UNIVERSITY OF IDAHO
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Efficient Resource Combinations on Dryland Farms in Southeastern Idaho

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Contents

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Introduction

INCOMES of wheat farmers in southeastern Idaho have declined substantially in recent years. This drop in income can be attributed to a combination of factors, of which wheat acreage restrictions, declining prices for wheat and feed grains, and increasing operating costs are the most important. Farmers are faced with the problem of determining what adjustments they can make in their farming operations to limit the effect of the cost-price squeeze and improve their net incomes.

PURPOSE

This report is designed to present the results of an analysis of the operating costs of different sizes of specialized wheat-summerfallow farms and to ascertain returns for operators' labor and management from appropriate combinations of land, labor, and capital resources. It is believed that this will provide farmers with the basic information they need to make decisions applicable to their specific situations.

Data needed for the analysis were obtained by personal interview with 75 wheat farmers in southeastern Idaho. These farmers furnished information on available resources, operating costs, and cultural practices for their farming units. The farms of cooperating farmers were distributed on the basis of cropland acreage as follows:

12 percent of the farms had less than 500 acres of cropland.
23 percent of the farms had 500 to 999 acres of cropland.
28 percent of the farms had 1,000 to 1,499 acres of cropland.
26 percent of the farms had 1,500 to 1,999 acres of cropland.
4 percent of the farms had 2,000 to 2,499 acres of cropland.
2 percent of the farms had 2,500 to 2,999 acres of cropland.
5 percent of the farms had over 3,000 acres of cropland.

[1] Agricultural Economist, Farm Economics Research Division, Agricultural Research Service, U.S. Department of Agriculture. The author wishes to express appreciation to Carl H. Gotsch, former graduate assistant at the University of Idaho, for his assistance in the field work and the initial stages of data analysis. Thanks are also due to the farmers who provided the basic data for the study.

