	5.1	55.8	49.1	73.7
Poultry	3.3	55.4	38.0	67.9
Fruit and nut	19.9	45.1	46.7	67.6
Miscellaneous	1.0	62.1	44.6	65.4
Ranches	29.2	59.8	46.5	64.0
Cotton	1.4	46.8	31.3	55.2
Livestock	2.1	33.9	26.8	46.8
General	.2	20.7	18.3	33.6
Cash grain	1.8	16.7	6.4	23.9
Dairy	3.0	15.3	9.9	23.4
Tobacco	----	3.9	3.9	8.2
Total	5.0	32.8	24.8	43.7

[1] Farms with sales of $30,000 or more in 1929, which is comparable with $48,600 in 1959 and $48,450 in 1964 (*7*).

[2] Class I: Census of Agriculture farms with sales of $40,000 or more (*17, 18*).

[3] Farms with sales of $100,000 or more (*9*). They are part of the total number of class I farms.

NUMBER AND IMPORTANCE OF LARGE CORN FARMS

No one definition of farm size is satisfactory for all analytical purposes. Thus, acres, number of workers, gross sales, and magnitude of fixed and variable investment and equity are all referred to in this report. A 500-acre unit is obviously smaller, physically, than a 2,000-acre unit. Yet the magnitude of equity investment may be about the same if a 2,000-acre owner has only 25-percent equity in his unit and a 500-acre owner has 100-percent equity.

If a farmer has a highly mechanized 1,000-acre unit and hires some custom services, he may employ no more hours of labor per year than would a 500-acre operator whose unit is not highly mechanized. Thus, size is relative and interrelated with a number of variables. For our analysis of large corn farms, size usually refers to the number of acres of corn.

Specific studies designed to provide probability samples or to identify the entire population of large corn or other feed grain farms have not been undertaken. Thus, only approximations of the number and relative importance of large corn production units are possible.

Data analyzed in this section were obtained in large part from 1969 ASCS records and 1970 SRS published data or were estimated from published reports of the 1964 Census of Agriculture and from primary data enumerated of all known corn producers in selected counties. The ASCS data understate the total number of large feed grain units and total acreage produced by them, since nonparticipants in the ASCS program were not included. The 1964 Census of Agriculture does not account for changes in number and percentage of total acres during the last half of the 1960's, a period of apparent increase in the number and importance of large units in the production of all farm commodities.

Since corn, grain sorghum, and barley are generally combined as feed grains in ASCS data, all three crops are discussed in this section. Based on permitted acres, ASCS program participants who operated units with a feed grain base of 1,000 acres or more in 1969 produced about 3.8 percent of the total acres of corn, grain sorghum, and barley harvested for grain in that year. They harvested about 1.3 percent of the corn acres, about 11.9 percent of the grain sorghum, and about 6.8 percent of the barley acres (table 3). The acreage produced by farm operators who participated in the feed grain program is slightly understated since ASCS records did not allow exact tenure classifica-

Table 3.–Relative importance of feed grain, corn, grain sorghum, and barley acreage on operating units of 1,000 acres or more participating in ASCS feed grain program, by region, United States, 1969

Region	Acres permitted for participants operating units of 1,000 acres or more[1]				Acres harvested by all feed grain producers[2]				Share of total production by participants operating units of 1,000 acres or more[1]			
	Corn	Grain sorghum	Barley	Feed grain	Corn	Grain sorghum	Barley	Feed grain	Corn	Grain sorghum	Barley	Feed grain
	1,000 acres				*1,000 acres*				*Percent*			
Northeast	7.9	0	0	7.9	1,864	0	343	2,207	.4	0	0	.4
Lake States	55.0	0	36.2	91.2	7,089	0	743	7,832	.8	0	5.2	1.2
Corn Belt	248.6	3.7	1.3	253.6	29,297	267	71	29,635	.9	1.2	1.3	.9
Northern Plains	253.8	331.6	98.2	683.6	8,426	5,034	2,760	16,220	3.1	6.6	3.5	4.2
Appalachian	29.1	0	0	29.1	3,365	82	239	3,686	.9	0	0	.8
Southeast	65.6	0	0	65.6	2,805	40	24	2,869	2.3	0	0	2.3
Delta	4.9	3.9	0	8.8	499	132	2	633	1.0	3.9	0	1.5
Southern Plains	8.6	943.0	6.8	958.4	629	6,738	516	7,883	1.4	14.1	1.4	12.1
Mountain	8.8	312.0	149.0	469.8	387	811	2,911	4,109	2.2	39.0	5.1	11.5
Pacific	2.2	11.3	355.0	368.5	237	421	1,922	2,580	1.1	2.8	18.7	14.2
United States	684.5	1,605.5	646.5	2,936.5	54,598	13,525	9,531	77,654	1.3	11.9	6.8	3.8

[1] An unspecified acreage produced by ASCS participants with a feed grain base of 1,000 acres or more is omitted since tenure codes provided by ASCS were not fully specified.

[2] Crop Production, 1970, Annual Summary, Stat. Rpt. Serv., Crop Rpt. Bd., CR PR 2-1 (70), U.S. Dept. Agr.

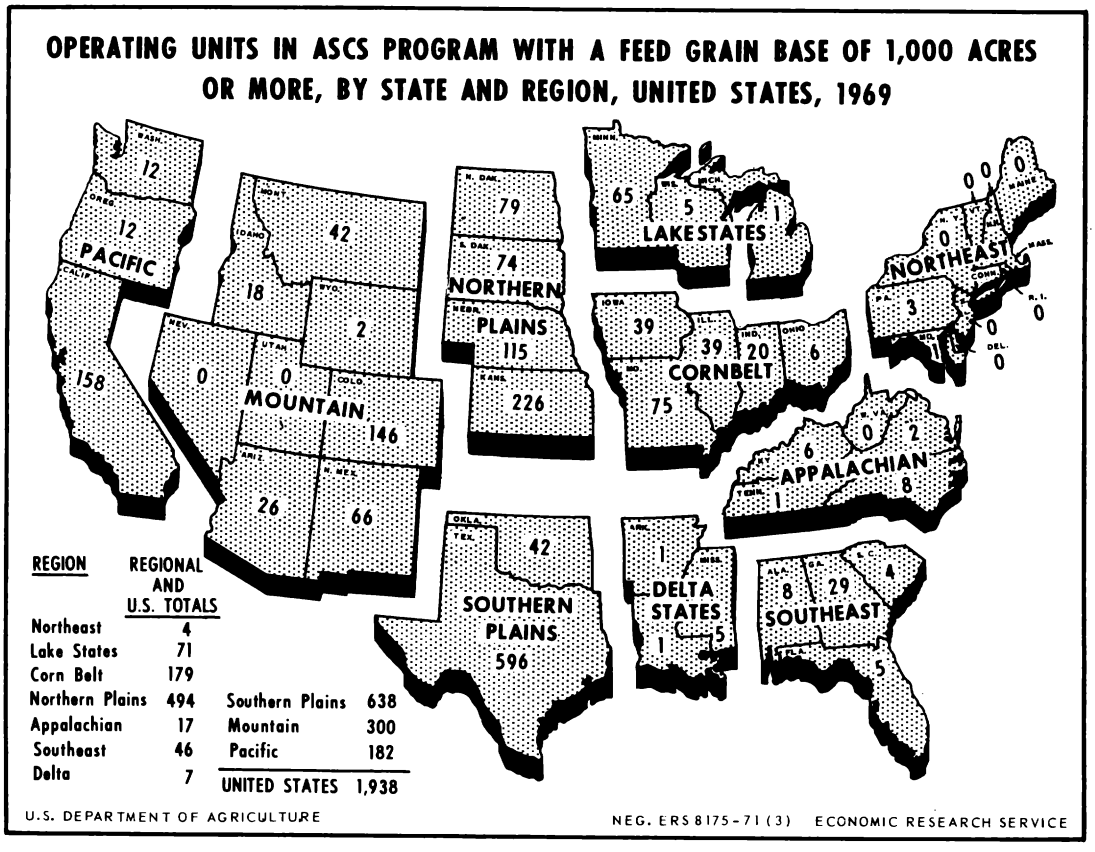

Figure 1.

tion of about 15 percent of those participants with a feed grain base of 1,000 acres or more.[5]

Regionally, the Pacific States had the largest percentage—14.2—of combined corn, grain sorghum, and barley acres harvested by participants with large feed grain acreage; next was the Southern Plains with 12.1 percent and the Mountain States with 11.5 percent. ASCS participants with large acreages were not particularly important in corn production in any region, but they produced about 39.0 percent of the grain sorghum in the Mountain States and 14.1 percent of the grain sorghum in the Southern Plains.

In 1969, 4,727 individuals and firms with a feed grain base of 1,000 acres or more participated in the ASCS program (table 4).[6] Nearly 30 percent (1,418) of the large-acreage participants were in the Northern Plains. The Southern Plains accounted for about 27 percent (1,272); the Corn Belt States, 10 percent (481); and the Mountain States, 13.5 percent (601). There were 1,938 participants who operated units with a feed grain base of 1,000 or more acres (fig. 1); the remaining 2,789 were classified as landlords or were not classified by tenure.

Of the 1,938 operating participants, 484 had the largest percentage of their total feed grain base in corn (app. table 2), 1,089 had the largest percentage in grain sorghum (app. table 3), and 365 had the largest percentage of their feed grain base in barley (app. table 4). The Corn Belt States accounted for 175 of the 484 corn unit participants and the Northern Plains, 179. The Southern Plains States accounted for 628 of the 1,089 grain sorghum unit participants, the Northern Plains, 241, and the

[5] A 100-percent sample was taken of all 1969 ASCS feed grain participants with a feed grain base of 500 acres or more. County ASCS offices classified program participants as owner-operators, operators, cash lease tenants, or in another category by each tract of land they held an interest in. Participants were placed in whichever tenure class accounted for over 50 percent of their acreage. Thus, some participants were not operators. Tables in this section using ASCS data are for all participants but only totals for those who operate units are broken out separately. Participants were placed in the State and region where their greatest number of acres were located.

[6] See app. tables 1-4 for State data on number of operating unit participants and size of their units.

Table 4.–All ASCS feed grain program participants with a feed grain base of 500 or more acres, including those operating units with a feed grain base of 1,000 or more acres, by region, United States, 1969[1]

Region	Program participants with acreage size of–											All participants[2]	Participants operating units with 1,000 acres or more[3]
	500-749	750-999	500-999 (total)	1,000-1,499	1,500-1,999	2,000-2,999	3,000-3,999	4,000-5,999	6,000-7,999	8,000 or more	1,000 or more (total)		
	Number												
Northeast	37	6	43	0	1	3	0	0	0	0	4	47	4
Lake States	803	182	985	99	18	13	0	1	0	0	131	1,116	71
Corn Belt	2,595	680	3,275	307	100	56	8	5	4	1	481	3,756	179
Northern Plains	6,140	1,720	7,860	1,010	254	107	33	11	1	2	1,418	9,278	494
Appalachian	219	78	297	60	3	2	1	2	0	0	68	365	17
Southeast	432	195	627	74	118	92	1	0	0	0	285	912	46
Delta	31	24	55	20	2	0	0	0	0	0	22	77	7
Southern Plains	2,998	1,145	4,143	734	258	158	39	68	13	2	1,272	5,415	638
Mountain	1,402	526	1,928	383	131	62	8	8	4	5	601	2,529	300
Pacific	680	231	911	184	48	62	24	16	11	100	445	1,356	182
United States	15,337	4,787	20,124	2,871	933	555	114	111	33	110	4,727	24,851	1,938

[1] Feed grain acreage includes corn, grain sorghum, and barley. All feed grain acreage program participants were included in the States where their largest number of feed grain acres were located. Total base acres may be overstated since owners' and operators' acres were double counted in some cases. A 100-percent sample was drawn of all ASCS participants with a feed grain base of 500 acres or more. Operating unit participants include only owner-operators and tenants.

[2] Program participants are in all tenure groups including landowners.

[3] Data are regional totals from app. table 1.

Mountain States, 208. The Pacific States accounted for 174 of the 365 barley operating unit participants.

The number of ASCS participants with 500 to 999 acres of feed grain base totaled 20,124 (table 4). The Northern Plains had the highest number with 7,860; followed by the Southern Plains with 4,143; the Corn Belt with 3,275; and the Mountain States with 1,928.

In 1969, there were 1,783 ASCS program participants who operated units with a wheat base of 1,000 acres or more.

The total number of operating units producing 1,000 acres or more of corn in 1969 was about 2,000 and accounted for 5 to 8 percent of total U.S. production. The number of large feed grain farms was estimated in other ways. An approximation can be obtained in three ways: (1) informal estimates by knowledgeable observers indicate that the 484 ASCS participating corn operating units represent about 25 percent of the total number of large corn units; (2) based on ASCS and primary data, only one out of four producers with a corn acreage exceeding 1,000 acres in 1969 was an ASCS program participant in 10 selected Iowa and 14 selected Illinois counties.[7] The ASCS participants' average was about 25 percent of the total acreage of large producers in the *selected counties;* and (3) the 1964 Census of Agriculture recorded 6,556 commercial cash grain farms that each harvested 1,000 cropland acres or more (*18*, p. 1012). These included wheat farms. Based on rates of change in earlier periods, we can project that the 6,556 census farms with cropland acres of 1,000 or more doubled between 1964 and 1969. Of the total, about 15 percent produced mostly corn on row crop acres.

Exact measurement of total feed grain or corn produced by all large-unit operators is not presently feasible. However, the foregoing data show that large units are important but not predominant in corn and grain sorghum or barley production. Large units are not as significant in the Corn Belt as in the Northern and Southern Plains.

The Corn Belt was structured historically around small family-sized farms. A farm with up to 300 acres of row crops plus some acres for hay and small grains has been the most typical full-time operation. A 500-acre row crop unit is considered relatively large by Midwestern standards. If all corn were produced on units of 500 acres or more of corn, the current number of total operating units in the Corn Belt would be reduced by more than half. Regardless of the current relative importance nationally of large feed grain production units, it is important to analyze incentives for establishing large units or for enabling small ones to grow to large size. Then we can more accurately project changes in size, number, ownership, and other structural characteristics of Midwestern corn and feed grain production.

PART II.—ADVANTAGES OBTAINED BY LARGE-SIZED CORN FARMS

PAST RESEARCH

Cost and Income Models

Past studies of economies of size have been guided by cost curve and market price concepts. While numerous variations have evolved, the central ideas in cost models have focused on short- and long-run concepts which describe "u"-shaped curves in the short run and the envelope-type curves in the long run (*8*, pp. 2-6).

Short- and long-run cost theory can serve as a useful guide for analysis of individual firm survival and growth as well as public policy formulation. However, cost theory has not provided a complete framework for studying the rate of development and adoption of new technology and business techniques, the rate of application of new knowledge, or changes in production resulting from Government policy (*12*). Each of the foregoing can affect the number and size of large-scale farm firms.

Past Studies

Numerous empirical applications of theoretical cost frameworks have been made in the U.S. farming sector (*3,4,8*, pp. 34-70). The analyses have generally shown that costs decrease with increasing output but level off and remain constant for the largest farms sampled or simulated. Past studies in the Corn Belt of cattle feeding and corn, soybean, and egg production have generally found that economies of size are reached by farms with one to three laborers (*19*, p. 176). Analysts have acknowledged, however, that farm firms might grow larger to increase the magnitude of net returns through producing more output at a constant or increasing cost.

Faris and Armstrong provided some empirical insight in a study of California crop farms. They showed that relatively large farm firms are able to obtain discounts of up to 20 percent on several

[7] Primary data for the selected counties included 97 percent of all corn acres in the selected Iowa counties and 65 percent in the Illinois counties in 1969, thus suggesting that most large-scale units were identified.

purchased inputs (*3,4*). Agricultural marketing economists have indicated possible advantages that large-scale farm units producing fresh fruit, vegetables, and broilers may achieve through contract or integrated production. However, cash grain production has not been analyzed for this. Goldberg highlights consideration of an agribusiness system for wheat from production through marketing (*6*). Several authors in a publication edited by Garoian analyze conglomerate operations in agriculture in the Corn Belt and elsewhere and provide some insight into incentives for conglomeration (*5*).

Past cost studies on both the Corn Belt and other areas and the subsequent policy interpretations can be criticized for several reasons:

1. Research emphasis has been on one- and two-family labor units to the exclusion of very large units. Little attention has been given to possibilities of starting operations at a large size rather than growing gradually over time.
2. The focus has been mainly on an engineering approach and on internal technical economies.
3. According to one author, economies from buying and selling in large volume have usually been ignored (*1*, p. 43). These can sometimes offset increasing internal operating costs.
4. Single-product analysis has been emphasized at the expense of multiple-product analysis. Concepts and methodology are generally better developed for single-product analysis.
5. The focus has been on the farm firm, independent of related agribusinesses. Average market prices have been assumed. Possible marketing economies have been excluded, such as economies that are gained through contractual input and marketing arrangements and that may provide a higher net price for the producer.
6. Consideration has not been given to common ownership of farm and nonfarm activities and the potential advantages—to an entrepreneur—of a conglomerate business.
7. Cost theory has not been used to analyze noneconomic motivation nor development and application of new technology for very large farms or integrated firms.

PROPOSED RESEARCH

Cost and Income Model[8]

Cost concepts have important applications in analysis of large farm firms. However, economists have generally tried to explain business costs and income in a model which can be defended as theoretically accurate and realistically complete for any type or size of farm. Such models may not be particularly useful with all large businesses.[9]

Costs and income for large single-product farm firms are depicted in figure 2. A farm firm may be large and produce more than one product but the curves in the figure would probably remain the same. Part I of the model has been used in many cost studies for family farms using labor equivalents up to at least three men, and generally shows results from such studies. Part II hypothesizes for large units that the net price per unit of product sold may gradually increase 8 to 10 percent with improved marketing and selling arrangements. Also, cost per unit of output may decrease (again, 8 to 10 percent) for very large units through efficient organization and operation and through purchasing economies.

We hypothesize that larger firms can reduce some internal fixed costs by spreading them over more units of output and can reduce purchased input costs by purchasing inputs in larger volume. Market price and net product price may be increased (1) by large-volume sales, (2) by taking advantage of temporary price increases, and (3) by the farm firm assuming

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[8] Several economic terms require specific interpretation. "Entrepreneural role" or "entrepreneurship," as we use the terms, implies an overall ability to bring together the resources required by management and also an ability to stand the monetary risks involved in ownership, investment, and, in some cases, the operation of a business. In an accounting framework, the entrepreneurial function receives the residual after all costs, including an opportunity cost, have been met. Entrepreneurial returns may be positive or negative.

"Management" implies the ability to conduct, control, and direct entrepreneurial decisions to achieve desired objectives. An opportunity wage rate can be assigned to management if a market rate is not established by an entrepreneur who provides his own management input. Similarly, a market opportunity rate can be assigned to supervisor, foreman, and labor inputs.

"Ownership" and "investment" are also considered. Investment is generally necessary for ownership. One way of viewing returns to ownership is to assign a market rental rate or opportunity return. The amount of investment (equity level) necessary for ownership is that which is necessary to maintain legal ownership of property. Any excess investment dollars used for ownership purposes can be evaluated at an opportunity market rate of return. Thus, "equity position" or "financial leverage" (percentage of market value of assets that are part of the owners' net worth) are important concepts.

In many family-sized operations, the entrepreneurial, management, supervisory, labor, ownership, and investment functions are carried out by one individual or legal entity. In large operations, the functions are more likely to be performed by several legal entities.

[9] Our initial effort on case studies of large farms should help to identify ways that models can be developed for large multiple-product firms and for farm and nonfarm firms under common ownership. Deductive processes should be used to develop models that can be tested. However, development of large multiple-product firm models was not an objective of this study.