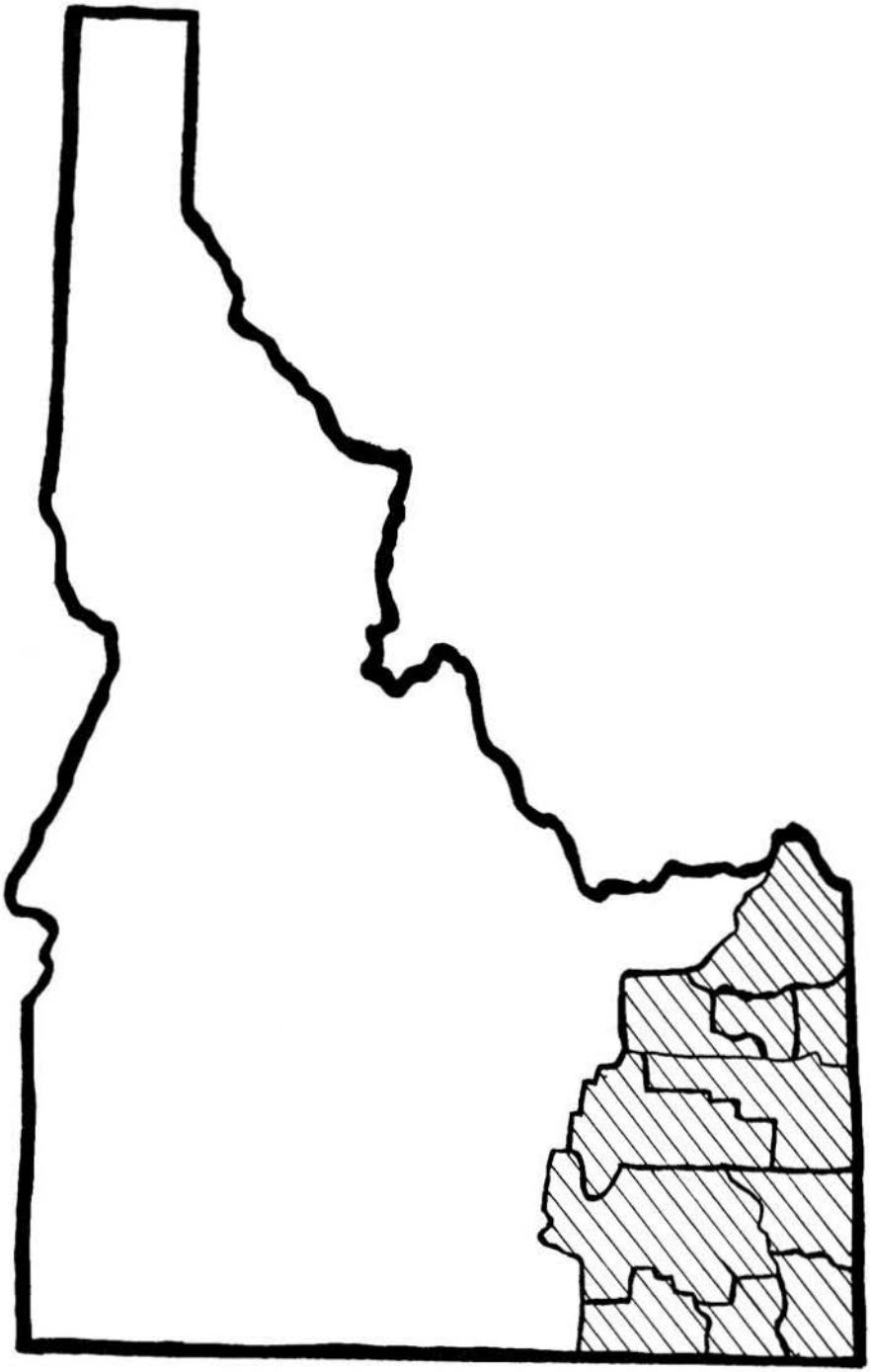

Figure 1—The study area.

Other information was obtained from various sources, including county agents, state and county A.S.C. offices, Crop Reporting Service, and machinery dealers.

The technique used in analyzing and presenting the results of the study is the farm budget method for representative sizes of farm organizations.

STUDY AREA

The dryland wheat area of southeastern Idaho includes portions of 12 counties illustrated in Figure 1. In 1958, according to the Crop Reporting Service, this area produced 42 percent of the dryland wheat grown in the State.

The altitude of the area is relatively high, ranging from 6,300 feet in northern Fremont County to 4,300 feet in Power County. The topography varies from nearly level benchlands, through gently rolling areas, to steep hills.

The growing season varies from an average of 74 frost-free days at the higher elevations to about 130 days at lower elevations. At some of the higher elevations, it is difficult to distinguish between the last spring frost and the first fall frost as in some years, frosts occur in practically every month. Climatic conditions generally limit crop production to grains, and the incidence of frost damage to these crops varies among different parts of the area. Snow mold is a problem peculiar to fall-planted grains grown at higher altitudes.

Soils are of loessial origin, mainly of the Ritzville loam type. With satisfactory weather, the soils have adequate fertility to produce good crops on an alternate crop-fallow basis. From 1946 to 1958 inclusive, annual precipitation averaged 12 inches. In 1958, precipitation varied from a high of 21 inches reported in Fremont County to a low of 9 inches in Bingham County. More than 40 percent of the annual precipitation normally comes in the form of snow in winter, and 25 percent of the annual rainfall occurs during May and June, when it is beneficial to crop production.

Low annual precipitation, coupled with other climatic conditions, not only limits the types of crops that can be grown on dryland farms, but also the varieties and cropping practices. An alternate crop-fallow system with half the cultivated land in crops and the rest in fallow, is the general rule. Wheat is sown in the fall, while most of the barley, the major alternative to wheat, is planted in the spring. Winter barley yields are much higher than those of spring varieties in years with mild winters; however, a truly winter-hardy variety is not yet available. Because of their predominant position on dryland farms, these two grains were the only crops considered in the study.

Subsurface tillage on fallow land, which leaves stubble residue near the surface, is the usual practice on dryland grain farms.

The practice of stubble mulch farming as recommended by the Idaho Agricultural Experiment Station[2] will result in maximum yields over an extended period in addition to its effectiveness in reducing erosion losses.

Nitrogen fertilization in connection with stubble mulching is recommended for some soils at rates of 30 to 40 pounds of nitrogen per acre. Applications above this range are not advisable because of the limited precipitation. Because of its limited use in the area, however, fertilizer was left out of the farm budgets.

Basis for Budgets

Farm budgets are used in this study to permit the changing of individual inputs and related production rates in order to measure their effect on income. Emphasis is placed on relative costs and returns rather than on their absolute levels. Farmers can use these budgets to measure the likely effects of changes in the organizations of their farms, as well as the effects of changes in their production practices.

Budgets are based on typical farming situations and practices in the area. A farmer can readily adapt the results of this study to his own situation by inserting figures based on his experience on his own farm.

FARM ORGANIZATIONS

Operators of the representative farms in this study are assumed to specialize in dryland production of wheat and barley. Wheat is the major cash crop. Barley is produced on the acreage diverted from wheat production by the acreage-allotment program. Although livestock enterprises and other crop enterprises are not included in the analysis, their importance to certain farmers in the study area is recognized.

Size—Budgets were prepared for farms with 1,000, 2,000 and 3,000 acres of cropland. These farms are designated as small, medium, and large, respectively. The sizes were chosen on the basis of machinery combinations, performance rates for various items of equipment, and time available to complete the field operations. Timeliness of fieldwork is an important factor in the success of dryland farming; however, profits can be reduced sharply by machinery investments larger than are required to perform the necessary operations on time. Machinery is one of the major farming investments. Farmers with excess machinery or machines larger than needed to do the job, could reduce their expenses and raise their net returns by reducing their machinery invest-

[2] Siddoway, F. H., H. C. McKay and K. H. Klages, *Dryland Tillage Methods and Implements*, Idaho Agricultural Experimental Station Bulletin No. 252, March, 1956.

ment to the size and type required to complete the cultural operations in the time available.