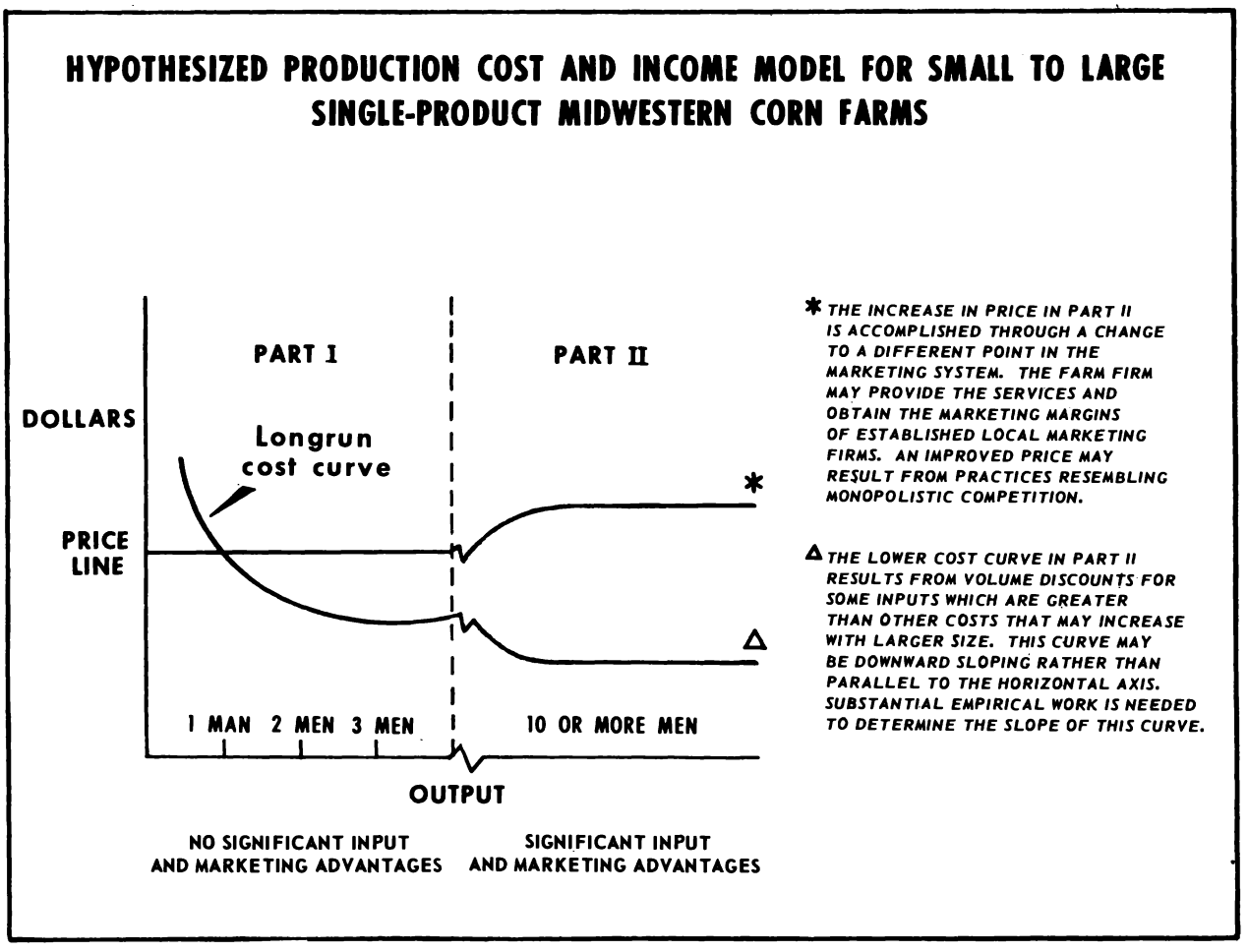

Figure 2.

some of the traditional marketing functions. These firms may need specialized purchasing and selling agents to obtain possible buying and selling advantages.

Investment Returns Models

Cost theory assumes that an individual or firm is committed to a certain economic activity in the short run, which, for corn production, may mean several crop years. This assumption is unrealistic for some equity owners, given the present mobility of resources and knowledge of alternative investment opportunities. Investors can change their investments on short notice depending on potential investment returns.

Cost theory should be supplemented with entrepreneurial and ownership concepts and rate of return on investment. Return on investment, both before and after Federal income taxes are considered, needs to be evaluated for a complete analysis of large corn production units. Equity levels, prospects for an increase or decrease in capital values, and an opportunity cost for equity and all unpaid labor and management should be included in total costs, as should income tax costs and risk exposure.

Economies-of-size concepts are building blocks for analyzing investment returns. Return on investment is influenced by net operating returns, which may be influenced by size of firm. Equity levels are important,. since credit interest costs are income tax deductible. A change in value of assets influences the total rate of return on investment; for example, a 5-percent change in asset value added to or subtracted from operating returns influences the net worth of the firm. Since the firm has alternative uses for assets, a market rate of opportunity cost should be considered on all assets including family labor and

Table 5.–Model of investment returns per acre before and after income taxes with varying corn prices, equity levels, and rates of appreciation, 500-acre corn production unit

Item	Unit	Equity level		
		100 percent	70 percent	30 percent
Total investment:				
Annual operating capital	Dol. acre	50	50	50
Equity in real estate and machinery investment	Dol. acre	650	455	195
Total	Dol. acre	700	505	245
Annual increase in real estate value of $600:				
5-percent appreciation	Dol. acre	30.00	30.00	30.00
10-percent appreciation	Dol. acre	60.00	60.00	60.00
High corn price ($1.27 per bushel):				
Gross sales	Dol. acre	140	140	140
Annual production costs[1]	Dol. acre	100	112	127
Annual net return before income taxes	Dol. acre	40	28	13
Rate of return on investment before income taxes	Percent	5.7	5.5	5.3
Income tax cost[2]	Dol. acre	6.00	3.20	.37
Annual net return on investment after income taxes	Dol. acre	34.00	24.00	12.63
Rate of return after income taxes	Percent	4.9	4.9	5.2
Decrease in rate of return due to income tax cost	Percent	.8	.6	.1
Low corn price ($1 per bushel):				
Gross sales	Dol. acre	110	110	110
Annual production cost	Dol. acre	100	112	127
Annual net return before income taxes	Dol. acre	10.00	-2.00	-17.00
Rate of return on investment before income taxes	Percent	1.4	-.4	-6.9
Income tax cost[2]	Dol. acre	0	0	0
Annual net return on investment after income taxes	Percent	1.4	-.4	-6.9
High corn price (1.27 per bushel):				
Rate of return on investment including capital appreciation:[3]				
5-percent equity appreciation	Percent	9.1	10.9	17.4
10-percent equity appreciation	Percent	13.4	16.8	29.6

[1] Includes repairs, depreciation, labor and management costs, State and local taxes, and interest on investment. No opportunity cost on equity included.

[2] Sole proprietorship and joint returns for a 500-acre unit assumed. $5,000 of deductions in addition to production expenses. No interaction assumed with prior or previous tax accounting periods.

[3] Annual returns with high corn price after income tax cost considered. No Federal tax on capital appreciation.

management. Income tax costs should be included, since the Federal income tax is progressive; that is, the larger the taxable income, the higher the tax rate and the total income tax cost. Risk exposure is an important concept. It is composed of (1) output (given a level of input), and product and input prices; and (2) business risks associated with firm growth.[10] Both of these components influence returns.

A hypothesized empirical example of return on equity for a corn production unit and several hypothesized rates of return on investment curves are presented. The empirical example is developed for a 500-acre unit. The investment returns curves show illustrative scale effects for units with one to 10 or more men.

[10] Some risk concepts are recognized in the hypothetical investment returns model in this section but quantitative considerations are not developed in the income, cost, and investment returns examples in following sections in part II. However, qualitative considerations are recognized in part V.

Empirical Model

In table 5, fixed and operating capital requirements, cost of production, and market price are shown. The rate of return on equity before and after Federal income tax payments are considered is presented for three equity levels and two risk outcomes. These outcomes are given as high and low corn prices of $1.27 and $1 a bushel.

In all three situations (100-, 70-, and 30-percent equity levels), with a high corn price, the rate of return on equity is positive both before and after income tax costs are considered. With a low corn price, the return is positive for the 100-percent equity situation but negative for the two lower equity situations. With a high corn price and after Federal income tax costs are considered, the rate of return on equity is highest when the percentage of equity is lowest. That is, the rate of return on investment decreases the most (from before-tax returns) for the 100-percent equity situation–5.7 to 4.9 percent. The

decrease is 5.5 to 4.9 percent for 70-percent equity and 5.3 to 5.2 percent for 30-percent equity. The decrease is greater for the 100-percent equity position since no interest cost is deductible; taxable income was lower for the other two situations because of deductions for interest costs.

In many farm investment situations, potential capital appreciation, particularly on real estate, is an important consideration. Financial leverage can accentuate the effect of capital appreciation. After capital appreciation of 10 percent, the rate of return on investment increased over 570 percent with 30-percent equity (from 5.2 to 29.6 percent) and only about 265 percent with 100-percent equity (from 4.9 to 13.4 percent) (table 5). With a 5-percent rate of capital appreciation, the rate of return on investment increased over 330 percent with 30-percent equity (from 5.2 to 17.4 percent) and about 185 percent with 100-percent equity (from 4.9 to 9.1 percent).

Curves Showing Rates of Return on Investment

Figure 3 presents hypothesized rates of return on

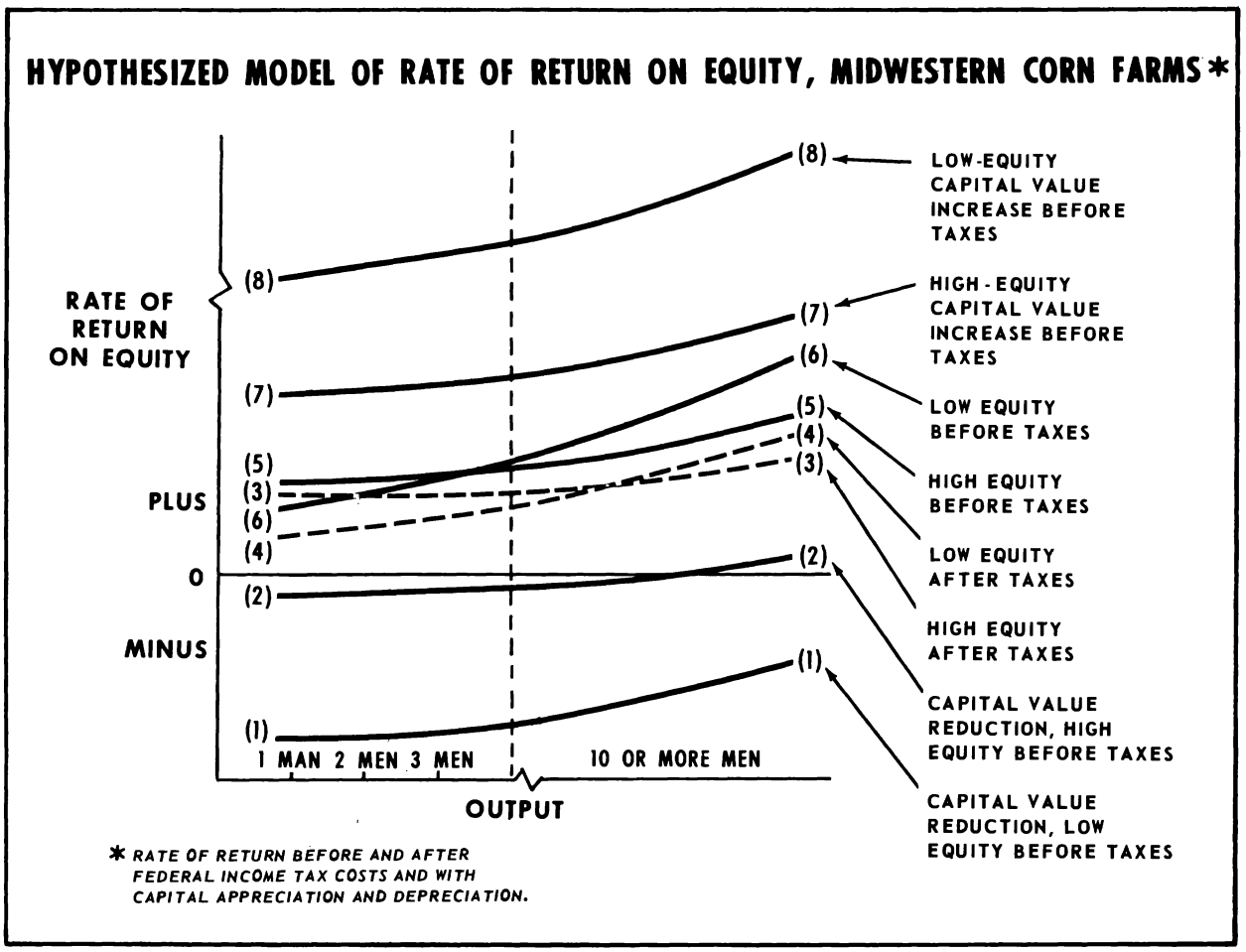

Figure 3.

investment for U.S. farms. Scale effects are considered. Assuming a constant corn price, the hypothesized rates of return on equity shown in curves 3 through 6 (those with no change in capital value) fall inbetween curves 1 and 2 and 7 and 8 (those with decrease and increase, respectively, in capital value).

When rates of return are calculated before income tax costs are considered, the increase is hypothesized to be greater with greater output for a low-equity situation (curve 6) than for a high-equity one (curve 5). This would be the outcome if larger firms generated a residual return that was greater than possible cost increases including interest on credit or an opportunity cost on equity.

Rates of return are expected to decrease when income tax costs are included along with scale considerations (curves 3 and 4 compared with curves 5 and 6). At the small-output level, the rate of return after income taxes is expected to be lower with low equity than with high equity. At the large-output level, the rate should be lower with high equity. The change in rates by size of firm is expected since at small-output and low-equity levels, interest costs must be paid and the tax rate is low. However, at the greater output level, the reduction in taxable income due to interest cost may more than offset the increase in income tax rates.

When capital value increase is considered (curves 7 and 8), the rate of return increases less with size for the high-equity situation than for the low-equity one. This would be the outcome if the various sizes of firms generated a residual return greater than an interest or opportunity cost. Buying and selling advantages at the large-size level can contribute to the greater residual at this level.

When capital value decrease is considered, the magnitude of negative return is expected to be greatest for a high-leverage situation (low equity). The rate of return is expected to increase with increasing size of firm for a high-equity situation (curve 2). In a low-equity situation, the rate of negative return is expected to be greater for the small compared with the large firm (curve 1). The rate of return is expected to increase (decrease in negative value) if the large firm is able to generate a larger residual income.

INPUTS, COSTS, AND INCOME FOR LARGE CORN FARMS

The hypothesized cost and investment return curves were based on the assumptions that large corn production units should be able to produce for less cost per unit of output, market for a higher price, and show a higher rate of return on investment compared with small corn production firms.

This section gives an indication of the competitive nature of corn production units of varying size by presenting data from farmers and input and marketing firm interviews. Emphasis is placed on those items where large farms have financial advantages over small farms. In addition, budgets and rates of return on investment are developed and are similar to those needed by prudent investors before they invest their money. The main points of comparison are with income and costs associated with the units of 500, 1,000, 2,000, and 5,000 acres of corn.[11]

Quantity, Quality, and Price of Inputs

Though some emphasis was placed on ascertaining the quantity and quality of physical inputs used by the interviewed farmers, complete enumeration was not undertaken for specific quantities of inputs used under various production circumstances. Physical quantities used in the budgets were obtained from agricultural production specialists and supplemented from data obtained in the farmer interviews. Though expected, little difficulty was encountered in obtaining specific corn production data from units that produced both corn and livestock. Corn production and marketing data was kept as a separate entity from livestock by the interviewed units; likewise, management and entrepreneurial overhead expenses were preallocated to crop production, livestock, and other nonfarm business interests, where applicable, by the units.

Many of the farms visited were on good but not always class I soils. The farms visited had average corn yields of 100 to 130 bushels per acre depending on the year and the quality of land. Some corn producers obtain higher average yields than the large units visited, through more exact timing of cultural practices. These units would usually be smaller than the ones visited during the study.

Prescriptions for the quantity of seed, crop chemicals, and fertilizer inputs can be essentially standardized for predetermined yield objectives in a given area and with a given soil quality. Machines can be purchased in various sizes and combinations to fit the available crop production land. Some internal econ-

[11] Budgets were not developed for units larger than 5,000 acres. Not enough units with over 5,000 acres in corn production were interviewed to develop solid judgment on costs and income. However, those units interviewed that were larger than 5,000 acres obtained nearly the same average input costs and market prices as the 5,000-acre unit did.

omies can occur through spreading labor and some machines over more acres. However, machines are not available in an infinite range of capacities. A total systems approach to corn production involving both physical and business inputs is commonly used to optimize entrepreneurs' objectives.

The human inputs—labor, supervision, and management, for example—varied in quality. According to data from the farmer interviews, larger units required more supervision per unit of output than did small farms where one or two people provided all the labor, supervision, and management. However, larger machines allowed the biggest of the large units to spread labor and supervision over more units of output than did smaller machines. The large units controlled more dollars of assets and thus could pay higher rates for labor, supervision, and management. These rates tended to increase with size and enabled the large units to employ higher quality workers.

Based on farmer interviews, large corn production units have a major opportunity to reduce costs by purchasing enough inputs to get inputs for volume discounts. They can negotiate directly with the manufacturer, jobber, or distributor of such items as fertilizer, seeds, crop chemicals, petroleum products, machinery, equipment, and parts. This method of purchasing often involves obtaining bids from suppliers. Direct purchasing can substantially reduce or eliminate distributor and dealer margins which are added on to purchase prices. Some farmers in the 2,000- to 3,000-acre range operated a dealership or retail sales unit to increase their input purchases to a level where greater discounts could be obtained from the manufacturer, jobber, or distributor. Units with 5,000 or more acres of row crops did not need to do this to obtain near-maximum discounts. Integrated firms reduce or eliminate middlemen's margins when the input firm supplies some or all of its own purchased inputs for the farm firms' production. For almost all purchased inputs, discounts appeared to increase with size of farm unit. Producers of 500 acres of corn did not appear to pay the full dealer retail list price on most of their purchased inputs.

There was a wide range in discounts achieved on various items. Not all large units attempted to achieve maximum discounts. Often, the level of service provided and exchange policies were important in determining input prices. Some hired managers were given certain purchase and sales authority, but were not encouraged to obtain the maximum discounts if such efforts might contribute to an adverse local image. The nature of competition between input suppliers in a trade territory also affected discounts that farmers could obtain.

Table 6 summarizes the magnitude of discounts that farmers with 1,000 or more acres of corn actually received on several important inputs used in 1969 and 1970 corn production. Average size of the 28 medium-sized farms was 2,502 crop acres, with 1,692 acres in corn. Data for the largest farms are broken out into those obtaining the "greatest" and the "smallest" discounts. The ratio of average crop acres to corn acres did not appear to differ significantly for these farms. The average size of the largest farms receiving the smallest discounts was 3,811 crop acres with 2,610 acres in corn; for those receiving the greatest discounts, it was 4,527 crop acres with 3,083 acres in corn.

Single-cross corn seed was often priced at $25 retail per bushel for medium-sized flats. However, very few farmers actually paid this price. The medium-sized farms averaged $20.01 and the greatest-discount farms, $19.41. The lowest price paid by the largest farms was $16.20 a bushel. One manager who bought only one brand and variety of seed for over 5,000 acres of corn paid about $13 a bushel. This included small-seed sizes. New planters, which will handle any size seed without necessitating a change of plates, increase buying flexibility.