Harvesting was considered by farmers to be the most critical operation with regard to time limits. Few migratory harvesting crews come into the area; and because of the short harvesting season, few local farmers have time for custom combining. Thus the farmers must own combines. The sizes of farms selected were determined in large degree by the acreage that could be harvested by the combines within the available time. Tractor-implement combinations can be adjusted to some extent for various sizes of farms. But this is not the case for combines.

The size of each representative farm selected approaches the upper limit of a range of acreages that can be operated with the machinery inventory used in the budget. Some operators are able to farm more than the acreages selected with the machinery inventory by working beyond a 10-hour day. In the study reported, a working day of 10 hours was assumed and longer work days were not considered. An average level of farm management ability was also assumed.

Land Use—On the specialized wheat-summerfallow farms studied, half the total cropland is available for crop production each year. Without acreage restrictions, this cropland was generally seeded to winter wheat. Under the acreage-allotment program, two-thirds of the available cropland is seeded to wheat and the diverted acres to barley. The cropping patterns for different sizes of farms budgeted are given in Table 1.

Table 1—Land use on specialized dryland wheat farms in southeastern Idaho

Land Use	Small Farm	Medium Farm	Large Farm
	Acres	Acres	Acres
Winter wheat	334	667	1,000
Spring Barley	166	333	500
Summerfallow	500	1,000	1,500
Total	1,000	2,000	3,000

INPUT-OUTPUT ASSUMPTIONS

Practices and production rates assumed in this section are based on the typical situation found in the study area. The importance of adapting them to the farmer's own situation is again emphasized.

Field Operations and Time Requirements—The optimum period and estimated days available for each field operation are given in Table 2. They are based on Weather Bureau data, Experiment Station information, and farmer survey data. Crop spraying is not shown as this operation is usually hired and re-

quires a relatively short time. Spraying time depends on the growth made by weeds, and timing is important if best results are to be obtained. Fertilizing can be a separate operation, or it can be done in connection with a tillage operation. Timeliness for this job is not considered important because of the long period of time available for its completion.

The calculation of time requirements for machinery and labor for fieldwork is given in Appendix Table 1. Machinery performance rates are based on farmers' estimates and substantiated by the Nebraska Tractor Tests[3]. The time available exceeds the

Table 2—Optimum period, available time, and equipment used to perform field operations on specialized dryland wheat farms, southeastern Idaho

Operations	Optimum Period	Time Available	Comment
	Dates	Days	
FALLOWING			
Deep soil tillage Chisels or sweeps to open soil to winter moisture and prevent soil erosion.	Aug. 15 to Oct. 15	35	Total available time, 60 days minus 15 days required for seeding winter wheat and 10 days inclement weather.
Stubble busting Tandem disks, offset disks, blade plows to break down stubble in preparation for summer cultivation.	April 15	20	Begun as soon as spring barley is seeded. Total available time, 45 days minus 25 days inclement weather.
Rod Weeding To kill weeds and hold moisture at highest level. Usually done three times during the summer.	June 1 to Aug. 1	45	Total available time, 60 days minus 15 days inclement weather.
CROPPING			
Seeding			
Winter wheat Deep furrow drills	Sept. 1 to Sept. 15	15	Optimum seeding time is very important. Seeding has priority over tillage operations.
Spring barley a. Tandem disking b. Rod weeding c. Seeding	Early as possible to May 15	10-15	Spring seeding has priority. Usually begin seedbed preparation by April 15. Seeding should be complete by May 15.
Harvesting	Aug. 1 to Aug. 15	15	Most farmers considered 15 days of harvesting a minimum. Operators of large farms often indicated more available time than those of smaller farms.

[3] The Nebraska Tractor Tests for 1958 were used. These tests are conducted to determine tractor performance with various drawbar loads.

time required for all operations except combining. Time requirements for harvesting equal the estimated time available. Hauling grain during harvest is not shown separately as this work is performed on the basis of yield and distance of the round trip to the grain storage facilities. Labor requirements for hauling depend upon the number of days of harvesting and number of drivers required.

Yield and Price Assumptions—Dryland crop yields vary among the different counties and within counties. Yields of winter wheat range from reported highs of 50 bushels to yields so low that the crop is not harvested. The average dryland wheat yield estimated for the area by the Crop Reporting Service for 1946 to 1958 was 20 bushels. Yields of 20, 25, and 30 bushels of wheat and 25, 30, and 35 bushels of barley are budgeted to show the effects of increased yields on farm income.

The average barley yield for the area as estimated by the Crop Reporting Service is 25 bushels per acre. Prices of $1.70 per bushel, or $56.60 per ton, for wheat, and $1.70 per 100 pounds, or $34 per ton, for barley are used in the budgets. These are average prices received by farmers for their 1958 crops.

INVESTMENTS

The investments in land, buildings, and machinery on the three representative farms are given in Table 3.

Land—Too few sales were reported in the study area to determine a market price of land. Therefore, the average appraisal value of $75 per acre was used.

Buildings—Each farm budgeted is assumed to have storage facilities adequate to store one year's crop. The cost of storage facilities was obtained from estimates made by farmers and dealers in grain storage buildings. On the 1,000-acre farm, the buildings are circular type bins, and the larger farms have both circular and quonset types.

Machinery storage buildings are assumed to be large enough to house adequately the machines required. The buildings are of the metal quonset type with cement foundation and floor and can be used temporarily for extra grain storage.

Machinery—Data on the power and equipment needed to operate the three representative farms were based primarily on the types and sizes of machines observed on farms in the area. Inventories varied greatly from farm to farm. The most common sets of equipment were assumed for each farm budgeted.

The machinery on the 1,000-acre farm includes a 30 to 40 h.p. crawler tractor with associated equipment and one combine. The 2,000-acre farm has a 50 to 60 h.p. crawler tractor with associated

equipment and 2 combines. The 3,000-acre farm has both a 30 to 40 h.p. crawler tractor and a 50 to 60 h.p. crawler tractor with associated equipment and 3 combines[4].

These inventories are believed to approach the minimum equipment needed to operate the representative farms. Inventory values for the various equipment items are the purchase prices reported by farmers.

Table 3—Investments in land, buildings, and machinery for three representative farms

Investments	Small farm	Medium farm	Large farm
	Dollars	Dollars	Dollars
Land	75,000	150,000	225,000
Buildings	8,351	13,617	18,775
Machinery	28,618	47,148	68,698
Total	111,969	210,765	312,473

COSTS

Variable costs are the cash operation costs that vary with acreage operated and number of bushels produced. Fixed costs are those that must be met annually and cannot be charged to any specific farm enterprise.

Variable Costs—The operator's labor is not included as a cash expense but other family labor is valued as though it were hired. The small farm is operated by one man with his own machinery, except during harvest. He spends approximately 818 hours on direct farm labor. This does not include time spent on repairs and upkeep and on general farm management duties. During harvest the farmer operates his combine and hires a man with a truck to haul grain. The grain hauler drives the farmer's truck as well as his own, leaving one truck in the field to be loaded while he drives the other to the elevator or bin storage. Thus, two trucks and one driver haul the grain from one combine.

The medium size farm is also operated by one man, with his own machinery, except during harvest. He spends approximately 1,014 hours on direct farm labor. He operates one combine and hires an additional combine operator at $2 per hour to operate the second combine. The operator owns two trucks. Two truck drivers are hired at $1.50 per hour. Thus, two trucks with two drivers haul for two combines.

The operator of the large farm hires 560 hours of part-time labor for preharvest work at $1.50 per hour. The operator spends approximately 693 hours on direct farm labor. At harvest time, he operates one combine and hires two additional combine oper-

[4] A complete inventory of the machinery for each of the representative farms is given in Appendix Table 2.

ators at $2.00 per hour. The operator owns three trucks, and two drivers are hired at the rate of $1.50 per hour. Thus three trucks with two drivers haul the grain from three combines.

The costs of fuel, oil, grease, and repairs are based on the number of hours required to perform the necessary operations. The rates of use of fuel, oil, and grease are based on the Nebraska Tractor Tests and on information from the farm survey. Prices of these items are those paid by farmers in the study area. Repair costs are based on the number of hours each machine is used in the farming operation. Appendix Table 3 shows the machinery operating costs for the three farms.

The average cost of custom weed spraying is $1.90 per acre for broad-leaved weed killers of the 2-4-D type. The average proportion of seeded acres sprayed on farms in the area is 40 percent. Spraying is done once only.

The farm share of automobile costs is determined by the amount of use for farm business as reported by farmers. This includes operating costs only. Depreciation is listed on the schedule with machinery depreciation in Appendix Table 4. The automobile is used for trips to town for small supply purchases and for farm management activities. Automobile operating costs charged to the small, medium, and large farms are $500, $600, and $650, respectively.

Truck expense is the farmer's cost of operating his own trucks. In harvest a 200-bushel load is hauled an average distance of 20 miles. Additional truck use at seeding time and for miscellaneous hauling jobs around the farm is also considered. Some custom haulers are available in the area for hauling grain during harvest. The custom hauling rate for one man with a truck is $25 a day.

Cleaning and treating charges are included in the price of seed grain that is purchased. Prices used are $2.10 per acre for wheat, with a seeding rate of 60 pounds per acre; and $1 per acre for barley, with a seeding rate of 48 pounds per acre.

Fixed Costs—License costs are figured at $25 per truck and $17.50 for one automobile. As the automobile is used for farm purposes only half time, the license fee charged to the farming operation is $8.75. Insurance costs for farmers included in the study average 37 cents per acre of cropland. This includes insurance on vehicles, buildings, and machinery, personal liability coverage, and Workmen's Compensation Insurance.

Supplies, telephone, electricity, accounting services, and miscellaneous expenses on farms in this area average about 30 cents per acre.