Fertilizer, a major cost item in corn production, was purchased for major discounts by large farms. In the case of anhydrous ammonia (NH_3), the greatest-discount large farms paid $38 to $50 a ton, and the medium-sized farms paid $43.10 to $70. The greatest-discount large farms paid an average of $59 a ton for P_2O_5 while the medium-sized farms averaged $64.10. For K_2O, the greatest-discount large farms paid an average of $36 a ton and the medium-sized farms, $41.15.

The lowest quotation on anhydrous ammonia was $33 a ton f.o.b., with the plant about 130 miles from the farm. The manager estimated the hauling cost at $5 a ton. All of the units with 4,000 or more acres of corn bought anhydrous for $40 a ton or less, delivered in semitruck tank loads. The 2,000-acre units that bought for this price resold anhydrous to neighbors.

In recent years, crop chemicals have become more important in corn production. The medium-sized farms paid an average price of $2.03 a pound for atrazine; and the greatest-discount large farms averaged $1.96 a pound.

The 48 farmers interviewed used both gasoline- and diesel-powered engines and obtained substantial discounts on fuel for each. The maximum price discounts for number 2 diesel fuel were possible by buying on an annual bid basis in about 3,000-gallon-load delivery amounts. The greatest-discount large

Table 6.–Range and average prices of selected inputs, corn farms with 1,000 acres or more, Corn Belt, 1969-70

Item	Unit	Medium-sized farms			Large farms					
		Average, 28 farms	Range		Smallest-discount average, 10 farms[1]	Range		Greatest-discount average, 10 farms[1]	Range	
			Low	High		Low	High		Low	High
Total crop acres	Acre	2,502	1,400	3,170	3,811	2,400	8,400	4,527	2,450	6,100
Acres of corn	do.	1,692	1,000	2,350	2,610	1,254	8,000	3,083	1,700	5,300
Seed	Dollars/bushel	20.01	17.50	25.50	21.24	19.00	24.00	19.41	16.20	25.00
Fertilizer:										
NH_3	Dollars/ton	52.62	43.10	70.00	45.35	40.00	60.00	42.83	38.00	50.00
P_2O_5	do.	64.10	60.00	68.00	65.00	—	—	59.00	58.00	60.00
K_2O_5	do.	41.15	38.00	45.60	38.40	30.00	48.00	36.00	33.00	38.00
Atrazine	Dollars/pound	2.03	2.00	2.05	2.12	2.00	2.25	1.96	1.92	2.00
Fuel:										
Diesel	Dollars/gallon	.162	.133	.190	.155	.110	.179	.117	.100	.130
Gasoline	do.	.192	.172	.220	.172	.130	.180	.144	.123	.190
Machinery repairs	Percentage discount	10	0	15	17	0	30	23	10	30
Machinery	Percentage over dealer invoice	8	5	15	6.6	3	15	.5	10	-10
Interest (short and intermediate term)	Percent	7.7	7	8	8.5	8	9.5	8.3	7.5	9.0
Labor and supervision:										
Foreman	Dollars/month	931	600	1,200	400	450	600	538	430	650
Full-time labor	do.	466	300	800	378	403	425	390	300	450
Part-time labor	Dollars/hour	1.75	1.30	2.50	1.83	1.50	2.00	1.57	1.40	1.60

[1] All farm operators did not respond on each input item. 1969 prices represent an average year-round price; 1970 prices represent only spring prices. 1969 prices were obtained during interviews with the farm operators; 1970 prices were obtained from a mail survey of the same operators and are averaged in the table.

farms paid $.100 to $.130 a gallon for diesel fuel and the medium-sized farms paid $.133 to $.190. The average price paid for gasoline was $.192 a gallon for medium-sized farms and $.144 for the greatest-discount large farms.

For machinery and machinery repairs, the greatest-discount large farms purchased new machinery for 0.5 percent over dealer invoice cost, the smallest-discount large farms for 6.6 percent, and the medium-sized farms for 8 percent. Some of the large farms obtained machinery in large quantities for up to 10 percent less than dealer invoice price.

It has been relatively easy for a large-unit manager to obtain a "gentlemen's agreement" from a machinery dealer to buy anything he needs for 3 to 5 percent over dealer invoice. Buying at dealer cost requires disposing of used machines, perhaps by auction, and then buying a complete complement of new machines on a bid basis from a major manufacturer or dealer.

The largest farms purchased machinery repair parts for discounts up to 30 percent from retail price. These units generally dealt with several suppliers, and discounts were not uniform for various items, even from the same supplier. Some of the large units had entered into "service contracts" with a manufacturer who provided parts for 25 percent less than retail price and permitted the farmers to perform their own warranty repair.

Historically, interest rates have been lower for large units compared with family-labor-sized farms. However, interest rates increased more for large units—in 1969 and 1970. Ceilings imposed by some State usury laws have favored small unincorporated individuals, provided lenders were willing to loan at or under the usury ceilings. Lenders were able to avoid State usury laws when lending to corporations, which these laws do not cover, and have obtained a higher rate than when lending to individuals. In some cases, lenders are entering into profit-sharing arrangements with corporations engaged in farming. At times, large farm corporations have borrowed from large banks in the cities or have turned directly to equity markets.

The medium-sized units paid an average interest rate of 7.7 percent for short- and intermediate-term credit. The large units averaged 8.3 to 8.5 percent, with some paying up to 9.0 percent.

Labor and foreman wage rates showed a wide range for the medium-sized farms that were interviewed. They paid $300 to $800 a month for full-time labor, with an average of $466. The largest units paid $300 to $450 a month. The average foreman rate was $931 a month for the medium-sized units, $538 for the greatest-discount large units, and $400 for the smallest-discount large units.

Wage rates quoted for labor and foremen can be expected to show wide variation since they usually are related to individual job responsibility and to fringe benefits such as housing insurance and retirement programs. Benefits range from none to extensive. In addition, wide variation exists in the quality of labor employed. Some people classified as foremen were actually assuming many overall management responsibilities. Large farms generally hire management and supervision in a competitive wage market. Family-labor-sized units continue to be able to employ family members at no salary or at least at a salary that is negotiated within the family.

Selling Advantages

The ability of large corn units to obtain a higher net price for corn sold depends on eliminating some of the traditional marketing steps and resulting costs or selling to a special higher priced market. Contract production is used by some large units to increase price. The contract specifies time, quality, and quantity dimensions, any one or all of which can command a higher price. The need for and costs of middlemen handlers are eliminated, and production, handling, and processing of the products is prescheduled for greater efficiency. Obtaining a higher net price for corn sold is also possible when the marketing firm owns the farm producing unit or the unit owns the firm. At each stage in traditional marketing and processing, costs and potential value increase, but costs do not necessarily increase as much as prices if the system has been organized efficiently at all levels.

Operators of large corn farms have apparently become interested in corn marketing businesses, which they operate during the winter. In this season, full-time labor and tandem trucks used during harvest are idle and have a near-zero opportunity cost. Operators' involvement in grain handling, including custom hire, only incurs the variable out-of-pocket costs for fuel, repairs, and so on. Large corn units appear to need modern handling, drying, and storage facilities for their own corn and they also must be capable of selling their own production direct to a user or to an outlet that pays higher prices for corn than local outlets did. This situation creates and reinforces the operators' incentives to become grain dealers and haulers.

Business activities involving corn production that is integrated or coordinated with input or marketing firms help extend the capacity of "good managers" to reduce production costs and increase the potential for selling at a higher net price. The variability of price and risk in both buying and selling is thought to be

reduced. At the same time, the need for management expertise increases and more concern must be given to the organization and supervision of hired labor. Advantages are enhanced for expert managers while disadvantages increase for those with inadequate skills.

Based on the interviews with large farm firms, managers with a large quantity of corn to market could apparently stay in constant contact with potential market outlets. The larger the volume to be sold regularly, the better the potential for a higher annual average price. Large farm firms move products rapidly to any location in the general trading area with the most favorable price, after adjusting for transportation and handling costs. As a result, these firms obtain a higher price. Also, volume buyers are attracted to volume sellers.

The incentive to use the futures market to hedge sales or to sell for future delivery was greater for large versus family-sized units. Technically, managers of small units can also hedge sales but they are generally relatively uninformed, and at the volumes handled, the potential gains may not be as great as they would be from other uses of the managers' time. But a one-half-cent price increase per bushel on 500,000 bushels means $2,500 to the large unit.

Midwestern corn production units of 500 or more acres generally did not deliver corn directly from field harvest to market outlets. Processing facilities on or owned by the farm were used to remove excess moisture. Such facilities are common if the corn is not to be fed to livestock on the farm.

Large units and particularly units with 300,000 or more bushels of corn to market generally bypassed local market outlets. They marketed directly to a terminal or to large-volume users.

Estimated Cost and Income Budgets

Of farms in the ASCS commodity program, only three had over 4,000 acres of corn and only 48 had between 2,000 and 4,000 acres of corn in 1969 (app. table 2). When corn and grain sorghum were combined, the number of units was 16 and 159, respectively. However, many large feed grain units did not appear to participate in the ASCS program.

The estimated budgets for the four sizes of corn farms studied are based on inputs, costs, and market prices obtained from the farmer, input firm, and marketing firm interviews. The 500-acre corn production unit is used for comparison purposes since about 500 acres of corn are thought to comprise a viable one-family farm unit. The 500-acre unit was assumed to be operated by one man and his family. The 1,000-acre unit would be handled in a partnership by two farm families. The larger units, 2,000 and 5,000 acres, were considered as corporations with hired labor and management.

Organizational and management ability on the farms studied appeared equivalent to that on the top quarter of all class I farms. All of the managers interviewed, including those on similar-sized units, did not use the same quantity of inputs per acre or obtain the same amount of discount on their purchased inputs. Also, marketing practices varied considerably. Thus, the cost, income, and investment returns budgets represent estimated average levels of accomplishment which can be achieved by managers and business entrepreneurs. Considerable effort was expended to try to develop consistency in assumptions for the farm sizes considered. Perhaps the top 50 percent of producers with 1,000 or more acres of corn could achieve the results shown in the budgets if their production and financial objectives are similar to those assumed in these budgets.[12]

All cropland was assumed to be owned by the farm firm. The percentage of operated land owned actually varied considerably for the farms interviewed. Land was valued at $500 an acre; the opportunity cost was 7.5-percent interest for an annual use cost of $37.50 per acre per year, plus an added $5 per acre in real estate and personal property taxes. This opportunity

[12] Input suppliers acknowledge that the magnitude of input cost relations used in these budgets for large farms are currently possible. However, they counsel that the relative prices may not be maintained in the long run. To obtain the 30-percent equity level indicated in the plans, large farm units would need to obtain financing from other than traditional farm lenders. In recent years, the production capacity of nitrogen producers has been greater than that needed for relatively high-retail-priced nitrogen. Thus, large units have been able to bargain for low nitrogen prices. In the future, large production units may pay prices nearly equal to those paid by smaller units. Farm machinery manufacturers or dealers or both have sold new machines to large farmers at or below dealer invoice cost. In the future, such selling practices may not be necessary to attract purchases by large units.

Each large-farm situation is different and thus no one farm firm can be expected to exactly duplicate the input and outcome shown in the feasibility plans. Each firm has a different combination of land quality and climate, access to machines and machine services, and labor and management. Specific budgets would be required for each individual firm and owner if the objective were to suggest firm operations to maximize the owner's objectives in light of his resources. Farm firms with no nonfarm interests may have different operational objectives and needs from those of commonly owned farm and nonfarm firms. For example, a commonly owned farm firm may find greater returns potentials or lower risk exposure in certain nonfarm activities than it was encountering in attempting to maximize shortrun returns in the farm business.

cost plus the tax cost equaled a cash rent of $42.50 per acre per year for land producing 110 bushels of corn.

Farm firms seldom operate with 100-percent equity in all assets or with no equity in any of the assets used in the business. The interest rates used to develop the variable and fixed corn production costs were 7.5 percent for real estate for all four sizes of firms. The rates of short- and intermediate-term investments were 8 percent for the 500- and 1,000-acre units and 9 percent for the 2,000- and 5,000-acre units. The interest rate levels represent realistic opportunity costs on equity investment and approximate the current credit rates for short-, intermediate-, and long-term loans. For short periods of time, interest rates have been higher than the rates used. However, most of the large units obtained their real estate loans several years ago and their average rate, including any new borrowing, was lower than currently quoted longterm interest rates.

Management costs were increased from $5 an hour on the small unit to $6 an hour on the 1,000- and 2,000-acre units, and $7 an hour on the 5,000-acre unit. These rates include the cost for supervisory foremen and office help. The increase from $5 to $7 allows for a higher level of skill and increased responsibility.

Labor costs, including fringe benefits, increased from $1.82 an acre for the 500-acre unit to $2.34 for the 5,000-acre unit. The increasing labor costs were assumed to account for the added competence and skill that laborers needed to operate the larger machines and to effectively serve as team members of a larger farm labor force. Also, lower priced labor may lack proper motivation to work effectively on large units.

An average yield level of 110 bushels of corn per acre was assumed for each of the four sizes of units. Similarly, the same quantity and quality of seed, crop chemical, and fertilizer input used were assumed by each size.

The feasibility budgets were based on inputs of one-third bushel of single-cross seed corn and fertilizer applications per acre of 50 pounds of 9-27-3 starter, 200 pounds of anhydrous ammonia, 70 pounds of K_2O, and 50 pounds of P_2O_5 (table 7). One-third ton annually of 80-percent calcium carbonate equivalent was included as a maintenance requirement. It would be applied every 3 or 4 years. Three pounds of atrazine were used per acre for weed control. Every third year, 3 pounds of aldrin would be needed for insect control. Seventeen gallons of diesel fuel and 3 gallons of gasoline per acre were

Table 7.–Estimated physical, labor, and management inputs required on corn production units of 500, 1,000, 2,000, and 5,000 acres, Corn Belt, 1969-70

Item	Unit	Quantity per acre	Quantity per unit with–			
			500 acres	1,000 acres	2,000 acres	5,000 acres
Seed	Bushel	0.33	167	334	667	1,667
Fertilizer:						
9-27-3 (starter)	Pound	50				
9-27-3 (starter)	Ton		12.5	25	50	125
NH_3	Pound	200				
NH_3	Ton		50	100	200	500
P_2O_5	Pound	50				
P_2O_5	Ton		12.5	25	50	125
K_2O	Pound	70				
K_2O	Ton		17.5	35	70	175
Limestone (80-percent calcium carbonate equivalent)	Ton	0.33	167.0	333.0	667.0	1,667
Herbicide (Atrazine)	Pound	3	1,500	3,000	6,000	15,000
Insecticide (Aldrin–every 3d year)	do.	3	500	1,000	2,000	5,000
Fuel, oil, and grease:						
Diesel fuel	Gallon	17	8,500	17,000	34,000	85,000
Gas	do.	3	1,500	3,000	6,000	15,000
Machinery repairs	Dollar	3.75	1,875	3,750	7,500	18,750
Labor	Hour	3.5	1,750	3,500	7,000	17,500
Management	do.	1.0	500	1,000	2,000	5,000

Table 8.–Estimated crop production machinery complement specifying size, quantity, and suggested dealers' list prices for corn production units of 500, 1,000, 2,000, and 5,000 acres, Corn Belt, 1969-70

Item	Size of item	500 acres		1,000 acres		2,000 acres		5,000 acres	
		Quantity	Price[1]	Quantity	Price[1]	Quantity	Price[1]	Quantity	Price[1]
		Number	*Dollars*	*Number*	*Dollars*	*Number*	*Dollars*	*Number*	*Dollars*
Tractors	116-140 hp.	0	0	1	11,955	2	23,910	5	59,775
	76-95 hp.	1	9,227	2	18,454	3	27,681	7	64,589
	45-50 hp.	1	7,000	0	0	0	0	1	7,000
Plows	6 bottom	0	0	1	2,818	2	5,636	5	14,090
	5 bottom	1	2,200	0	0	0	0	0	0
Disks	22 ft.	0	0	1	2,943	2	5,886	5	14,715
	16 ft.	1	1,800	0	0	0	0	0	0
Planters	12 row	0	0	1	6,276	2	12,552	5	31,380
	6 row	1	2,600	0	0	0	0	0	0
Cultivators	12 row	0	0	1	2,523	2	5,046	5	12,615
	6 row	1	1,500	0	0	0	0	0	0
Rotary hoes	24 ft.	0	0	1	2,071	2	4,142	4	8,284
Harrows	16 ft.	1	350	0	0	0	0	0	0
Combines	6 row	0	0	1	20,942	2	41,884	4	83,768
	3 row	1	13,000	0	0	0	0	0	0
Trucks	300 bu.	0	0	1	5,000	1	5,500	0	0
With tandem axle	500 bu.[2]	0	0	0	0	0	0	2	20,000
Pickups	Ton	1	3,000	1	3,000	1	3,000	2	6,000
Wagons	300 bu.	2	2,506	2	2,506	4	5,012	8	10,024
Fertilizer spreaders		0	0	0	0	1	1,500	2	3,000
Field sprayers	12 row	1	1,000	1	1,500	1	1,500	3	4,500
Small tools		[3]	1,000	[3]	2,000	[3]	3,000	[3]	5,000
Total list price			45,183		81,988		146,249		344,740
List price per acre			90.37		81.99		73.12		68.95

[1] Suggested dealer list price.

[2] Used for marketing as well as production. The truck used on the 2,000-acre unit has a tandem axle that accounts for the cost of $500 more than that for the 1,000-acre unit.

[3] Assorted amounts.

included in costs. The labor input was figured at 3.5 hours an acre for all units; and the management input, including supervision, was calculated at 1 hour an acre. The management input differed in quantity and quality by size of unit.

The number and size of machines and equipment used varied by size of unit (table 8). For instance, a 140-horsepower tractor was too large to establish an optimum machinery system on the 500-acre unit but could be used on the larger units. (Weather conditions were assumed to permit fieldwork 50 percent of the workdays.) The machinery and equipment complement was considered to be designed to follow conventional tillage practices of plowing, disking, planting, rotary hoeing, and cultivating, with supplemental chemical weed and insect control. Fertilizer application was custom hired on the 500- and 1,000-acre units; application was performed by the farm firm on the other two units. Crop chemical application was performed by the farm firm on each size of unit. All corn was harvested with a combine. Trucks were considered owned by all units except the 500-acre unit and are included in production equipment. However, they were also used to transport corn to market.

Because of use of larger and more efficient machines and greater volume discounts, the 5,000-acre unit was able to obtain an average new machinery and equipment investment at suggested dealers' list price of $68.95 an acre. The 500-acre unit had an investment of $90.37 an acre (table 9).

Dealer markup to establish list price typically was about 23 percent. In addition, large-volume dealers obtained approximately a 6-percent rebate on their total dollar purchases from the manufacturer at the end of the accounting year. The 5,000-acre unit, when purchasing all new machines and equipment at once, was able to buy at dealer cost, thus leaving the dealer with the 6-percent rebate. Farm units at each

Table 9.–Total and per acre estimated machinery cost before and after dealer markup, discount, dealer handling and transportation costs, and sales tax for corn production units of 500, 1,000, 2,000, and 5,000 acres, Corn Belt, 1969-70

Item	500 acres	1,000 acres	2,000 acres	5,000 acres
			Percent	
Dealer markup obtained from farmer	16.9	10.3	3.9	0.0
Approximate dealer rebate from manufacturer	6.0	6.0	6.0	6.0
Farmer's discount from retail list price	10.0	15.0	20.0	23.0
			Dollars	
Manufacturer's list price before dealer handling and transportation costs and sales tax:				
Total	45,183	81,988	146,249	344,740
Per acre	90.37	81.99	73.12	68.95
Farmer's discount from list price	4,518	12,298	29,250	79,290
Cost to farmer after discount	40,665	69,690	116,999	265,450
Cost to farmer for dealer handling and transportation (4 percent)	1,627	2,788	4,680	10,618
Sales tax (3 percent)	1,269	2,174	3,650	7,645
Total cost to farmer	43,561	74,652	125,329	283,713
Actual average investment per acre	87.12	74.65	62.66	56.74
Yearly depreciation per acre[1]	13.07	11.20	9.40	8.51
Reduction in annual machinery cost (per acre)	0	1.87	3.67	4.56

[1] 15 percent yearly, 60 percent for 4 years.