Personal property taxes are figured at 1 percent of the machinery investment. Real estate taxes on farms studied average $1.02 per acre.

Machinery depreciation is based on the average life of a machine as reported by farmers in the survey. The straight-line depreciation method is used, with allowance made for a 10-percent salvage value. The depreciation schedule is shown in Appendix Table 4.

The building depreciation, based on an estimated average life of 30 years is given in Table 4.

Table 4—Depreciation of buildings with 30 years estimated life

Building	Small farm		Medium farm		Large farm	
	Cost	Dep.	Cost	Dep.	Cost	Dep.
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Grain storage	3,351	112	6,117	204	8,775	293
Machine Storage	5,000	167	7,500	250	10,000	333
Total	8,351	279	13,617	454	18,775	626

Analysis of Budgets

Table 5 shows the income, expenses, and net returns on the three representative farms. The relative differences between the expenses and returns of the farms, rather than their absolute levels, should be stressed. Note that the total net farm income and the net farm income per acre increase more than in proportion to the increase in the farm size.

SCALE ECONOMIES

These increasing returns, or economies of scale, are due to some of the considerations listed below. Equipment-operating costs (fuel, oil, grease, and repairs) per acre are $1.80 on the small farm, $1.75 on the medium size farm, and $1.51 on the large farm.

The per acre cost of the farm share of automobile operating expense also decreases with increases in farm size. Depreciation costs also reflect economies of scale.

The one major item of cost that increases with increases in farm size is hired labor. The operator of the small farm has no hired labor cost. The per acre hired labor cost is $3.93 on the medium sized and $6.46 on the large farm.

No charge is made for operator labor in Tables 5 and 6. Return to operator labor and management, calculated as a residual return after interest on the machinery and real estate investment have been substracted, is shown in Table 6.

However, certain scale economies result from treating operator labor as an opportunity cost. If a charge of $3,600, the average annual wage for a hired man were assumed, it would reduce

Table 5—Income, expenses, and returns, representative farms in southeastern Idaho

Item	Small farm	Medium farm	Large farm	Farmer's[1] situation
	Dollars	Dollars	Dollars	
Income:				
Wheat	11,356	22,678	34,000	
Barley	3,386	6,793	10,200	
Total	14,742	29,471	44,200	
Cash expense:				
Hired labor	0	785	1,939	
Fuel, oil, grease repairs[2]	1,800	3,494	4,516	
Weed spraying	380	760	1,140	
Car (farm share)	500	600	650	
Truck	119	238	357	
Custom hauling	375	0	0	
Supplies and misc.	300	600	900	
Seed	867	1,734	2,600	
Licenses	33	59	84	
Insurance	370	748	1,129	
Taxes	1,286	2,511	3,747	
Total	6,030	11,629	17,062	
Net cash income	8,712	17,942	27,138	
Less depreciation	2,988	5,697	8,226	
Net farm income	5,724	12,245	18,912	

[1] Space is provided for the farmer to fill in his own items of income and expense for comparative purposes.
[2] From Appendix Table 3.

the net farm incomes of the three representative farms to $2,124, $8,645, and $15,312. The net farm incomes per acre would then be $2.12, $4.32, and $5.10, respectively. This suggests that the economies of scale are much greater than those indicated in Table 5. Consider the increase in farm size from 1,000 to 2,000 acres. When a charge is made for operator labor, doubling the farm size increases the net farm income a little more than four times. Increasing the farm size from 1,000 to 3,000 acres, or tripling the size, increases the net income by more than seven times.

It was pointed out previously that the operator provides all the necessary pre-harvest labor on the medium sized farm. During harvest, additional labor is hired for $440. The operator of the smaller farm does not fully utilize his labor resources. By working an additional 196 hours, he could operate twice as large

a farm. This, of course, assumes that he has adequate capital available for expansion. The per acre cash expense on farms larger than the medium sized farm is increased primarily because more hired labor is required.

RETURNS TO THE FARM OPERATOR

Information on income, expenses, and net returns in this report are for representative farms. No doubt each farmer has resources that differ from those of the representative farms. Therefore, farmers can make the best use of the information in this report by comparing their own farm incomes and expenses with those of the farms budgeted. These comparisons will help them select the size of operation that best suits their resource situation. Space is available in Tables 5 and 6 for farmers to list their own items of income and expense.

The net farm income indicated in Table 6 is a total return to the labor, capital, and management of the operator. To determine the returns a farmer gets on his labor and management, a price can be put on each item of capital investment. Assume that the farmer owns all the capital assets debt free. A return of 6 percent is assumed on the machinery investment; this approximates machinery loan interest charges. When this return to machinery investment is subtracted from net farm income, the result is a return to the farmer's labor and management and to the real estate investment shown in Table 6.

A return of 5 percent is assumed on the appraised value of the land investment, and on 60 percent of the new cost of farm buildings, the average building value. The residual return to labor and management is also shown in Table 6.

Farmers who own their land and/or machinery free of debt may use the interest on these investments, along with the return

Table 6—Return to investments, labor, and management, three representative farms in southeastern Idaho

Item	Small farm	Medium farm	Large farm	Farmer's[1] situation
	Dollars	Dollars	Dollars	Dollars
Net farm income[2]	5,724	12,245	18,912	
Less 6% interest on machinery	1,717	2,829	4,122	
Return to labor, management, and real estate investment	4,007	9,416	14,790	
Less 5% interest on real estate investment	3,750	7,500	11,250	
Return to operator's labor and management	257	1,916	3,540	

[1] Space is provided for the farmer to fill in his own items of income and expense for comparative purpose.
[2] From Table 5.

to labor and management, for living expenses. Farmers who must pay interest on land, buildings, and machinery may be forced to use their depreciation allowances to meet living expenses.

Table 7 illustrates the labor use on the representative farms. Earlier it was noted that hired labor requirements increase with the increase in farm size. The operator, however, spends less time on direct labor on the larger farms and presumably more time on management. The net result is that the total direct operating labor increases less than in proportion to increases in farm size.

Table 7—Labor requirements, three representative farms in southeastern Idaho

Labor	Small farm	Medium farm	Large farm
	Hours	Hours	Hours
Direct operating labor of farm operator	818	1,014	693
Hauling labor	157	314	314
Direct operating hired labor	0	157	874
Total direct operating labor	975	1,485	1,881

EFFECTS OF INCREASING YIELDS

Table 8 shows the per acre incomes, expenses, and returns for the three representative farms. Large increases in returns are realized from 5-bushel increases in yields of wheat and barley. This indicates the importance of utilizing the best quality, high-yielding seed, recommended varieties, and recommended cultural practices. These are probably the most important steps farmers can take to increase their income.

With each 5-bushel increase in yields of wheat and barley on the three farms illustrated, the net returns are increased $3.51 per acre.

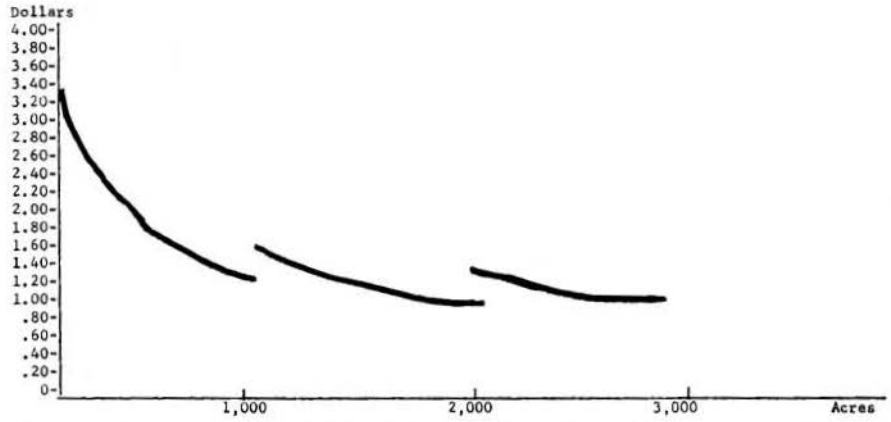

Figure 2—Average total cost curves of wheat farms in southeastern Idaho

Conclusions

The three representative farm budgets illustrate the importance of combining machinery, land, and labor in a way that will yield the lowest average total costs. These budgets are based on present practices, yields, and sizes and performance rates of tractors and equipment. Although they need to be revised with changing practices and tractor and equipment sizes and performance rates, they demonstrate also the marked effects that yields can have on income.

AVERAGE TOTAL COSTS

The average total costs shown in Figure 2 do not include charges for operators' labor. They are the total out-of-pocket costs incurred on the farms studied. Note that relative minimum average total costs occur at the 1,000 and 2,000-acre farm sizes. Because of scale economies pointed out earlier, the absolute minimum of the average total cost is at the 3,000-acre farm size. Similarly, the 2,000-acre farm shows economies of scale over the 1,000-acre farm and has lower average total costs.

Table 8—Income, expenses, and returns per acre on farms with varying yields

Item	Average yields	5-bushel increase	10-bushel increase
	Bushels	**Bushels**	**Bushels**
Yields:			
Wheat	20	25	30
Barley	25	30	35
	Dollars	**Dollars**	**Dollars**
Small farm:			
Gross farm income	14.74	18.25	21.76
Less cash expense	6.03	6.03	6.03
Net cash income	8.71	12.22	15.73
Less depreciation	2.99	2.99	2.99
Net return to labor capital and management	5.72	9.23	12.74
Medium farm:			
Gross farm income	14.74	18.25	21.76
Less cash expense	5.76	5.76	5.76
Net cash income	8.98	12.49	16.00
Less depreciation	2.85	2.85	2.85
Net return to labor capital and management	6.13	9.64	13.15
Large farm:			
Gross farm income	14.74	18.25	21.76
Less cash expense	5.69	5.69	5.69
Net cash income	9.05	12.56	16.07
Less depreciation	2.74	2.74	2.74
Net return to labor capital and management	6.31	9.82	13.33

On the basis of these indications of technological economies of scale, one would expect the long-run adjustments to be toward the larger farms, if land prices are not affected unduly by such changes. An increase in land prices could hamper or even stop the adjustment to larger farms. The limit of these adjustments to larger size is not known because of inadequate information on the cost structure of farms larger than those budgeted, but the trend would be toward the 3,000-acre farm size. However, many additional considerations affect these adjustments. Some of them are listed below.