Table 10.–Retail cost and discounts for purchased physical inputs, and costs for labor and management on corn production units of 500, 1,000, 2,000, and 5,000 acres, Corn Belt, 1969-70

Item	Unit	Retail price for 500-acre unit	Discount from price paid by 500-acre unit for units of–			Retail price per input for units of–		
			1,000 acres	2,000 acres	5,000 acres	1,000 acres	2,000 acres	5,000 acres
			Percent			*Dollars*		
Seed:	Bushel	22.40	10	20	25	20.16	17.92	16.80
Fertilizer:								
NH_3	Pound	.0275	7	15	25	.0256	.0234	.0206
P_2O_5	do.	.097	7	15	20	.09	.082	.078
K_2O	do.	.043	7	15	20	.04	.036	.034
9-27-3 (starter)	do.	.043	7	15	20	.04	.036	.034
Herbicide (Atrazine)	Pound	2.45	10	15	20	2.20	2.082	1.96
Insecticide (Aldrin)	do.	1.60	10	15	20	1.44	1.36	1.28
Fuel, oil, and grease:[1]								
Diesel fuel	Gallon	.17	10	20	25	.153	.136	.128
Gasoline	do.	.19	7	15	22	.177	.162	.148
Machinery repair parts:	Acres	3.75	0	5	10	3.75	3.56	3.38
Labor:								
Wages	Hour	1.40	[2]	[2]	[2]	1.50	1.70	1.80
Fringe benefits	do.	.42	[2]	[2]	[2]	.45	.51	.54
Total		1.82	[2]	[2]	[2]	1.95	2.21	2.34
Management:	do.	5.00	[2]	[2]	[2]	6.00	6.00	7.00

[1] Oil and grease were included at 15 percent of fuel cost.

[2] Not applicable.

size level could expect to pay dealer handling and transportation costs and sales tax.

After all discounts and additions for transportation, sales tax, and so on, were accounted for, the 5,000-acre unit was able to obtain machinery at an average per acre cost of $56.74, compared with $87.12 for the 500-acre unit. When depreciation was calculated at 15 percent a year for 4 years and salvage value was estimated at 40 percent, the 500-acre unit had an annual cost of $13.07 and the 5,000-acre unit, $8.51, a difference of $4.56 per acre per year. All machines for each size of unit were assumed to depreciate at the same rate.

Large units also obtained a discount on machinery repair parts (table 10). These parts were estimated to cost $3.75 an acre for the 500-acre unit and to decrease 10 percent to $3.38 for the 5,000-acre unit.

Higher costs for labor and management partially offset reductions for other inputs. Purchased physical input costs in the budgets were compared on the basis of before-interest cost. Compared with the 500-acre unit, the 5,000-acre unit was able to obtain the inputs

Table 11.–Estimated cost per acre for seed, chemicals, petroleum products, machinery repairs, depreciation, and reduction in cost per acre on corn production units of 500, 1,000, 2,000, and 5,000 acres, Corn Belt, 1969-70

Item	Dollar cost per acre for units of–				Reduction in cost per acre for units of–		
	500 acres	1,000 acres	2,000 acres	5,000 acres	1,000 acres	2,000 acres	5,000 acres
	Dollars						
Seed	7.44	6.72	5.97	5.60	0.72	1.47	1.84
Fertilizer:							
NH_3	5.50	5.11	4.67	4.13	.39	.83	1.37
P_2O_5	4.85	4.50	4.10	3.90	.35	.75	.95
K_2O	3.01	2.80	2.59	2.24	.21	.42	.77
9-27-3 (Starter)	2.15	2.00	1.83	1.72	.15	.32	.43
Subtotal	15.51	14.41	13.19	11.99	1.10	2.32	3.52
Limestone	1.50	1.50	1.50	1.50	–	–	–
Crop chemicals:							
Herbicide (Atrazine)	7.35	6.62	6.25	5.88	.73	1.10	1.47
Insecticide (Aldrin)	1.60	1.44	1.36	1.28	.16	.24	.32
Subtotal	8.95	8.06	7.61	7.16	.89	1.34	1.79
Fuel, oil, and grease:							
Diesel fuel	2.89	2.60	2.31	2.17	.29	.58	.72
Gas	.57	.53	.49	.44	.04	.08	.13
Oil and grease	.52	.48	.42	.39	.04	.10	.13
Subtotal	3.98	3.61	3.22	3.00	.37	.76	.98
Machinery repair parts	3.75	3.75	3.56	3.38	–	.19	.37
Miscellaneous[1]	1.50	1.50	1.50	1.50	–	–	–
Total cash costs	42.63	39.55	36.55	34.13	3.08	6.08	8.50
Machinery depreciation[2]	13.07	11.20	9.40	8.51	1.87	3.67	4.56
					Increase in cost per acre		
Labor	6.37	6.82	7.73	8.19	0.45	1.36	1.82
Management	5.00	6.00	6.00	7.00	1.00	1.00	2.00
Total reduction in annual cost after increased labor cost and management costs are deducted					*Reduction in cost per acre* 3.50	7.39	9.24

[1] Includes the following cost items: telephone, legal and hired accounting services, magazines and books, attendance at farm business conferences, farm share of an automobile (for the 500- and 1,000-acre units), and farm business liability insurance.

[2] Includes property insurance cost.

for $9.24 an acre less, the 2,000-acre unit for $7.39 less, and the 1,000-acre unit, for $3.50 less (table 11). Machinery depreciation was the largest cost reduction item, followed by fertilizer, seed, crop chemicals, petroleum products, and machinery repair parts.

Crop storage costs and some of the marketing costs and income were calculated separately from production. In fixed and variable drying and storage costs, 5,000-acre units should save a minimum of $0.012 a bushel over costs for 500-acre units (table 12). The 5,000-acre unit incurred additional variable costs of about $4.40 an acre ($0.04 a bushel) to negotiate marketing opportunities and transport corn to outlets outside the local community. However, the market price was thought to be $0.08 a bushel higher than that received by the 500-acre unit, thus providing a $0.052 profit spread.

The three smallest units were assumed to obtain an average selling price of $1.10 a bushel for 110 bushels per acre of number 2 yellow corn. The 5,000-acre unit obtained $1.18 a bushel for terminal delivery of the corn. After all drying, storage, and transportation costs were deducted, the 5,000-acre unit received $1.074 a bushel and the 500-acre unit, $1.022. In total, the 5,000-acre unit was thought to obtain an estimated net marketing advantage of $5.72 an acre compared with the 500-acre unit.

Total Costs and Income Before Considering Federal Income Tax Costs

Costs and income without an opportunity cost.– Costs and income are shown for the four sizes of units with 100-percent equity assumed in all investment and no opportunity cost for investment, unpaid labor, or management (table 13). The cost per bushel of production was lowest for the 1,000-acre unit, $0.59; and highest for the 5,000-acre unit, $0.69. The higher cost for the 5,000-acre unit includes $0.04 per bushel transportation charges to a terminal market.

Net returns per acre to unpaid labor, management, and investment in the business, as traditionally calculated, were highest for the 1,000-acre unit at $56.11 an acre and lowest for the 2,000-acre unit, $47.62. In this type of comparison, the net income for the 2,000- and 5,000-acre units is reduced by the amount of labor and management costs. These costs were not considered for the 500- and 1,000-acre units which have one or two men who worked as unpaid family members.

Costs and income with an opportunity cost.– When family labor and management valued at $11.37 and $12.82 an acre, respectively, were included for the 500- and 1,000-acre units, costs

Table 12.–Estimated drying, storage, and marketing costs per bushel and acre for corn production units of 500, 1,000, 2,000, and 5,000 acres, Corn Belt, 1969-70

Item	Marketing costs and advantages							
	Per bushel on units of–				Per acre on units of–			
	500 acres	1,000 acres	2,000 acres	5,000 acres[1]	500 acres	1,000 acres	2,000 acres	5,000 acres[1]
	Dollars				*Dollars*			
Drying and storage cost[2]:								
Variable	0.038	0.036	0.034	0.032	4.18	3.96	3.74	3.52
Fixed	0.040	0.038	0.036	0.034	4.40	4.18	3.96	3.74
Subtotal	0.078	0.074	0.070	0.066	8.58	8.14	7.70	7.26
Transportation[3]	0	0	0	0.04	0	0	0	4.40
Total costs	0.078	0.074	0.070	0.106	8.58	8.14	7.70	11.66
Sale price[4]	1.10	1.10	1.10	1.18	121.00	121.00	121.00	129.80
Net price after above costs deducted	1.022	1.026	1.03	1.074	112.42	112.86	113.30	118.14
Net marketing advantage over 500-acre unit after above costs deducted	0	0.004	0.008	0.052	0	0.44	0.88	5.72

[1] Only the 5,000-acre unit is assumed to have sufficient volume to market outside the local trade territory.
[2] Assumes 10 percentage points of moisture removed and includes all costs including property insurance.
[3] Included with production costs for local marketing.
[4] For 110 bushels per acre of number 2 yellow corn. Costs in addition to that for transportation are included in production cost budgets to obtain the $1.18 selling price for the 5,000-acre unit. The added costs include the overall higher level of management and long-distance communications for this unit.

Table 13.–Estimated costs, income, and returns with 100-percent equity before and after an opportunity cost for unpaid family labor and management on corn production units of 500, 1,000, 2,000, and 5,000 acres, Corn Belt, 1969-70

Item	500 acres	1,000 acres	2,000 acres	5,000 acres
	Dollars per acre			
Gross income per acre	121.00	121.00	121.00	129.80
Variable costs:				
Production	42.63	39.55	36.55	34.13
Drying and storage	4.18	3.96	3.74	3.52
Transportation to terminal	0	0	0	4.40
Hired labor and management[1]	0	0	13.73	15.19
Subtotal	46.81	43.51	54.02	57.24
Fixed costs:				
Machinery depreciation	13.07	11.20	9.40	8.51
Drying, storage, and real estate depreciation[2]	5.40	5.18	4.96	4.74
Real estate and personal property taxes	5.00	5.00	5.00	5.00
Subtotal	23.47	21.38	19.36	18.25
Total cost	70.28	64.89	73.38	75.49
Net income per acre to unpaid labor, management, and investment on the 500- and 1,000-acre units and to investment on the 2,000- and 5,000-acre units	50.72	56.11	47.62	54.31
Cost per bushel	.64	.59	.67	.69
Total cost including opportunity cost on equity[3]	81.65	77.79	73.38	75.49
Net investment income per acre after deducting opportunity cost on equity[3]	39.35	43.29	47.62	54.31
Cost per bushel	.74	.71	.67	.69

[1] A sole proprietorship form of business organization is assumed for the 500-acre unit and a partnership for the 1,000-acre unit; labor and management costs for both units are included as opportunity cost. A subchapter C corporation form of business organization is assumed for the 2,000- and 5,000-acre units; labor and management costs for both units are cash cost items to the business.

[2] Includes property insurance cost.

[3] For the 500- and 1,000-acre units, the opportunity cost on unpaid family labor and management is included.

increased and the net income per acre decreased. With these costs included, the 2,000-acre and 5,000-acre units had lower costs and higher net returns to investment and entrepreneurship compared with the 500- and 1,000-acre units (table 14).

When an opportunity cost on all investment, labor, and management was added, the cost per bushel was the lowest at $1.06 for the 2,000-acre unit, and the highest at $1.14 for the 500-acre unit. However, the 5,000-acre unit has the lowest cost–$1.036–if its extra terminal marketing costs are omitted (table 14).

Net income per acre (return to entrepreneurship) claimed the residual after all direct costs and an opportunity cost were accounted for. The lowest net income per acre was -$4.51 for the 500-acre unit, and the highest was $11.43 for the 5,000-acre unit. The total difference was estimated at $15.94 an acre.

When interest and opportunity cost rates were used (7.5 percent for real estate, 8 percent for short- and intermediate-term interest on the 500- and 1,000-acre units, and 9 percent for short- and intermediate-term interest on the 2,000- and 5,000-acre units), the owners of each size of unit received the stated opportunity rate of return on equity investment whether they held 30- or 100-percent equity in the assets (tables 13 to 15). The return to entrepreneurship was positive for only the largest three sizes of units. However, the 500-acre unit, with a -$4.51 entrepreneurial return, can be considered a successful unit if the owner-operator is willing to accept a lower (1) labor wage, (2) management wage, or (3) opportunity rate on investment.

Federal Income Tax Costs

Federal income tax costs can become a major cost or cash withdrawal item for the four sizes of corn production units and for the profitability levels

Table 14.–Estimated costs, income, and returns after inclusion of an opportunity cost on investment, labor, and management on corn production units of 500, 1,000, 2,000, and 5,000 acres, Corn Belt, 1969-70

Item	500 acres	1,000 acres	2,000 acres	5,000 acres
	Dollars per acre			
Gross income per acre	121.00	121.00	121.00	129.80
Total cost before opportunity cost is added	70.28	64.89	73.38	75.49
Additions for opportunity cost:[1]				
Variable costs:				
Interest on production	2.87	2.72	2.87	2.82
Labor and management[2]	11.37	12.82	0	0
Subtotal	14.24	15.54	2.87	2.82
Fixed costs:				
Interest on machinery investment	3.49	2.99	2.82	2.56
Interest on real estate	37.50	37.50	37.50	37.50
Subtotal	40.99	40.49	40.32	40.06
Total opportunity cost	55.23	56.03	43.19	42.88
Total cost	125.51	120.92	116.57	118.37
Net income per acre (return to entrepreneurship)[3]	-4.51	.08	4.43	11.43
Cost per bushel	1.14	1.10	1.06	[4] 1.08

[1] Interest on short- and intermediate-term investment was calculated at 8 percent for 500- and 1,000-acre units and at 9 percent for 2,000- and 5,000-acre units. Interest on real estate was calculated at 7.5 percent for all sizes of units.

[2] A sole proprietorship form of business organization is assumed for the 500-acre unit and a partnership for the 1,000-acre unit; labor and management costs for both units are included as opportunity cost. A subchapter C corporation form of business organization is assumed for the 2,000- and 5,000-acre units; labor and management costs for both units are cash cost items to the business. Unpaid family labor and management would receive $5,685 for the 500-acre unit and $12,820 for the 1,000-acre unit.

[3] The interest rate used on credit and equity obviously has a major impact on cost per acre or bushel. For instance, by reducing or increasing the interest rate (7.5 percent) used on real estate by 1 percent, the cost per acre for the 500-acre unit is decreased or increased by $5.00 and the cost per bushel changes by $.045.

[4] If transportation costs to a terminal market are deducted for comparability with the other units which do not pay these, the cost per bushel is $1.036.

considered. Given constant input and market prices, the lower the equity in the business, the lower the income tax cost. Also, the larger the taxable income, the greater the income tax cost.

Legal form of business organization can make a difference in Federal income tax costs for a given level of net taxable farm income (*16*, p. 122). Several legal forms of business organization were possible for each of the four sizes of units. The form selected for each unit was the one that would provide the lowest tax rate structure for that size of unit. For the 500-acre unit, the tax rate structure for all labor, management, and entrepreneurial income was that of a couple filing a joint ownership return. A two-family partnership was assumed for the 1,000-acre unit and each family was considered to be taxed as a sole proprietorship filing a joint return. For the 2,000- and 5,000-acre units, labor and management wages were paid to employees and were a tax-deductible cost to the business. Thus, the tax rate structure was that for a subchapter C corporation.

At the 100-percent equity level, total and per acre income tax costs were lowest for the 500-acre unit–$4,495, or $8.99 an acre–and highest for the 5,000-acre unit–$123,846, or $24.76 an acre (table 15). At the 30-percent equity level, the total income tax cost decreased to $812 and $51,296, respectively, for the 500- and 5,000-acre units. Thus, the tax cost per acre decreased to $1.62 an acre for the 500-acre unit and to $10.26 for the 5,000-acre unit.

The lowest cost per acre shown for the 5,000-acre unit was higher than the highest cost for the 500-acre unit (table 15). This is primarily because of the progressive nature of Federal income tax rates and the higher net return to entrepreneurship for the 5,000-acre unit (table 14).

Table 15.–Taxable income and total and per acre Federal income tax cost at three equity levels on corn production units of 500, 1,000, 2,000, and 5,000 acres, Corn Belt, 1969-70[1]

Item	500 acres	1,000 acres	2,000 acres	5,000 acres
	Dollars			
Total net taxable business income when percentage of equity in the total business investment is–				
100	25,360	56,110	95,240	271,550
60	16,590	38,830	60,680	185,800
30	10,010	25,860	34,780	121,450
Total income tax cost when percentage equity in the total business investment is–				
100	[2] 4,495	[3] 10,716	39,215	123,846
60	2,170	5,728	22,626	82,684
30	812	2,734	10,194	51,296
Income tax cost per acre when percentage of equity in the total business investment is–				
100	8.99	10.72	19.61	24.76
60	4.34	5.73	11.31	16.53
30	1.62	2.73	5.10	10.26

[1] A sole proprietorship form of business organization is assumed for the 500-acre unit and a partnership taxed as a sole proprietorship is assumed for the 1,000-acre unit; management income plus income on equity is taxable to the family business. A subchapter C corporation form of business organization is assumed for the 2,000- and 5,000-acre units. 1969 Federal income tax rates were figured without a surcharge. No capital gains or losses are considered.

[2] Assumes $5,000 personal deduction.

[3] Assumes 2 families in equal ownership and $5,000 each for personal deduction.

The foregoing analysis considers no management practices designed to adjust taxable income so that the same amount of taxes is due each year, or to avoid or delay tax liability by legal avoidance strategies. The amount of tax that might be paid by a profitable large unit is sufficient to encourage an investor to seek methods that avoid the tax bite and increase the potential for financial accumulation.

SUMMARY OF INCENTIVES FOR LARGE CORN PRODUCTION UNITS

For Midwestern corn production, no single concept or variable appears to stand alone in explaining the incentives for establishment of or growth to a large-sized unit. Several variables appear important but may be weighted differently by different owners or prospective owners of large units. These variables are (1) buying and selling economies, (2) investment and entrepreneurial returns before income tax costs, (3) return on investment after income tax costs, (4) financial leverage, and (5) low equity and business growth through financial leverage and income tax avoidance opportunities.

Buying and Selling Economies

Discounts over 20 percent greater for the 5,000-acre unit compared with the 500-acre unit provide an incentive of $13.06 an acre for the 5,000-acre unit (tables 9-11). The advantage that the 5,000-acre unit can obtain by selling to a terminal market can add $5 or more in net returns per acre before Federal income tax costs are considered.

Input discounts and marketing advantages appeared to more than offset the higher labor, management, and operating credit costs that the 5,000-acre unit incurred compared with the 500-acre unit. After an opportunity cost on investment was considered, the net return to entrepreneurship per acre was larger for the 2,000- and 5,000-acre units compared with the 500- and 1,000-acre units. The 5,000-acre unit had an advantage over the 2,000-acre unit in obtaining larger discounts for purchased inputs and a better net marketing advantage.

Investment and Entrepreneurial Returns Before Considering Federal Income Tax Costs

The lowest pre-income tax rate of return on a full-equity investment position with no capital appreciation was estimated at 6.8 percent for the 500-acre unit (table 16). The highest returns were for the 5,000-acre unit at 9.6 percent. The 1,000-acre unit's returns were 7.6 percent and the 2,000-acre unit's returns, 8.4 percent.