ADJUSTMENT OPPORTUNITIES

Consider now the adjustments that can be made to reduce costs.

Most farmers can find new or improved practices that will enable them to increase crop yields profitably. Farmers with acreages below or between the representative farm sizes have additional alternatives. They can do as follows:

1. Keep the farm at its present size and make no changes in amounts of equipment and labor used in the operation.
2. Make more efficient use of their labor and machinery resources by doing custom work for other farmers.
3. Increase their cropland acreages by purchase or rental. Dovetailing their current farming operations with land in another production area where the growing season is sufficiently earlier or later will permit them to use the same equipment and labor resources over a longer period. The additional cost of transporting the equipment must be recognized.
4. Decrease their cropland by selling or renting out part of the farm and reducing their equipment inventory to fit the needs of the reduced farm size. When custom operators are available, they could hire some of the farmwork done on a custom basis.

The decisions a farmer makes regarding these alternatives will depend upon some of the following considerations:

1. The opportunity costs or alternative uses of his capital and labor. A farmer may be able and he may prefer to invest his capital and/or labor in a business that will give him greater returns than he could get from expanding his farming operations.
2. The supply and demand for land for sale or rent. There have been very few land sales in the area. This limits the opportunities for farm enlargement.
3. The terms of financing for additional land purchases. The length of loan, the interest costs, and the availability of loan funds all affect a farmer's decision.

4. The preference for leisure time in lieu of earnings from labor. A farmer may place a higher value on leisure time than on the additional income that would result from increased farm labor.

5. The farmer's attitude toward the additional risk which he would incur in expanding his farm business. This is determined partly by the following factors:

   a. His age. If the farmer is nearing retirement age, he may be reluctant to expand his operation because of the additional demands on his capital, labor, and management. A younger farmer is likely to have a different attitude toward risk.

   b. His plans. The length of time a man plans to continue to farm as an operator or a landlord will affect his decisions.

   c. His equity in land and equipment. A farmer with full equity may not be willing to risk his equity in order to take the added risks of an expanded operation.

Appendix Table 1—Rates of performance and time requirements for field operations on specialized dryland wheat farms, southeastern Idaho

Item	Unit	Summerfallow				Winter wheat		Barley			
		Deep soil	Stubble	Rod weeding			Com-		Rod		Com-
				I	II & III	Seeding	bining	Disking	weeding	Seeding	bining
SEASON		Fall	Spring	Summer		Fall	Fall	Spring	Spring	Spring	Fall
Small farm											
Acreage worked	acres	500	500	500	1,000	334	334	166	166	166	166
Rate of performance	A/hr.	3.2	5.5	5.3	6.8	8.9	3.5	5.5	6.8	8.9	3.5
Tractor use	hours	156	90	94	146	37	....	30	24	19	....
Labor requirements[1]	hours	173	100	104	162	41	106	33	27	21	51
Total time required	days	17	10	10	16	4	11	3	3	2	4
Time available[2]	days	35	20	45		15	11		15		4
Medium farm											
Acreage worked	acres	1,000	1,000	1,000	2,000	667	667	333	333	333	333
Rate of performance	A/hr.	5.3	10.5	8.0	9.2	12.6	7.0[3]	10.5	9.2	12.6	7.0[3]
Tractor use	hours	189	93	125	218	53	....	32	36	26	....
Labor requirements[1]	hours	210	103	139	242	59	210	36	40	29	96
Total time required	days	21	10	14	24	6	11	4	4	3	4
Time available[2]	days	35	20	45		15	11		15		4
Large farm											
Acreage worked	acres	1,500	1,500	1,500	3,000	1,000	1,000	500	500	500	500
Rate of performance	A/hr.	5.3	10.5	13.3[3]	16.0[3]	9.9	10.5[3]	10.5	8.0	9.9	10.5[3]
Tractor use	hours	283	143	224	188	101	....	48	62	50	....
Labor requirements[1]	hours	314	159	248	210	112	313	53	69	56	158
Total time required	days	31	16	12	11	11	11	5	7	6	4
Time available[2]	days	35	20	45		15	11		15		4

[1] For each nine hours of tractor or combine work, one hour of labor has been added for servicing of equipment.

[2] For time available refer to Table 2, Page 8.

[3] When more than one tractor or combine are used, the rate shown is the combined rate for the operation. Tractor hours and labor requirements are the total for two or three outfits as the case may be.