The rate of return increased with lower equity for the two largest units, held even for the 1,000-acre

Table 16.—Rate of return on total investment and return to entrepreneurship before Federal income tax costs considered, and appreciation and reduction in real estate value, at three equity levels, on corn production units of 500, 1,000, 2,000, and 5,000 acres, Corn Belt, 1969-70[1]

Before Federal income tax considered	500 acres	1,000 acres	2,000 acres	5,000 acres
	Percent			
Return on total investment with no change in real estate value, and percentage of equity in the business of:[2]				
100	6.8	7.6	8.4	9.6
60	6.3	7.6	8.9	10.9
30	5.0	7.6	10.8	14.3
Return on total investment with 5-percent appreciation in real estate value, and percentage of equity in the business of:[3]				
100	11.1	11.9	12.8	14.0
60	13.5	14.9	16.2	18.3
30	19.3	22.1	25.5	29.0
Return on total investment with 5-percent reduction in real estate value, and percentage of equity in the business of:[3]				
100	2.5	3.2	4.0	5.2
60	-1.2	.3	1.6	3.6
30	-9.4	-7.0	-3.9	.4
	Dollars per acre			
Return to entrepreneurship after opportunity cost included for investment and with 100-percent equity:[3]				
No change in real estate value	-4.51	.08	4.43	11.43
5-percent appreciation in real estate	20.49	25.08	29.43	36.43
5-percent reduction in real estate	-29.51	-24.92	-20.57	-13.57

[1] A sole proprietorship form of business organization is assumed for the 500-acre unit and a partnership taxed as a sole proprietorship is assumed for the 1,000-acre unit; management income plus income on equity is taxable to the family business. A subchapter C corporation form of business organization is assumed for the 2,000- and 5,000-acre units. 1969 Federal income tax rates were figured before a surcharge was used. No capital gains or losses are considered.

[2] Assumes that variable cost items are financed for 8 months. Machinery, drying, and storage investment are included at 50 percent of new value. Real estate is valued at $500 an acre.

[3] Depreciation on real estate improvements and payment of interest on opportunity cost for investment are excluded.

unit, but declined for the 500-acre unit. The decline for the 500-acre unit occurred since its net returns decreased by a greater percentage than did equity investment. The increase for the 2,000- and 5,000-acre units occurred since their net returns did not decrease by as great a percentage as did equity investment. At the 30-percent equity level, the 500-acre unit's returns were 5.0 percent on investment and the 5,000-acre unit's returns, 14.3 percent.

Since average real estate values increased 6 percent a year from 1960 through 1969 in the Midwest, estimation of both earned and unearned returns to equity assets is useful. An increase in the value of equity assets favors low-equity investments. When a 5-percent increase in the value of real estate was added to the entrepreneurial returns for each size of unit at the 100-percent equity level, returns on equity were 11.1 percent for the 500-acre unit and 14.0 percent for the 5,000-acre unit. When a 30-percent equity level was assumed, the rate of return increased to 19.3 percent for the 500-acre unit and 29.0 percent for the 5,000-acre unit.

Average real estate values can also decrease. When a 5-percent decrease was considered, the pre-income tax rate of return at the 100-percent equity level was 5.2 percent for the 5,000-acre unit, the highest; and 2.5 percent for the 500-acre unit, the lowest. The rates for the 1,000- and 2,000-acre units were 3.2 and 4.0 percent, respectively. At the 30-percent equity level, the 500-acre unit showed the largest negative return at -9.4 percent; the 5,000-acre unit showed the only positive return—0.4 percent.

After an opportunity cost for labor and equity and a 5-percent increase in real estate values were con-

sidered, the return per acre to entrepreneurship was $20.49 for the 500-acre unit and $36.43 for the 5,000-acre unit. With a 5-percent decrease in real estate values, the return dropped to -$29.51 for the 500-acre unit and -$13.57 for the 5,000-acre unit (table 16).

Return on Investment After Considering Federal Income Tax Costs

In appraising incentives for investment in large corn production units, it is perhaps more realistic to use the rate of return on investment after Federal income tax costs are considered. Rates of returns after these costs were deducted were lower than pre-income tax rates at each size and equity level (tables 16 and 17). For instance, with 100-percent equity and no change in real estate value, the rate of return decreased from 6.8 to 5.2 percent for the 500-acre unit and 9.6 to 5.2 percent for the 5,000-acre unit.

Financial Position and Leverage for Two Sizes of Firms With the Same Total Investment

Though not conclusive, available evidence indicates that all types of large incorporated farms operate at lower equity levels than do all types of smaller, family-sized farms (*13*, pp. 70-75). Based on rate of return on investment either before or after Federal income tax costs are considered, investors would probably choose large units with lower equity over small units with higher equity. This is particularly true when an appreciation in real estate values is expected. However, if real estate values drop or the value of the total business declines and if low equity is involved, the financial position of the owner may be seriously jeopardized. If a decrease in real estate values occurs and the real estate is sold, it is possible to reduce income taxes by deducting farm real estate losses from other taxable income. Such income tax avoidance potentials may encourage large farm investors and entrepreneurs to assume risks associated with farm firm expansion.

An investor with a sufficient financial position to own all assets and variable inputs in a 500-acre unit at the 100-percent equity level could instead nearly own a 2,000-acre unit and finance the variable inputs at about the 30-percent equity level. The rate of return on investment would be higher from investing in the 2,000-acre operation, especially if land increased in value. The rate of return on investment after income tax costs for the 2,000-acre unit was 22.5 percent, with 30-percent equity and a 5-percent appreciation in real estate values (table 17). The 500-acre unit's returns were only 9.5 percent on investment with 100-percent equity and a 5-percent increase in real estate values.

Net Worth Increases and Business Growth Through Financial Leverage and Legal Income Tax Avoidance

Entrepreneurs with objectives of aggressive business growth are not likely to operate with 100-percent equity and pay the amount of income tax costs shown in table 15. Units of 500 and 1,000 acres are likely to operate at about the 60-percent equity level or lower; their income tax costs are then about 4 percent of gross sales. If their financial position is adequate to finance either size of unit with 100-percent equity, it is possible for them to invest in a larger farming unit or in other activities that provide opportunities for income tax avoidance.

The same situation holds for 2,000- and 5,000-acre units. At the 100-percent equity level, the 5,000-acre unit, operated as a corporation, would pay about 20 percent of gross income in Federal income taxes. At the 30-percent equity level, with income tax costs only about 40 percent of their cost at the 100-percent level, the 5,000-acre unit would probably become involved in tax-sheltered investments to reduce the $51,296 tax cost (table 15).

Units with high income tax cost may purchase additional land that could require considerable renovation and development. The land could be purchased for a low price. Soil and water conservation and land-clearing expenses on land needing improvement could be used to reduce Federal income tax costs. The added land could provide further operating economies and buying and selling advantages, and could contribute to financial accumulation over time. Eventually a second new operating unit could be "sponsored."

An example of the above method of reducing Federal income tax costs and increasing the financial position of a 5,000-acre unit during a 3-year period is shown in table 18. Assuming the 5,000-acre unit, with 30-percent ownership equity, successfully achieved the cost and income results shown in tables 13 and 14, the unit would generate annually above all cash costs about $100,000 that could be used for new investment.

In the example, the total cash required to start a land improvement venture was estimated at $100,000. During the 3-year period, the new land had a total net improvement cost of $210,462 after a Federal income tax cost savings of $153,888. In each year, the expenses from developing the new unit

Table 17.–Rate of return on total investment after Federal income tax costs considered, and capital appreciation and reduction in real estate value, at three equity levels on corn production units of 500, 1,000, 2,000, and 5,000 acres, Corn Belt, 1969-70[1]

Item	Rate of return on total investment after Federal income taxes for units of--			
	500 acres	1,000 acres	2,000 acres	5,000 acres
	Percent			
No change in real estate value and when percentage of equity in the business is–				
100	5.2	6.0	4.9	5.2
60	5.0	5.9	5.6	6.1
30	4.0	6.0	7.8	8.3
5-percent appreciation in real estate value and percentage of equity in the business of–[2]				
100	9.5	10.0	9.3	9.6
60	12.2	13.2	13.0	13.4
30	18.4	20.5	22.5	23.0
5-percent reduction in real estate value and percentage of equity in the business of–				
100	0.1	0.1	0.1	0.1
60	-0.2	-0.1	-0.2	-0.1
30	-10.3	-8.5	-6.9	-6.4

[1] A sole proprietorship form of business organization is assumed for the 500-acre unit and a partnership taxed as a sole proprietorship is assumed for the 1,000-acre unit; management income plus income on equity is taxable to the family business. A subchapter C corporation form of business organization is assumed for the 2,000- and 5,000-acre units. 1969 Federal income tax rates were figured before a surcharge was used. No capital gains or losses are considered.

[2] An opportunity cost for unpaid labor and management was subtracted from the net return after taxes for the 500- and 1,000-acre units.

equaled net taxable income from the 5,000-acre unit. The net improvement cost is before a net taxable income of $23,500 which could be generated from the new unit in years 2 and 3.

The 1,000-acre unit purchased by the original unit could be worth $500,000, or $400,000 more than initial equity, at the end of the 3-year improvement process. The financial gain from the venture, including net income generated, would be $213,038. If the 1,000-acre unit's value at the end of 3 years were only $400,000 ($400 an acre), the increase in financial position for the $5,000-acre unit would be $113,038. Assuming all of the improvements were successfully completed, at the end of the 3-year period, the 1,000-acre unit should be capable of producing yields per acre similar to those of the initial 5,000-acre unit and could have similar expenses per acre.

In year 4, the unit, now comprising 6,000 acres, could support the selection of another business venture larger than the original 1,000-acre addition. The entire enlarged unit would use more tax-deductible dollars and allow a larger Federal income tax writeoff.

The 5,000-acre corporation would also have the opportunity in years 2 and 3 of finding a suitable investment for its estimated annual cash flow of $100,000. The corporation might hold the money as retained earnings or as a contingency for adverse conditions, or it might use the money to start another tax-sheltered investment in year 4.

PART III.–SALIENT ECONOMIC CHARACTERISTICS OF 10 LARGE CORN FARMS

Description and analysis in this part of the report highlight economic phenomena for 10 selected large Midwestern corn farms. Several interrelated variables such as legal form of business organization and growth have not been treated extensively by farm management economists for family-labor-sized farms. Some economic and business phenomena suggest that each large farm is unique. However, large farms share some similarities with each other and have some problems that are similar to those of family-sized farms. These similarities may be greater than the differences of each large farm.

Table 18.—3-year, 1,000-acre land improvement program to reduce Federal income tax cost for a 5,000-acre corn production unit with 30-percent equity

Item	Year 1	Year 2	Year 3
		Dollars	
Potential net taxable income per year	121,450	121,450	121,450
Purchase cost of 1,000 acres at $200 an acre with 50-percent equity	100,000	NA	NA
Income from previous year used to pay current year's expense	NA	NA	10,000
Net income from 1,000 acres, end of year	NA	10,000	13,500
Interest on 1,000-acre investment	7,500	7,500	7,500
Land-clearing expense[1]	5,000	5,000	5,000
Soil and water conservation expense[2]	100,000	80,000	92,000
Interest on land-clearing and soil and water conservation expense	9,150	[3] 18,950	[4] 26,950
Total expense	121,450	121,450	121,450
Net taxable income to 5,000-acre unit	0	0	0
Net taxable income from 1,000-acre unit	0	10,000	13,500
		End–year 3 and potential–year 4	
Value of 1,000 acres, end of program:		500,000	
Equity		100,000	
Untaxed capital gains		300,000	
Development expense		350,050	
Federal income tax cost savings		153,888	
Net development cost saved by income tax savings		210,462	
Net income invested in development		23,500	
Net financial gain including net income generated		213,038	
Debt:			
Real estate		100,000	
Improvement expense[5]		186,962	
Total		286,962	
Potential for year 4 (return to entrepreneurship at 30-percent equity):			
Before capital appreciation		13,500	
After 5-percent capital appreciation		43,500	

[1] Expenditures for land clearing, such as eradication of trees, stumps, and brush; treatment or moving of earth; and diversion of streams or watercourses may not exceed $5,000 or 25 percent of taxable farm income, whichever is less. No carryover of excess into future years is permitted.

[2] Expenditures for soil and water conservation work, such as treatment or movement of earth; construction, control, and protection of diversion channels, ditches, earthen dams, watercourses, outlays, and ponds; eradication of brush; and planting of windbreaks may not exceed 25 percent of gross farm income in any taxable year. Any excess may be carried into future years. Years 2 and 3 also include expenditures for liming, fertilization, and so on.

[3] Interest on these expenses for both years.

[4] Interest on these expenses for all 3 years.

[5] After deducting Federal income tax cost savings plus interest minus net income generated.

Ten units in Illinois, Indiana, Iowa, and Ohio, with between 1,700 and 8,600 crop acres in 1969, were analyzed. They were included in the survey described in parts I and II, and were selected on the basis of the available data and the willingness of the owners and managers to have their farms analyzed. The ownership, financial position, or operating organization of the 10 units should not necessarily be considered representative of all large Midwestern corn farms.

The 10 cases may represent most of the current range of complexity of large corn farms. Two of the units were minor subsidiaries of the same large parent organization, which holds extensive farm and nonfarm business interests. Only the corn production activities of the two units were studied; thus, a complete analysis of the firms and the future of such firms was not fully developed. Another case involved a family that had a successful nonfarm business and only recently started a farm business venture. The family found an opportunity to transfer entrepreneurial, financial, and management skills from an industrial to a farm production sector and to begin exploiting production and business technology advantageously. A fourth unit involved an affluent industrialist who contracted with a commercial farm management firm which directly operated his farm. A fifth unit was formed by a group of investors who joined together in a farming venture. After 4 years, the venture proved unprofitable and was liquidated. A sixth case was that of a wealthy individual who spent

a lifetime developing farm properties and used a unique profit-sharing procedure to motivate manager-operators of subunits of his large unit. The remaining four cases were family farms that had grown to large size. Motivation for growth and the methods used were reasonably similar among the four. Management and financing were similar to those for smaller family-sized units.

These 10 farms do not represent all the apparent complexities of large U.S. farms of every type. Integrated and contract types of production, for example, are more common for other commodities than corn. Much of the production of commodities such as poultry and fresh vegetables is contracted for before production begins. Major nonfarm businesses are involved in such ventures only as minor subsidiaries.

CLASSIFICATION OF CASES

The 10 cases were divided into three general types for analysis (table 19). The five units comprising group A had owners in a financially affluent position, with other farm business interests and extensive nonfarm business interests. The four units making up group B were owned by farm families in more moderate financial positions, with no other farm business interests, and more limited nonfarm business interests. The 10th unit was the unsuccessful investors' unit. Putting a unit in group A implied an aggregate net worth of over $500,000 for the principal owners. For some units, the net worth was probably several million dollars. The financial criterion for a group B unit was an aggregate net worth of over $250,000. Unit 10 was not extensively compared with the two groups. It was in operation only 4 years, and several of its characteristics were dissimilar to those of the other units.

OWNERSHIP AND OPERATING LEGAL FORM OF BUSINESS ORGANIZATION

The operating legal form of business organization used by the group A units was a subchapter C corporation (table 19). Some of the units were part of more than one corporation. The owners combined them with other business interests for income tax accounting purposes. For instance, units 1 and 2, both owned by the same parent organization, along with its other farm and nonfarm interests, were largely self-contained and each was set up as a separate corporation. Unit 3, owned by a family-owned corporation, was leased on a cash plus profit-sharing basis to a professional management company that operated the farm. One of the unit owners was also a major shareholder in the management corporation. Unit 4 was operated by the same family corporation that owned it. This family also owned and operated nonfarm corporation interests. Unit 5, owned by an elderly individual and his wife, was operated under a manager and several submanager-operators and their families who shared in the profits. The owner provided all of the inputs except labor and daily operating management and also had other extensive farm and nonfarm business interests.

Three of the four group B units used a father-and sons partnership as the operating legal form of business organization. The fourth used a subchapter S operating corporation. Farm real estate was owned by individual family members for the three partnership units and by the corporation for the fourth unit.

Each particular form of ownership was mainly developed and used to gain social security coverage and retirement income for the parents and farm commodity program participation for the owners. Business continuity was of concern for each of the group B units. The incorporated unit developed the corporate form of business in an attempt to transfer assets to the children. The three partnership operations were transferring management responsibilities to the sons and assets were being sold or given to them. The sons were also buying additional farm real estate.

OWNERSHIP LONGEVITY

The length of time that the units have been in existence varies (table 19). Acreage for group A units was assembled before 1945. The acreage for cases 4 and 5 was put together about the turn of the century; for case 3, by 1920. Actual ownership of the units has changed over time. Units 1 and 2 have been held by the same owners for 32 and 28 years, respectively. Unit 3 has been held by the same family for about 50 years and the present owner for 3 years. Unit 4 was held by one family for about 60 years; in recent years, the ownership has changed twice. The present owner purchased the unit in 1967. Unit 5 was held by several owners over the past 40 years; the current owner has held the land for 8 years.

Group B's acreage sizes expanded in recent years. Some of the present owners have owned or operated

Table 19.–Selected characteristics of 10 large corn farms, Corn Belt, 1969

Category	Number of unit	Legal form of business organization[1]	Ownership longevity of –		Owners	Major financing sources		Acres			Livestock, 1969	
			Real estate as a unit	Present owner or operator		Short- and intermediate-term	Long-term	Operated in 1969	Percentage cropped, 1969	Percentage increase in acres operated, 1960–69	Type	Amount
			Years					*Number*	*Percent*			*Number*
Group A: Financially affluent position with extensive nonfarm business interests and other farm business interests	1	subchapter C corporation	32	32	family-controlled	city banks	[2]NA	±10,000	41	0	beef	10,000 fat cattle, self-owned and custom-fed
	2	do.	28	28	family-controlled	city banks	[2]NA	±10,000	89	0	beef	13,000 fat cattle, self-owned and custom-fed
	3	do.	50	3	family-owned real estate, closely held	local banks, [3]PCA	insurance company, city banks	2,900	79	0	swine, beef	500 fat hogs 350 steer
	4	do.	70	3	family-owned	city banks, local banks	insurance company, city banks	6,800	94	0	beef	12,000 fat cattle, 6,000 breeding cows
	5	do.	70	8	husband-and-wife owned [real estate] several operating families	local banks	self	8,000	62	0	none	none
Group B: Moderate financial position with no other farm business interests and limited nonfarm business interests	6	subchapter S (father-sons) corporation	[4]NA	[5]3–50	father and 2 sons and other heirs as corporation	city banks, local banks	[6]FLB	4,500	86	80	beef	400 steers
	7	father-sons partnership	[4]NA	3–50	father and 2 sons	local banks, [3]PCA	[6]FLB	2,860	90	150	beef	400 fat cattle
	8	do.	[4]NA	3–29	father and 2 sons	local banks, [3]PCA	[6]FLB	2,530	97	520	none	none
	9	father-several sons partnership	[4]NA	10–40	father and 4 sons	local banks, [3]PCA	[6]FLB	6,095	76	485	none	none
Unsuccessful investor group	10	corporation	0	4	closely held by unrelated stockholders	city banks	stock issue	1,820	96	82	none	none

[1] More than 1 form of legal business organization, such as landowning corporation and operating partnership, is involved in some large farms. Only the operating form is given.
[2] Not available.
[3] Production credit association.
[4] Not applicable.
[5] Period for present owner or operator varies depending on whether only the father's or both the father and sons' lengths in the business are considered.
[6] Federal land bank.

the units or both for between 3 and 50 years, depending on whether only the father's length of owning or operating is considered or if the present father-and-son partnerships are considered.

DECISIONMAKING

There was a distinct difference in management and decisionmaking between the two groups of case units. All of the major financial management decisions and functions for the group A units were carried on at corporate headquarters, which were distant from the farm units. The setup for decisionmaking was similar for units 1, 2, and 4. An on-the-farm manager was employed to make all shortrun operating decisions. For units 1 and 2, the parent organization employed an overall head farm manager to supervise the unit managers and the other farming interests of the parent organization. Company-employed livestock and agronomy specialists periodically visited the units and assisted the management team in decisionmaking. Unit managers were responsible for buying all inputs except livestock. Unit 4 employed "outside" consultants as necessary. The on-the-farm management was responsible for purchase of inputs including livestock, although the owners also sometimes participated in livestock purchases and sales.

The professional farm management firm that leased unit 3 was responsible for employing an on-the-farm foreman and also an overall manager who took care of the day-to-day management of four other large units in the area of unit 3. Employees of the farm management company handled purchase of inputs and sale of products.

The owners of unit 5 employed a manager who made all decisions, excluding those involving major expansion. He supervised four subunit manager-operators. All five received a base wage and shared in profits. The overall manager also supervised repair and storage facilities and purchased inputs to produce and market the corn crop.

All of the group A units employed operating foremen and supervisors when necessary. The units also hired foremen for their machine shops and elevator and feed-processing operations.

Group B units each used a similar method of decisionmaking involving fathers and sons. The main decisionmaker for some situations was the father and for others, one or more of the sons. The sons handled daily decisions while the father tended to work on longrun decisions, especially on units where he was active in the business. The influence of wives and children of group B unit owners in farm business decisions appeared to be much greater than that of family members of hired managers in group A.

The incentive to purchase inputs for maximum discounts varied for the two groups. No particular incentive was provided for managers of units 1 and 2 in group A. Thus, their purchased input costs per input unit were higher than those shown for the lowest cost units in part II (table 6).

The management firm that leased unit 3 did not attempt to achieve maximum discounts on purchased inputs. The firm tried to maintain a local image conducive to maintaining present local professional farm management business and to obtaining more of it. Unit 4 set the manager's overall salary on the basis of profitability of the farm business and the difficulty of growth problems he encountered. Maximum input discounts were sought and achieved. Unit 5 sought and achieved maximum input discounts since the unit manager in large part was employed to function as a purchasing and sales agent as well as a farm operations manager. He shared in returns from the farm.

All group B units (moderate financial position) had reason to attempt to achieve maximum discounts on purchased inputs. They were not striving to develop other local businesses and did not rely on availability of much community labor. Each unit obtained discounts near the maximum discounts that some units considered in part I achieved. However, managers of group B units did not seek input discounts as actively as did managers of group A units.

The wage paid employees classified as laborers varied widely among the units in both groups. None of the unit managers or owners suggested that employing labor at the lowest possible cost was an objective. In some instances, employees classified as laborers actually assumed supervisory and operating decisionmaking functions. For group A, the rate paid for labor and supervision varied by the amount and kind of fringe benefits. Units in both groups provided housing for full-time laborers and supervisory help. Three group B units did not employ full-time help since family members provided year-round labor. The fourth unit employed two full-time men and part-time labor when needed. The average labor and supervisory pay was considerably higher for group A units. Of the six sons involved in unit 9 in group B, some were in school and worked off the farm in nonpeak labor periods.

FINANCING SOURCES

There were major differences between group A and B units in the financing sources used (table 19). Group B units obtained longterm credit from Federal land banks; in contrast, group A units tended to obtain longterm credit from insurance companies and city banks. Group B units obtained short- and intermediate-term credit from local banks and production credit associations; group A units used both city and local banks. One group A unit used a production credit association.

USE OF CONSULTANTS

A contrast can be made between the two groups on the use of hired technical assistance consultants. Both groups used the "free" services of the Cooperative Extension Service and land grant college or university experiment station personnel. They also contracted as needed with specialized lawyers and accountants. In general, group A units employed higher quality and more experienced full-time managers. Yet these units hired more "outside" technical assistance than did group B units, which tended to function like many family-labor-sized farms. Most of the group B units' technical assistance was obtained from "free" sources, such as farm magazines, neighbors, community merchants, dealers, and the Cooperative Extension Service.

INCOME AND EXPENSES

Income and expense statements obtained in the interviews and slightly modified by the authors are presented in table 20 for one farm in group A and one in group B. The data are somewhat representative of operating statements on a per acre basis for the other units in each group–for an average crop production and product price year. All costs associated with corn production except Federal income taxes are included. The group A unit had about three times as many crop acres as the group B unit did. Some of the differences in individual cost items can be attributed to location and soil fertility differences; others are due to volume.

The group A unit spent about $1 more per acre for office help and supplies than did the group B unit (family owned and operated), whose office work was performed by the manager or his family. The cost of other purchased input items such as machinery repair, petroleum products, and seed was considerably less for the group A unit (financially affluent position). Fertilizer costs were similar for both units. However, the group B unit spent less on crop chemicals and did more cultivation work. Both units were operating with low equity in the businesses; thus, real estate, machinery, and personal property interest costs were similar. The family owned and operated unit was paying a lower interest rate but had a higher investment cost per acre.

The salaries plus fringe benefits of the hired manager and workers for the group A unit were greater than the income that the group B unit managers withdrew. Thus, the group A hired manager and workers appeared to have a potentially higher material standard of living than did the owners, managers, and employees of the family owned and operated unit.

FIRM GROWTH

Two important variables in firm growth are management and entrepreneurial ability and performance. Group A units appeared to have "better" management and entrepreneurial capacity than did group B units, which may explain the overall greater growth for group A units. Their management and entrepreneurial talent could be made available for seeking, evaluating, and developing new ventures. Group B's management and entrepreneurial capacity needed to be largely devoted to the existing operations to ensure their survival.

Past Growth

One measure of size is the number of crop acres. Group A units did not expand in crop acreage between 1960 and 1969 (table 19). Size was about 2,900 to 10,000 acres. All of the land farmed was owned by the units.

Group B units increased their crop acreage in greatly varying degrees. During the 1960's, the lowest increase was 80 percent and the highest, over 500 percent. Acreage size in 1969 was about 2,500 acres

Table 20.–Example of income and expense statements for one farm in group A and one farm in group B, large corn production farms, Corn Belt, 1969

Item	Case unit, group A[1]		Case unit, group B[2]	
	Total	Per acre	Total	Per acre
	Dollars			
Cash expenses:				
Office help and supplies	6,625	1.25	400	.25
Labor, supervision, and management	38,478	7.26	8,864	[3] 5.54
Machinery repair	23,267	4.39	11,072	6.92
Shop supplies	3,816	.72	800	.50
Petroleum products	12,508	2.36	8,016	5.01
Crop chemicals	41,075	7.75	9,728	6.08
Fertilizer	59,996	11.32	18,608	11.63
Seed	23,161	4.37	9,760	6.10
Utilities	4,982	.94	848	.53
Miscellaneous	3,180	.60	960	.60
Real estate interest	187,037	[4] 35.29	56,032	[5] 35.02
Machinery and equipment interest	21,359	[4] 4.03	6,400	[5] 4.00
Real estate taxes	27,772	5.24	11,200	7.00
Personal property taxes	2,968	.56	1,264	.79
Insurance	2,491	.47	1,024	.64
Noncash expenses:				
Machinery, equipment, and building depreciation	54,060	10.20	25,824	16.14
Total expenses	512,775	96.75	170,800	106.75
Income:				
556,500 bushels of corn at $1.10 each	612,150	115.50		
184,000 bushels of corn at $1.05 each			193,200	120.75
Net return to equity and entrepreneurship	99,375	18.75	22,400	14.00

[1] 5,300 acres of corn was used for livestock feed. Harvesting but not storage-drying costs are included. The corn was transferred to the livestock account at $1.10 a bushel. The unit had a large financial position.

[2] 1,600 acres of corn was marketed to a local outlet. The unit was family owned and operated.

[3] Plus $3.87 of unpaid family labor per acre.

[4] The firm was operating with about 15-percent equity in corn production, real estate, machinery and equipment, and operating expenses.

[5] The firm was operating with about 20-percent equity in corn production, real estate, machinery and equipment, and operating expenses.

to over 6,000 acres. Three of the units owned about 67 percent of all cropland that they operated in 1969. One unit, however, owned less than 30 percent.

A second measure of size is the amount of value added through livestock production. Three group A units (financially affluent) each fed over 10,000 head of beef cattle per year in their lots that adjoined the corn production units. Only unit 4 fed just its own cattle. Also, this unit had about 5,900 beef cows by 1969. Livestock were a minor enterprise on unit 3 and were not handled on unit 5.

Livestock were not handled on two of the four group B (moderate financial position) units. Unit 6 handled about 400 grazing steers and unit 7 fattened 400 cattle.

Other dimensions are involved in firm growth. The 1960's was a period of availability and adoption of new technology in corn production and increasing demand for both corn and livestock–especially beef. Of the 10 units, those initially under 3,000 acres used the new technology to grow extensively in crop acres. The units that did not increase crop acreage generally expanded their livestock enterprises. All 10 units used new technology to increase crop yields.[13] Each showed increases in average corn yield during the decade. They also intensified production on suitable row crop acreage.

[13] The units showed several other dimensions of firm growth, such as increases in the value of the businesses, the rate of return on investment, and the magnitude of net earnings.

Group A units did not show acreage growth during the 1960's, but, in addition to increasing the volume of corn production, they expanded in other ways. As contrasted with those in group B, owners in group A were able to move more quickly when volume business opportunities became available—for example, a new opportunity for artificial insemination for beef cows or need for a blight resistent seed variety. They also were able to draw on financial and management resources from other farm and nonfarm segments of their businesses as opportunities developed on the individual units. They similarly transferred resources from their corn farms to other business interests.

Group A units 1 and 2 expanded in their cattle-fattening operations both through the number of cattle owned and by custom feeding. These units had some growth characteristics that differed from those on the other eight units. The two units were not self-financed nor were returns above cash costs necessarily available for reinvestment in the units. As the owners of the two units also had other farm and nonfarm interests, they consequently were able to consider investment alternatives in addition to those associated with Midwestern corn and livestock production.

The owner of unit 3 employed a commercial farm management firm to develop and operate it during the late 1960's. Previously, the unit had been tenant operated. The management company did little to improve or expand the livestock program used by the former tenant. Instead, it increased crop yields through intensive application of corn production technology.

Both the owner of the unit and the management firm operating it were involved in the growth of unit 3. The owner, as with the owners of units 1 and 2, had other farm and nonfarm business interests. In the farm interests, he tended to concentrate on crop production. The management firm, contrasted with most other commercial farm management firms, was expanding by directly operating units as opposed to employing tenant operators.

In addition to intensifying crop production during the 1960's, unit 4 showed major growth in cattle feeding and cow-calf production. The man who owned the unit during the early 1960's did the major work in intensifying crop production. He combined the land in the unit with low-quality land some distance away to enable participation in Government commodity programs. The present owner did not purchase or lease this additional land. He constructed a 6,000-head-capacity feedlot and feed-handling facilities and, in addition, entered cow-calf and heifer-breeding activities. Some of the breeding stock was contract produced on ranches a considerable distance from the corn production unit. To accommodate the cattle feeding and breeding activities, the owner diverted all of the lowest quality and some of the high-quality land from corn production to forage silage and fast-growth grazing crops.

Unit 5 showed major growth in crop production during the 1960's. The new owner accomplished this through drainage of land, improvement work, and construction of a separate cattle feedlot. He had a long history of purchase and development of "difficult" farm properties. He died in 1969 and the operation was sold.

The four group B units achieved most of their growth through both increasing crop output per acre and adding more acres. A strong catalyst for growth was the involvement of sons on the farms and the formation of father-and-son operating partnerships. In some instances, the sons returned to the units after military service or college-level training or both. The families were counseled by their legal, financial, and tax advisors to expand since their operations were efficient and could handle increased debt loads.

Units 8 and 9 had a larger percentage growth than did units 6 and 7. Unit 8 chose the land-rental route and increased acres owned by only 320 while increasing acres rented by almost 2,000. The owners have a short term objective of expanding to 5,000 crop acres. Unit 9 showed the greatest growth in number of acres, from 897 to 6,095. However, where the other three were father-and-son units, unit 9 was a father-and-four-son partnership with two younger brothers who worked on the farm but were not involved in ownership.

In summary, growth of the four group B units followed essentially the same general paths that a family operation would use to expand from 400 to 600 or more acres. Family labor became available and sons expressed an interest in farming as a career. As land became available in the units' operating territory, for either purchase or rental, the units were able to aggressively bid for such land.

Future Plans

Interview questions about future growth plans were handled in distinctly different ways by owners and managers of the group A units compared with owners of group B (moderate financial position) units. Managers of group A units were committed to continued employment with the owners, but were not hesitant in considering alternative employment opportunities. Though they were provided with some profit-sharing and retirement benefits, they viewed

their employment as similar to that with an industrial firm at a middle-management level.

The owners of unit 4 in group A had definite interest in further expansion of the operation if additional adjoining tracts of land became available. They also planned to expand their beef cow-calf enterprise. As part of their breeding stock activities, they may develop a separate corporation to manage such stock for other investors. The other group A unit owners and managers saw some potential for expanding livestock enterprises, but generally viewed expansion in the agricultural industry in terms of acquiring new farm businesses or agribusinesses. Their present units were large enough to obtain most available size economies. They expect to update these units as new technology becomes available.

Owners of group A units had no particular or strong attachment to the units but rather showed interest in financial accumulation strategies and apparently invested in farming ventures when these offered growth potential. The availability of credit on a low-equity basis and the opportunities for income tax avoidance were important considerations. All the group A units had several alternative growth activities under consideration both in farm and nonfarm production.

Owners of group B units showed more attachment to their existing units as a business base and as a place to live and work. They expressed no particular preference for either purchasing or renting as a method of acquiring additional land. Units 7, 8, and 9 had definite but general acreage growth objectives. Unit 6 with two sons was trying to decide on operational goals and was experiencing some leadership conflicts. One of the sons indicated interest in phasing out the farming operation.

A LIQUIDATED CASE UNIT

Case unit 10 was a new farming venture organized in 1966. By the fall of 1969, it was being liquidated.

The entrepreneurial motivation for starting the unit came from a farmer with a typical family-sized operation who thought he saw an opportunity to exploit farm technology on a larger scale than his own financing permitted. The farmer invested some of his own equity in the new venture by exchanging his farm for stock in the operation and by becoming its hired manager.

An investment underwriting firm joined with the farmer in obtaining the financing. A management consulting firm was employed to develop a feasibility plan, which was also used to attract equity investors. About 1,800 of an expected 2,000 acres were purchased.

The feasibility plan proved to be inaccurate and did not anticipate problems in several respects:

1. Minimum tillage was projected which would reduce average corn production costs by one-third or more, but expected cost savings did not materialize.
2. Corn yields were projected about 30 percent greater than average yields for the area and were higher than yields actually achieved.
3. The problems of combining a number of small tracts of land into an efficient 2,000-acre operating unit were overlooked.
4. Corn prices were estimated about 20 percent higher than prices actually obtained.

Failure to obtain the indicated results from the projections contributed to the failure of the operation. Tracts of land purchased were too small, scattered, and "cut-up" with creeks, hills, and gullies to permit efficient operation with large tillage machines. In addition, serious weed problems were encountered on land that was purchased from older operators who had not stayed abreast of current production technology. Land for the unit was, however, purchased for the projected cost. Interest costs were about 2 percent higher than projected. A further criticism is that the plan allowed no time for establishment before growth was undertaken. All of the growth in acreage took place in about 2 years.

Table 21 shows that estimated costs of $67.85 an acre were $50.36 short of actual costs in the third year of production. In addition, the lower yields and corn prices caused the firm to incur a cash deficit of about $200,000. Similar but not quite as severe losses had been incurred in the first 2 years of operation.

In the fourth year, about one-half of the land was sold and the remainder leased out. All of the corporation's machinery and equipment was sold. At the time of this study, the corporate owners were trying to sell the rest of the land.

The unit was managed by the organizer-manager until he resigned from the corporation before the end of the third crop year. Three additional hired workers provided the labor. The investment underwriter and the organizer-manager both participated in the financing function. About one-half of the operating money was obtained from shares of common stock issued to about 45 investors and the rest was borrowed from commercial banks. The unit was organized as a subchapter C corporation. Thus, operating losses could not be passed on to the shareholders. The owners could use only capital losses incurred through the liquidation process as deductible income tax losses.

Table 21.–Simulated comparison of selected cost items estimated in a feasibility plan and 3d-year actual costs for a liquidated large corn farm, Corn Belt, 1969

Selected cost items	Costs per acre	
	Estimated	Actual
	Dollars	
Variable:		
Seed	3.00	
Fertilizer	12.70	
Lime	1.10	30.57
Chemicals	4.00	
Fuel and oil	3.05	
Hail insurance	.15	
Maintenance and repair on–		
Machinery	2.00	
Buildings	.30	1
Equipment rental	.75	
Labor and management	8.00	
Full-time workers	9.00	15.77
Part-time workers	1.00	
Fringe benefits	.55	
Consulting fees	2.00	8.05
Accounting and legal fees	1.00	
Insurance		
Keymen	1.25	0
Casualty	.35	0
Test plots	1.00	0
Other	0	19.71
Fixed:		
Property taxes	5.50	3.88
Equipment taxes	.90	
Depreciation	9.25	40.23
Contingencies	1.00	
	67.85	118.21

[1] Firm included these with fixed costs.

PART IV.–STAYING POWER OF FAMILY-SIZED CORN FARMS

FOUR ANALYTICAL CATEGORIES

The obvious question raised by the probable incentives for large farms shown in earlier sections is: what are the implications for the staying power of smaller farm units? The size and profitability of farm businesses and the investment goals of farm families should be considered when comparing family-labor-sized units with large businesses. Farm and other rural people are not as easily identified as "farmers" as they were a decade or more ago. Thus, an up-to-date view of farm entrepreneurs and their business interests is necessary in appraising both the staying power of family-sized farms and the future potential for formation of additional large farms.

Reinsel's study of 1962 and 1963 Federal farm income tax returns of individuals and corporations provides a basis for classification and study of farm entrepreneurs (*11*). Using similar unpublished data for 1966, he classified all individual U.S. taxpayers with farm profits or losses in that year in one of five groups based on their total taxable income.[14] For example, in 1966, 36 percent were classified in the "upper middle" group, 25 percent in the "lower middle" group, and 22 percent in the "poor" group. Farm receipts for these groups averaged $10,040, $8,590, and $5,460, respectively. Individuals in the two groups with the highest taxable income were combined. They accounted for 17 percent of the taxpayers, and were classified as either "well-off" or "affluent." They numbered 531,000 and are grouped as "high-income" for the 1966 data. The average farm receipts were $23,590.

Reinsel's published study showed that a higher percentage of the well-off and affluent groups received off-farm income from several sources than did the middle-income and poor groups. Off-farm

[14] Individuals with farm losses were classified by size of farm as well as amount of taxable income (*11*, pp. 22).

income of taxpayers with farm incomes in the five Corn Belt States came from sources that were similar to those of all other U.S. farm taxpayers.

Again using 1966 data, Reinsel identified 523,000 individuals in the Corn Belt States of Ohio, Illinois, Indiana, Iowa, and Missouri who reported fram income. Their farm receipts averaged $41,460. Reinsel estimated that 169,000 individuals from these States reported farm losses. Their average farm receipts—$5,420—were less than half those of people in these States who reported profits.

Thus, 692,000 individual taxpayers in the Corn Belt had some farm income. From this total, at least four categories of family-sized farm operators and farmland owners can be analyzed in terms of their staying power:

1. We estimate that probably less than 10 percent (60,000 families) of these taxpayers have full-time family employment situations and use aggressive farm business growth strategies.
2. Over 60 percent, or about 400,000, fall into low-income or minimum-growth classifications, or both.
3. About 30 percent are part-time or "part farm income" entrepreneurs who fall into Reinsel's upper middle, welloff, and affluent income groups.
4. Landowners not operating farms constitute an important group of farm income taxpayers in the Corn Belt. They can often be classified in the upper middle and high-income brackets, though some retired farm operators with income only from their landholdings would fall in the lower middle and poor groups.

The four categories are not mutually exclusive. Over time, a farm operator may be in more than one of them. Empirical data on numbers of "farmers" who fall into each of the categories have not been collected. However, the categories appear meaningful for staying-power analysis.

UNITS USING AGGRESSIVE GROWTH STRATEGIES

Aggressively managed units of sufficient size can provide a farm family with an acceptable opportunity for full employment of family labor and management talent, an acceptable income for family living, and some excess income for farm growth investment. Total assets managed usually have a current value of $200,000 or more. Generally, units using aggressive growth strategies have 300 or more acres of corn or corn and soybean production, plus an intensive livestock program. On row crop units of 500 acres or more, livestock need not be an important part of the operation.

On many commercial family-sized farms, the operator and his family derive most of their income from the farming operation. In some cases, however, the operator views farm real estate ownership and operation as a financial growth area which is a joint venture with off-farm activities. Full-time employment is often held in other sectors of the economy and hired labor is employed in the farming operation. Farm losses may be deducted from other income for income tax purposes even though the farm is operated at a high level of production and efficiency. The farming unit is sometimes located in areas where urban development will eventually use the farmland.

The operators' age range for commercial family-sized operations is generally between 30 and 55 years (*10,* pp. 4,8,9). Usually, older operators who use aggressive growth strategies involve one or more of their children in the operation or operate in partnership with another farm family. Nonfarm investments are generally part of the family's total investment portfolio.[15] Off-farm employment, such as work as a manufacturer's representative in the off-crop production season, is sometimes involved for operators who do not have full-time off-farm employment.

For reasonably efficient family-sized units which are relatively free of debt, a net cash income, or cash withdrawal, of $35 to $45 an acre is possible. Thus, for a 500-acre cash grain farm, $15,000 to $20,000 a year can be withdrawn from the farm business for family living and income tax payments. Similar amounts per acre may be available from a smaller acreage when an extensive livestock program is combined with grain production.

When commercial family-sized units operate with a 50- to 60-percent equity level, the cash withdrawal potential is lowered by the required interest and principal payments. However, the added cost for interest helps to hold Federal income tax costs for a family of four to about $2 an acre.

Several factors appear important in appraising the future role of commercial family-sized operations. Business continuity and estate transfer plans that minimize death taxes appear significant. Many commercial operators who use aggressive growth

[15] Extensive studies have not been undertaken to determine the nature and extent of nonfarm investments of farm operators. However, in an unpublished financial profile study of central South Dakota farmers, Krause found that generally, farmers using aggressive growth strategies have nonfarm investments.

strategies will control units of 1,000 to 2,000 acres before they reach retirement age. These operators have the family-labor-sized units that are successful in obtaining buying and selling advantages similar to those shown in earlier sections for the 500-acre and larger operations. They can provide strong competition for outside investors who may attempt to form units of 4,000 to 5,000 acres.

To remain viable, the family-sized operation will need input firms that provide an opportunity for competitive purchase of specified inputs at prices close to those paid by large units. Equally important to family-sized units are marketing channels that—through contract production or direct sale to processors—provide opportunity for product sale prices close to large-unit prices. Adequate credit on terms similar or better than those for large units is another variable important for survival of family-sized farms.

LOW-INCOME AND MINIMUM-GROWTH UNITS

Present family-sized units with low income, when considered in terms of survival over the next two decades, appear to represent a disproportionately large share of the total number of family-sized operations in the Midwest. Generally, 80 to 500 total acres per unit are involved and the operators are usually over 45 years old (*10,* pp. 4,8,9). Many are near retirement age. The operators possess insufficient assets, skills, or motivation to develop moderate farm business growth. They have usually rejected both the use of high-leverage financing and the adoption of much of the farm technology which encourages increases in farm size.

Recent studies at Midwestern universities estimate the gross income per acre of corn production for these units—about $90—as $35 lower per acre than for family-sized units with aggressive growth strategies. Production expenses, with about 70-percent equity in the business, are about $70 an acre for these low-income units. The cash withdrawal potential is about $20 per acre of corn production. With 200 to 400 acres of corn production, the cash withdrawal potential is $4,000 to $8,000. The amount of allowable depreciation of assets for tax purposes is usually not spent for replacement of machinery and buildings. Income tax costs are generally very low.

The operator and his wife can survive until retirement with an acceptable standard of living in many rural communities, especially if the farm real estate was purchased over 15 years ago and is not encumbered by a large debt. Some younger operators, those under 45 years, who are in the low-income, minimum-growth category will eventually become aggressive-growth farm operators. The remainder will either accept off-farm employment to supplement their farm income or will quit farming and accept full-time nonfarm employment. When farmers in the low-income nonviable category quit farming, their real estate is generally absorbed by aggressive-growth, viable family-sized or larger units.

PART-TIME FARMS AND PART-INCOME UNITS

Part-time farm operators have been increasing in number, especially in the eastern Corn Belt, near medium- and large-sized cities. Row crop acres operated by part-time operators range from 100 to 500 or more. Some of these operators have sizable total farm operations.

Many part-time operators held objectives of full-time farm employment a decade ago. However, with adequate academic or technical skills and training, they have found cash income to be greater from off-farm employment. The wives often have nonfarm jobs too. Through the use of farm development and depreciation expense, income tax costs on total income are small.

Part-time operators generally hire part of the labor for their crop production work and they and their children complete the rest. Young part-time farm operators may expand the size of their farming operations but not become full-time operators.

A less well understood group of farm entrepreneurs is that of part farm income farmers—persons who derive only part of their income from farming activities. Some people in this category have substantial nonfarm investments. The farm business may be large, with real estate holdings that provide investment diversification. Some families accumulated their wealth from agricultural operations and investments; others accumulated assets in other industries. There appear to be approximately as many commercial farms with sales of $20,000 or more that are owned by part-income entrepreneurs as by farmers who rely mainly on farm income.

Several variables are important in appraising the future of part-time or part-income units. Employment and income prospects in the nonfarm sector of the economy, farm real estate price appreciation prospects, and the ability to hire management or hire custom crop production are all important.

NONOPERATING FARM REAL ESTATE OWNERS

According to ownership data for the five Corn Belt States, less than 60 percent of the farm real estate is

owned by the same individuals who are responsible for crop production (farm operators). Part-income entrepreneurs are part of this percentage. Retired farmers, farmers' widows, and farmers' heirs who are often university trained and are professional workers also own a great deal of farm real estate. Nonoperating owners generally rent their real estate to operators described in the other three categories in this part. The agressive-growth strategy group appear as the most common renters.

The financial position, income level, and family living expense needs of nonoperators are sometimes such that they do not require the maximum potential annual income from their farm real estate. Close personal ties between the owners and renter-operators and prospects for increasing farm real estate values have encouraged absentee owners to continue ownership.

The possibility of renting absentee-owned farm real estate has encouraged operators of family-sized units who have growth plans to own only part of the land that they operate. Operators who are full tenants frequently need to find several absentee-owned tracts of land to develop viable operations. They also encounter problems with typical rental terms.

In some Midwestern farming communities, the supply of "good tenants," in terms of landowners' returns, may be decreasing. This has implications for landowners because of the magnitude of new investment often required to accommodate operators' growth strategies and also assure farm income potential. Absentee landowners may be encouraged to sell their land if a lack of good tenants exists or the bargaining power advantage shifts to the good tenants remaining in an area. Also, as close personal ties between operators and landlords decrease or as landlords die, absentee-owned farm real estate may be sold outside the family. Thus, an increased potential for consolidation of farm real estate ownership by or among farm operators or investors, may develop in many Midwestern farming communities.

PART V.—THE FUTURE FOR LARGE AND FAMILY-SIZED CORN FARMS

TWO MAJOR INFLUENCES ON LARGE AND POTENTIALLY LARGE UNITS

Corn production currently appears to be the most important use for Midwestern farmland that is or can be developed for intensive row crop production. Recent increased production of corn and grain sorghum in other geographic areas is not likely to effect shifts in the use of high-quality land for corn production in the Corn Belt. Lower quality land may be shifted to intensive forage production for livestock and to recreation uses. Thus, how might the future structure of corn production units develop in this region?

Description and analysis in part III focused on units with large blocks of land that have been held together (group A) and on more typical family-sized units that have grown to large size (group B). Since the number of existing large-sized units similar to those in group A is limited, the following two factors will mainly influence future size structure: (1) the potential for investors of starting new units at a large size and (2) the number and activities of present family-sized units with under 1,000 acres similar to those in group B.

Though unit 10, featured in part III, attempted to start at a large size and failed, this does not mean that new large corn units cannot be developed. Given the predominance in the Midwestern States of family-sized units with fewer than 1,000 crop acres, the major future large units will most likely evolve from the present units with one to two families and 500 or more acres.

No one variable can be used to describe the development of the Midwest's large corn farms. Some large-acreage units under single ownership were formed at about the turn of the present century, when Midwestern farmland was in early development stages. Ownership of remaining large acreages of land has generally been tightly controlled by family financial interests. In recent years, other large units have been formed in areas where extensive land development has been required. These units were usually adjacent to major rivers or were in communities where extensive opportunity existed to exploit available technology. Three out of the four group B units were formed in such areas.

Given the possible entrepreneural returns shown in table 16, organizers of large units can be competitive with family-sized units in bidding for purchase or rental of land. However, one difficulty for such organizers is purchasing or renting enough land for a large unit within an operating territory in a short enough period of time to obtain the advantages shown for large units. Most class I land is in private ownership in small tracts. Individual tracts become available for purchase or rental at different times in an operating territory. For nonfarm investors, obtaining enough of these through purchase or rental to

develop a 2,000-acre unit appears more feasible than obtaining enough for a 5,000-acre unit.

Large-unit organizers may be the most successful in obtaining the necessary amount of land in areas where large amounts of money are needed for land development and irrigation. Greater opportunity for development of large units in the immediate future appears to be outside the central Corn Belt. Given the organizational uncertainty in establishing a new large unit and the extended startup time required, a large number of nonfarm investor-entrepreneurs are not likely to be immediately attracted to such activity in the Corn Belt.

Even after recognizing the limitations of the assumptions used for the feasibility budgets and financial returns analysis in part II and considering the growth success shown by nine of the 10 case units, there remains the easy temptation to project a major increase in the numbers of units with 2,000 or more acres of corn. The temptation is encouraged by the additional assumptions made of profit maximization objectives for individual firms, no change from the current technological status, and essentially a lack of institutional impediments. All these assumptions do not fully account for the interaction of numerous economic variables in a dynamic economy nor for the personal values and goals of people and firms in the farm and agricultural sector. Under present institutional structures, efficient family-sized operations with growth objectives appear to hold a competitive advantage in gaining control of the number of crop acres necessary for large, profitable corn units. With a sufficient financial position or a highly favorable production performance, or both, managers of family-sized farms with less than 1,000 acres will be able to rent or purchase additional nearby land.

Not all successful operators with fewer than 1,000 acres of Midwestern crop production can be expected to attempt to grow to large size. The risk and uncertainty inherent in further growth may discourage some operators even when their financial position and overall management and entrepreneurial skills are sufficient to achieve such growth. Family sacrifices possibly needed to achieve growth may not appear equal to the potential financial gains. Also, nonfarm investment opportunities may appear superior to further farm firm growth risks.

Several other factors that may influence the number and importance of large corn farms have not been quantified in this or other studies. The following two sections comprise a qualitative discussion of some of these considerations.

TECHNOLOGICAL CONSIDERATIONS

Technological developments in production and business may have an important influence on the future relative position of family- and large-sized corn production units. However, projection of technological developments and possible implications continues to be an inexact science.

Corn-breeding work may develop plants that will require a substantial change in the complement of purchased inputs and will need large capital outlays for production. Some types of future corn plants may require field layouts that can be production isolated; production of such corn may thus be most feasible only on large acreages that can be isolated from other corn production.

During recent years, there has been a trend toward design and manufacture of large farm machines, including those for crop production. This trend is projected to continue. Remote- or automatic-control machines are presently discussed but do not appear feasible in the near future. However, present evidence indicates that machines can be designed and manufactured to meet the economic needs of nearly any size of corn production unit. Larger machines that may be developed in the future could reduce per unit production costs below those shown for 5,000-acre units.

Air, water, and farm product pollution have become of increasing concern to the public. Residue from crop chemicals is of concern because of its effect on both the quality of crop and livestock food products and the quality of water for livestock and human consumption. Commercial fertilizer leaching and runoff into water supplies, as well as soil erosion into water supplies, is also causing concern. New legislation may alter possible farm organizational patterns after more is learned about the potential impacts of (1) a reduction in the use of crop chemicals and fertilizers, (2) the substitution of other crop chemicals for those presently used, or (3) the control of crop chemical and fertilizer runoff. Control of runoff may be the most difficult to achieve for corn production in (1) areas of high-density population where the runoff into human water supplies is the main problem and (2) areas where the runoff into both livestock and human water supplies is the main concern.

Conceptually, pollution problems may be solved by technological breakthroughs that may be neutral or

serve as incentives or disincentives for large corn production units. Technological breakthroughs do not yet exist to enable determination of whether one-owner, large, contiguous acreages of land will be needed to develop effective pollution control.

Technological developments in business may be equally as important as physical and biological ones. Common ownership of large farm businesses, agribusinesses, or nonagricultural interests, as well as integrated and contract production, may become important considerations. Midwestern feed grain and livestock production are, at present, relatively free of such arrangements. However, livestock, poultry, fruit, and vegetable commodities have come under such arrangements in recent years. Conditions creating an economic need for a certain quantity and quality of product in a certain time period appear the most important if integrated or contract production is to develop for most Midwestern corn production. Such conditions do not yet exist and are not likely to develop in the immediate future. Developments in institutional and retail food services may encourage specified production of feed grains as inputs for livestock production activities that may be owned by institutional food services and retail food firms.

ADDITIONAL CONSIDERATIONS

Production and financial objectives of large-unit owners are diverse. As seen in our interviews, financial accumulation opportunities were implied important objectives of individuals and firms with no previous farming experience. Owners of large units developed from family-sized units emphasized growth in corn production. All of the owners and managers stressed the personal satisfaction derived from owning or managing a large unit or both. Competition with friends managing similar-sized investments was another motivation factor that was emphasized. Most of the owners or managers were not willing to state specific objectives for acreage size or gross or net income level. However, acreage size was usually increased each year or two for most units with under 3,000 acres.

For corn farms of 1,500 to 3,000 acres, the maximum input discounts were usually achieved by operating input supply businesses as a way to obtain the corn production inputs at the lowest possible price. Selling inputs to other farmers makes this possible. The types of businesses most commonly found were dealerships in machinery, fertilizer, seed, chemicals, and petroleum products.

Sometimes farmers have expanded into the input supply field and sometimes enterpreneurs of supply businesses have bought farming resources as investment and financial accumulation permitted. In some cases, successful farmers have actively promoted new landowning corporations involving lawyers, bankers, accountants, machinery dealers, and so on, as business associates. Here, the farmers became tenant operators of the land they owned along with other investors in the enterprise.

Even with 50-percent equity and half the land rented, it now takes about $400,000 in equity assets to control a corn unit of 2;000 acres. This requirement highlights problems of estate planning and business continuity for a unit owned and managed by a farmer and his wife. Incorporation provides a method of planning for the transfer of an estate with a minimum loss of family wealth through taxes. It does not necessarily provide for continuity of management. If the unit is large enough to support a paid manager, the choice of managers may be widened since people besides members of the owner's family may be employed. However, wealth accumulation and transfer of management remain definite problems for individual owners of large units. The inability to develop plans for transferring farm units intact from one generation to the next could inhibit the formation of large midwestern corn units through the growth of existing units. The larger units may incorporate. Nonowner-managers and minority stockholders may then encounter problems in achieving their personal, financial, and management objectives.

Another problem area for large units is the profit-sharing arrangement with management and creditors. Management and capital generally are available if the opportunity for financial gains is attractive. Traditional labor and management arrangements have been set up essentially for owner-operators. These arrangements remain applicable for most corn production. Yet for some other agricultural commodities and for business in general, contracts are being written which incorporate base wages for managers and interest for creditors, with profits over prescribed levels being shared by formula between owners, managers, and creditors. Such arrangements for corn production could increase the competitive advantage of large units over smaller family-held businesses.

Institutional changes in farm input and product markets can affect large-farm developments. Will inputs and accompanying services be available at similar prices to both large- and family-sized units or will the apparent disadvantages of smaller units continue? Future location of market outlets and business growth objectives of the outlets' owners and

managers can have a major impact on family-sized units. Changes in credit availability through changes in State usury laws and federally regulated policies can also considerably affect family-sized units and farm size.

Several additional institutional factors may be important for the future of large farm units. Among these are farm commodity legislation, credit availability, and income tax policy, each of which influences profit levels and capital gain prospects for venture money. In addition, the general level of domestic economic activity and the off-farm employment opportunities for family-sized farm operators can influence the number and importance of large units, as well as family-sized and part-income units.

Apparently, many rural people are concerned about the gradual trend toward the formation of large farms and do not readily favor it. If these units are owned by "outside capital," the concern is magnified. Currently, people in the more industrialized and populated eastern part of the Midwest are less concerned. Yet most large farms have an "image" problem in their community. This problem may not seriously retard the formation of large farm units, but it will not help either. However, legislation against large farm corporations, which has been passed or is pending in some States could be a problem for the large farm. Not all large units are incorporated.

Large corn production units appear capable of providing some desirable benefits for the economy. Their wage levels can be competitive with those in nonfarm employment. These units should be able to try more production and business innovations that require more capital than family-sized operations can provide. Management training and development, a constant challenge in farming, may be more effectively accomplished by large units. If so, this could attract the highly trained and motivated people who are needed if an industry is to be dynamic.

Extensive land development remains necessary in some communities for higher level and more efficient production. Large units with ample financing appear better suited to carry out such activities more efficiently than do a large number of small individual farmers who usually cannot coordinate their efforts.

This report focused on farms producing a single product, corn. However, the cash grain farms in the Corn Belt, from which the corn farms studied were selected, usually produce corn as the major crop and devote smaller acreages to soybeans, small grains, and forage. Such diversification, which will probably continue, may permit a better seasonal use of labor and machinery and allow price, weather, disease, and weed risks to be spread over more than one crop.

The Corn Belt has lagged behind other geographic areas in developing large cattle feedlots. Multiple-product large units both producing corn and feeding cattle or hogs, for example, may become more important in the Midwest. Thus far in the area, very few livestock enterprises have developed that did not have direct control over a substantial amount of corn and forage needed for feed. Combining corn and livestock production in a single unit offers the opportunity to eliminate drying, transportation, and other grain marketing and handling costs. Usually these costs must be paid by the livestock producer who buys the corn. In some cases, separate corn and livestock units that are physically close together enter into a contract before production begins.

Modern large-scale livestock enterprises do not resemble those organized by farmers on family-labor-sized farms who usually gear livestock work to fit requirements of off-peak seasonal crop production. Instead, large livestock units are industrialized, with weekly labor requirements which show little variation. Thus, the livestock activities require specialized full-time workers who have little opportunity to help with crop work during the planting or harvesting season. However, when crop work is light, full-time crop production labor can be used to provide building maintenance and to assist with manure handling and other livestock-associated tasks. More research is needed to determine the potential for increased large-scale livestock production as corn farms increase in size and number.

Management economies or diseconomies may occur in multiple-product firms since several different types and levels of management are required. On specialized corn units of 500 to 5,000 acres, one manager can handle the entire operation, although usually a field foreman or assistant manager is needed on the 5,000-acre unit. If a large cattle-feeding enterprise is added to a large corn farm, an assistant manager for cattle feeding is needed. For multiple-product firms, additional assistant managers are needed for each major enterprise that is added.

The presence of more large corn production units could encourage development of more large cattle-feeding operations if (1) economies could occur in the transfer of feed from the large production unit to the feedlot and (2) large units could more economically produce the corn and silage needed. More large feedlots may evolve if the crop production and feeding units are commonly owned or if operators of large feedlots need large corn farms to provide specified corn inputs.

Where large units or a few aggressive family-sized operations become prominent in a local community, extensive structural change may occur in the nonfarm business sector. Nonfarm firms that depend on

numbers of people for their business are affected when fewer, larger units employ fewer managers and laborers than would live and work in a community of predominately family-sized units. When increasing percentages of farm inputs are purchased and farm products marketed away from a local community, agribusiness firms in this community may tend to become nonviable. Potential effects of fewer, larger units and of aggressive family-sized operations vary from community to community and by trade area. In areas where urban development is increasing, farm firms may not play a dominant part in the future viability of the towns and cities. In areas where local town business is largely dependent on farm firm activity for survival, minor changes in farm numbers and in purchasing and sales patterns could cause major changes in the related business activity of local merchants.

The need exists to frequently collect and analyze production and financial coefficients for units of various sizes. In addition, several questions about large midwestern corn farms remain unanswered. More work is needed on estimation of the number of corn production firms by size, ownership structure, and relative importance. Insight is needed—by geographic and trade area—on how much land would be available to form large units and under what conditions it would be available. In addition, more insight is needed on the magnitude of entrepreneurs' and investors' interests in developing large corn farms.

The cost and income model used in this study for single-product firms needs to be extended to guide multiple-product analysis. Considerable conceptual analysis is needed of large firms that produce two or more farm commodities and may have input, marketing, or nonfarm businesses. Large conglomerate firms were not frequently encountered during the course of work for this report. However, a few of them exist that have an interest in corn production. They are unique but important and should be considered.

Since changes in farm ownership and operation may influence changes in agribusinesses and other firms in local communities and trade areas, separate studies are needed to analyze the external impact of both the development of more large farms and their activities within these communities and areas.

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APPENDIX TABLES

Appendix table 1.–ASCS commodity program participants operating units with a feed grain base of 500 or more acres, by State, region, and United States, 1969[1]

State and region	Program participants operating units with acreage size of–										
	500-749	750-999	500 to 999 (total)	1,000-1,499	1,500-1,999	2,000-2,999	3,000-3,999	4,000-5,999	6,000-7,999	8,000 or more	1,000 or more[2] (total)
	Number										
Maine	0	0	0	0	0	0	0	0	0	0	0
New Hampshire	0	0	0	0	0	0	0	0	0	0	0
Vermont	0	0	0	0	0	0	0	0	0	0	0
Massachusetts	0	0	0	0	0	0	0	0	0	0	0
Rhode Island	0	0	0	0	0	0	0	0	0	0	0
Connecticut	0	0	0	0	0	0	0	0	0	0	0
New York	2	0	2	0	0	0	0	0	0	0	0
New Jersey	2	0	2	0	0	0	0	0	0	0	0
Pennsylvania	5	5	10	0	0	3	0	0	0	0	3
Delaware	4	0	4	0	0	0	0	0	0	0	0
Maryland	11	1	12	0	1	0	0	0	0	0	1
Northeast	24	6	30	0	1	3	0	0	0	0	4
Michigan	27	3	30	1	0	0	0	0	0	0	1
Wisconsin	26	4	30	4	1	0	0	0	0	0	5
Minnesota	476	111	587	54	8	3	0	0	0	0	65
Lake States	529	118	647	59	9	3	0	0	0	0	71
Ohio	60	18	78	3	2	0	1	0	0	0	6
Indiana	175	37	212	12	4	3	1	0	0	0	20
Illinois	390	83	473	31	5	3	0	0	0	0	39
Iowa	486	103	589	32	4	1	1	0	1	0	39
Missouri	309	91	400	56	11	6	1	1	0	0	75
Corn Belt	1,420	332	1,752	134	26	13	4	1	1	0	179
North Dakota	666	160	826	60	17	1	1	0	0	0	79
South Dakota	483	97	580	52	11	8	3	0	0	0	74
Nebraska	1,029	202	1,231	86	21	6	2	0	0	0	115
Kansas	868	300	1,168	173	31	20	2	0	0	0	226
Northern Plains	3,046	759	3,805	371	80	35	8	0	0	0	494
Virginia	6	0	6	2	0	0	0	0	0	0	2
West Virginia	0	0	0	0	0	0	0	0	0	0	0
Kentucky	26	7	33	5	1	0	0	0	0	0	6
Tennessee	12	5	17	1	0	0	0	0	0	0	1
North Carolina	23	10	33	2	2	2	1	1	0	0	8
Appalachian	67	22	89	10	3	2	1	1	0	0	17
South Carolina	14	3	17	4	0	0	0	0	0	0	4
Georgia	115	45	160	21	3	4	1	0	0	0	29
Florida	26	7	33	5	0	0	0	0	0	0	5
Alabama	41	15	56	3	4	1	0	0	0	0	8
Southeast	196	70	266	33	7	5	1	0	0	0	46

Note: See footnotes at end of table.

Continued–

Appendix table 1.–ASCS commodity program participants operating units with a feed grain base of 500 or more acres, by State, region, and United States, 1969[1] – Continued

State and region	Program participants operating units with acreage size of–										
	500-749	750-999	500 to 999 (total)	1,000-1,499	1,500-1,999	2,000-2,999	3,000-3,999	4,000-5,999	6,000-7,999	8,000 or more	1,000 or more[2] (total)
	Number										
Mississippi	12	2	14	3	2	0	0	0	0	0	5
Arkansas	3	0	3	1	0	0	0	0	0	0	1
Louisiana	7	1	8	1	0	0	0	0	0	0	1
Delta States	22	3	25	5	2	0	0	0	0	0	7
Oklahoma	132	36	168	24	9	7	2	0	0	0	42
Texas	1,777	641	2,418	413	117	44	11	9	1	1	596
Southern Plains	1,909	677	2,586	437	126	51	13	9	1	1	638
Montana	179	64	243	28	7	7	0	0	0	0	42
Idaho	46	17	63	11	5	2	0	0	0	0	18
Wyoming	10	1	11	0	2	0	0	0	0	0	2
Colorado	340	137	477	95	34	14	2	1	0	0	146
New Mexico	172	59	231	45	15	5	0	1	0	0	66
Arizona	33	10	43	11	6	4	1	1	1	2	26
Utah	0	1	1	0	0	0	0	0	0	0	0
Nevada	0	0	0	0	0	0	0	0	0	0	0
Mountain	780	289	1,069	190	69	32	3	3	1	2	300
Washington	87	27	114	9	2	1	0	0	0	0	12
Oregon	32	9	41	9	1	1	0	1	0	0	12
California	155	68	223	74	32	28	8	12	1	3	158
Pacific	274	104	378	92	35	30	8	13	1	3	182
United States	8,267	2,380	10,647	1,331	358	174	38	27	4	6	1,938

[1] Feed grain acreage includes only corn, grain sorghum, and barley. All feed grain acreage program participants were included in the States where their largest number of feed grain acres were located. Total base acres may be overstated since owners' and operators' acres may have been double counted in some cases. A 100-percent sample was drawn of all ASCS participants with a feed grain base of 500 acres or more.

[2] Operating unit participants include only owner-operators and tenants.

Appendix table 2.–ASCS commodity program participants operating units with a corn base of 500 or more acres, by State, region, and United States, 1969[1]

State and region	Program participants operating units with acreage size of–										
	500-749	750-999	500 to 999 (total)	1,000-1,499	1,500-1,999	2,000-2,999	3,000-3,999	4,000-5,999	6,000-7,999	8,000 or more	1,000 or more[2] (total)
	Number										
Maine	0	0	0	0	0	0	0	0	0	0	0
New Hampshire	0	0	0	0	0	0	0	0	0	0	0
Vermont	0	0	0	0	0	0	0	0	0	0	0
Massachusetts	0	0	0	0	0	0	0	0	0	0	0
Rhode Island	0	0	0	0	0	0	0	0	0	0	0
Connecticut	0	0	0	0	0	0	0	0	0	0	0
New York	2	0	2	0	0	0	0	0	0	0	0
New Jersey	2	0	2	0	0	0	0	0	0	0	0
Pennsylvania	5	5	10	0	0	3	0	0	0	0	3
Delaware	4	0	4	0	0	0	0	0	0	0	0
Maryland	11	1	12	0	1	0	0	0	0	0	1
Northeast	24	6	30	0	1	3	0	0	0	0	4
Michigan	27	3	30	1	0	0	0	0	0	0	1
Wisconsin	26	4	30	4	1	0	0	0	0	0	5
Minnesota	322	71	393	33	4	1	0	0	0	0	38
Lake States	375	78	453	38	5	1	0	0	0	0	44
Ohio	60	18	78	3	2	0	1	0	0	0	6
Indiana	175	37	212	12	4	3	1	0	0	0	20
Illinois	390	83	473	31	5	3	0	0	0	0	39
Iowa	485	103	588	32	4	1	1	0	1	0	39
Missouri	295	89	384	52	11	6	1	1	0	0	71
Corn Belt	1,405	330	1,735	130	26	13	4	1	1	0	175
North Dakota	91	20	111	11	2	0	1	0	0	0	14
South Dakota	441	92	533	46	11	7	3	0	0	0	67
Nebraska	825	165	990	66	18	4	2	0	0	0	90
Kansas	93	21	114	7	1	0	0	0	0	0	8
Northern Plains	1,450	298	1,748	130	32	11	6	0	0	0	179
Virginia	6	0	6	2	0	0	0	0	0	0	2
West Virginia	0	0	0	0	0	0	0	0	0	0	0
Kentucky	26	7	33	5	1	0	0	0	0	0	6
Tennessee	12	4	16	1	0	0	0	0	0	0	1
North Carolina	23	10	33	2	2	2	1	1	0	0	8
Appalachian	67	21	88	10	3	2	1	1	0	0	17
South Carolina	14	3	17	4	0	0	0	0	0	0	4
Georgia	115	45	160	21	3	4	1	0	0	0	29
Florida	26	7	33	5	0	0	0	0	0	0	5
Alabama	41	15	56	3	4	1	0	0	0	0	8
Southeast	196	70	266	33	7	5	1	0	0	0	46

Note: See footnotes at end of table.

Continued–

Appendix table 2.–ASCS commodity program participants operating units with a corn base of 500 or more acres, by State, region, and United States, 1969[1] – Continued

State and region	Program participants operating units with acreage size of–										
	500-749	750-999	500 to 999 (total)	1,000-1,499	1,500-1,999	2,000-2,999	3,000-3,999	4,000-5,999	6,000-7,999	8,000 or more	1,000 or more[2] (total)
	Number										
Mississippi	12	2	14	2	1	0	0	0	0	0	3
Arkansas	1	0	1	0	0	0	0	0	0	0	0
Louisiana	5	0	5	1	0	0	0	0	0	0	1
Delta States	18	2	20	3	1	0	0	0	0	0	4
Oklahoma	3	0	3	0	0	0	0	0	0	0	0
Texas	19	9	28	6	1	0	0	0	0	0	7
Southern Plains	22	9	31	6	1	0	0	0	0	0	7
Montana	8	2	10	0	0	0	0	0	0	0	0
Idaho	0	0	0	0	0	0	0	0	0	0	0
Wyoming	2	1	3	0	0	0	0	0	0	0	0
Colorado	31	2	33	4	0	1	0	0	0	0	5
New Mexico	2	0	2	1	0	0	0	0	0	0	1
Arizona	0	0	0	0	0	0	0	0	0	0	0
Utah	0	0	0	0	0	0	0	0	0	0	0
Nevada	0	0	0	0	0	0	0	0	0	0	0
Mountain	43	5	48	5	0	1	0	0	0	0	6
Washington	2	0	2	0	0	0	0	0	0	0	0
Oregon	0	0	0	0	0	0	0	0	0	0	0
California	12	1	13	2	0	0	0	0	0	0	2
Pacific	14	1	15	2	0	0	0	0	0	0	2
United States	3,614	820	4,434	357	76	36	12	2	1	0	484

[1] All corn acreage program participants were included in the States where their largest number of corn acres were located. Total base acres may be overstated since owners' and operators' acres may have been double counted in some cases. A 100-percent sample was drawn of all ASCS participants with a feed grain base of over 500 acres.

[2] Operating unit participants include only owner-operators and tenants.

Appendix table 3.–ASCS commodity program participants operating units with a grain sorghum base of 500 or more acres, by State, region, and United States, 1969[1]

State and region	Program participants operating units with acreage size of–										
	500-749	750-999	500 to 999 (total)	1,000-1,499	1,500-1,999	2,000-2,999	3,000-3,999	4,000-5,999	6,000-7,999	8,000 or more	1,000 or more[2] (total)
	Number										
Northeast	0	0	0	0	0	0	0	0	0	0	0
Michigan	0	0	0	0	0	0	0	0	0	0	0
Wisconsin	0	0	0	0	0	0	0	0	0	0	0
Minnesota	1	0	1	0	0	0	0	0	0	0	0
Lake States	1	0	1	0	0	0	0	0	0	0	0
Ohio	0	0	0	0	0	0	0	0	0	0	0
Indiana	0	0	0	0	0	0	0	0	0	0	0
Illinois	0	0	0	0	0	0	0	0	0	0	0
Iowa	1	0	1	0	0	0	0	0	0	0	0
Missouri	14	2	16	3	0	0	0	0	0	0	3
Corn Belt	15	2	17	3	0	0	0	0	0	0	3
North Dakota	0	0	0	0	0	0	0	0	0	0	0
South Dakota	14	1	15	1	0	0	0	0	0	0	1
Nebraska	191	34	225	18	2	2	0	0	0	0	22
Kansas	758	276	1,034	166	30	20	2	0	0	0	218
Northern Plains	963	311	1,274	185	32	22	2	0	0	0	241
Virginia	0	0	0	0	0	0	0	0	0	0	0
West Virginia	0	0	0	0	0	0	0	0	0	0	0
North Carolina	0	0	0	0	0	0	0	0	0	0	0
Kentucky	0	0	0	0	0	0	0	0	0	0	0
Tennessee	0	1	1	0	0	0	0	0	0	0	0
Appalachian	0	1	1	0	0	0	0	0	0	0	0
Southeast	0	0	0	0	0	0	0	0	0	0	0
Mississippi	0	0	0	1	1	0	0	0	0	0	2
Arkansas	2	0	2	1	0	0	0	0	0	0	1
Louisiana	2	1	3	0	0	0	0	0	0	0	0
Delta States	4	1	5	2	1	0	0	0	0	0	3
Oklahoma	123	35	158	24	9	7	2	0	0	0	42
Texas	1,734	627	2,361	406	115	44	11	8	1	1	586
Southern Plains	1,857	662	2,519	430	124	51	13	8	1	1	628

Note: See footnotes at end of table.

Continued–

Appendix table 3.–ASCS commodity program participants operating units with a grain sorghum base of 500 or more acres, by State, region, and United States, 1969[1] –Continued

State and region	Program participants operating units with acreage size of–										
	500-749	750-999	500 to 999 (total)	1,000-1,499	1,500-1,999	2,000-2,999	3,000-3,999	4,000-5,999	6,000-7,999	8,000 or more	1,000 or more[2] (total)
	Number										
Montana	0	0	0	0	0	0	0	0	0	0	0
Idaho	0	0	0	0	0	0	0	0	0	0	0
Wyoming	0	0	0	0	0	0	0	0	0	0	0
Colorado	253	115	368	82	32	12	2	1	0	0	129
New Mexico	170	59	229	43	15	5	0	1	0	0	64
Arizona	25	2	27	8	4	2	0	1	0	0	15
Utah	0	0	0	0	0	0	0	0	0	0	0
Nevada	0	0	0	0	0	0	0	0	0	0	0
Mountain	448	176	624	133	51	19	2	3	0	0	208
Washington	0	0	0	0	0	0	0	0	0	0	0
Oregon	0	0	0	0	0	0	0	0	0	0	0
California	4	1	5	4	0	1	1	0	0	0	6
Pacific	4	1	5	4	0	1	1	0	0	0	6
United States	3,292	1,154	4,446	757	208	93	18	11	1	1	1,089

[1] All grain sorghum acreage program participants were included in the States where their largest number of grain sorghum acres were located. Total base acres may be overstated since owners' and operators' acres were double counted in some cases. A 100-percent sample was drawn of all ASCS participants with a feed grain base of over 500 acres.

[2] Operating unit participants include only owner-operators and tenants.

Appendix table 4.–ASCS commodity program participants operating units with a barley base of 500 or more acres, by State, region, and United States, 1969[1]

State and region	Program participants operating units with acreage size of–										
	500-749	750-999	500 to 999 (total)	1,000-1,499	1,500-1,999	2,000-2,999	3,000-3,999	4,000-5,999	6,000-7,999	8,000 or more	1,000 or more[2] (total)
	Number										
Northeast	0	0	0	0	0	0	0	0	0	0	0
Michigan	0	0	0	0	0	0	0	0	0	0	0
Wisconsin	0	0	0	0	0	0	0	0	0	0	0
Minnesota	153	40	193	21	4	2	0	0	0	0	27
Lake States	153	40	193	21	4	2	0	0	0	0	27
Ohio	0	0	0	0	0	0	0	0	0	0	0
Indiana	0	0	0	0	0	0	0	0	0	0	0
Illinois	0	0	0	0	0	0	0	0	0	0	0
Iowa	0	0	0	0	0	0	0	0	0	0	0
Missouri	0	0	0	1	0	0	0	0	0	0	1
Corn Belt	0	0	0	1	0	0	0	0	0	0	1
North Dakota	575	140	715	49	15	1	0	0	0	0	65
South Dakota	28	4	32	5	0	1	0	0	0	0	6
Nebraska	13	3	16	2	1	0	0	0	0	0	3
Kansas	17	3	20	0	0	0	0	0	0	0	0
Northern Plains	633	150	783	56	16	2	0	0	0	0	74
Applachian	0	0	0	0	0	0	0	0	0	0	0
Southeast	0	0	0	0	0	0	0	0	0	0	0
Delta States	0	0	0	0	0	0	0	0	0	0	0
Oklahoma	6	1	7	0	0	0	0	0	0	0	0
Texas	24	5	29	1	1	0	0	1	0	0	3
Southern Plains	30	6	36	1	1	0	0	1	0	0	3
Montana	171	62	233	28	7	7	0	0	0	0	42
Idaho	46	17	63	11	5	2	0	0	0	0	18
Wyoming	8	0	8	0	2	0	0	0	0	0	2
Colorado	56	20	76	9	2	1	0	0	0	0	12
New Mexico	0	0	0	1	0	0	0	0	0	0	1
Arizona	8	8	16	3	2	2	1	0	1	2	11
Utah	0	1	1	0	0	0	0	0	0	0	0
Nevada	0	0	0	0	0	0	0	0	0	0	0
Mountain	289	108	397	52	18	12	1	0	1	2	86

Note: See footnotes at end of table.

Continued–

Appendix table 4.–ASCS commodity program participants operating units with a barley base of 500 or more acres, by State, region, and United States, 1969[1] – Continued

State and region	Program participants operating units with acreage size of–										
	500-749	750-999	500 to 999 (total)	1,000-1,999	1,500-1,999	2,000-2,999	3,000-3,999	4,000-5,999	6,000-7,999	8,000 or more	1,000 or more[2] (total)
	Number										
Washington	85	27	112	9	2	1	0	0	0	0	12
Oregon	32	9	41	9	1	1	0	1	0	0	12
California	139	66	205	68	32	27	7	12	1	3	150
Pacific	256	102	358	86	35	29	7	13	1	3	174
United States	1,361	406	1,767	217	74	45	8	14	2	5	365

[1] All barley acreage program participants were included in the States where their largest number of barley acres were located. Total base acres may be overstated since owners' and operators' acres may have been double counted in some cases. A 100-percent sample was drawn of all ASCS participants with a feed grain base of 500 or more acres.

[2] Operating unit participants include only owner-operators and tenants.