Appendix Table 2—Machinery and equipment inventory, three representative farms, southeastern Idaho

Item	Small farm		Medium farm		Large farm	
	No. and Size	Original cost	No. and Size	Original cost	No. and Size	Original cost
		Dollars		Dollars		Dollars
Tractor	1, 30-40 H.P.	10,000	1, 50-60 H.P.	15,000	1, 50-60 H.P.	15,000
Tractor	———	———	———	———	1, 30-40 H.P.	10,000
Combine(s)	1, 14' S.P.	6,800	2, 14' S.P.	13,600	3, 14' S.P.	20,400
Disks	2, 10' tandem	1,552	3, 10' tandem	2,328	3, 10' tandem	2,328
Rod weeders	2, 12'	1,000	3, 12'	1,500	5, 12'	2,500
Tool bar	1, 14'	1,116	1, 21'	1,420	1, 21'	1,420
Grain drills deep furrow	2, 12'	2,200	3, 12'	3,300	3, 12'	3,300
Truck(s)	1, 1½ ton	3,700	2, 1½ ton	7,400	3, 1½ ton	11,100
Automobile (½ new cost)	1	1,500	1	1,500	1	1,500
Grain auger(s)	1	500	2	750	2	750
Shop equipment	———	250	———	350	———	400
Total investment		28,618		47,148		68,698
Per acre investment		28.62		23.57		22.90

Appendix Table 3—Machinery operating costs, three representative farms, southeastern Idaho

Item	Repairs			Fuel			Grease and oil	Total operating costs per year
	Cost per hour	Yearly use	Total repair costs	Total	Cost per gal.	Total fuel cost	Total cost	
	Dollars	Hours	Dollars	Gallons	Dollars	Dollars	Dollars	Dollars
Small farm								
Tractor 30-40 h.p.	0.80	596	467.80	1,907	0.18	343.26	41.72	861.78
Combine	3.40	142	482.80	539	0.23	123.97	19.88	626.65
Disks (2)	0.52	120	62.40				2.40	64.80
Rod weeders (2)	0.33	264	87.12				5.38	92.50
Tool bar	0.37	156	57.72				3.12	60.84
Drills (2)	1.10	56	61.60				1.68	63.28
Grain auger			5.00				0.50	5.50
Shop equipment			25.00					25.00
Total								1,800.35
Medium farm								
Tractor 50-60 h.p.	1.20	772	926.40	3,628	0.18	653.04	92.64	1,672.08
Combines (2)	6.80	142	965.60	1,079	0.23	248.17	39.76	1,253.53
Disks (3)	0.78	125	97.50				2.50	100.00
Rod weeders (3)	0.50	379	189.50				7.58	197.08
Tool bar	0.47	189	88.83				3.78	92.61
Drills (3)	1.65	79	130.35				2.37	132.72
Grain augers (2)			10.00				1.00	11.00
Shop equipment			35.00					35.00
Total								3,494.02
Large farm								
Tractor 50-60 h.p.	1.20	624	748.80	2,933	0.18	527.94	74.88	1,351.62
Tractor 30-40 h.p.	0.80	363	290.40	1,162	0.18	209.16	25.41	524.97
Combines (3)	10.20	142	1,448.40	1,619	0.23	372.37	59.64	1,880.41
Disks (3)	0.78	191	148.98				3.82	152.80
Rod weeders (3)	0.50	212	106.00				4.24	110.24
Rod weeders (2)	0.33	150	49.50				3.00	52.50
Tool bar	0.47	283	133.01				5.66	138.67
Drills (3)	1.65	151	249.15				4.53	253.68
Grain augers (2)			10.00				1.00	11.00
Shop equipment			40.00					40.00
Total								4,515.89

Appendix Table 4—Machinery depreciation, three representative farms, southeastern Idaho

Item	Small Farm			Medium Farm			Large Farm		
	No. and Size	Estimated life	Depreciation per year	No. and Size	Estimated life	Depreciation per year	No. and Size	Estimated life	Depreciation per year
		Years	Dollars		Years	Dollars		Years	Dollars
Tractor	1, 30-40 h.p.	10	900	1, 50-60 h.p.	10	1,350	1, 30-40 h.p.	10	900
Tractor							1, 50-60 h.p.	10	1,350
Combines S. P.	1, 14'	9	680	2, 14'	6	2,040	3, 14'	6	3,060
Disks	2, 10'	12	116	3, 10'	9	233	3, 10'	9	233
Rod weeders	2, 12'	12	75	3, 12'	9	150	5, 12'	9	250
Tool bar	1, 14'	12	84	1, 21'	8	160	1, 21'	8	160
Grain drills deep furrow	2, 12'	11	180	3, 12'	10	297	3, 12'	10	297
Trucks	1, 1½ ton	10	333	2, 1½ ton	10	666	3, 1½ ton	10	999
Automobiles	1	5	270	1	5	270	1	5	270
Grain augers	1	15	30	2	15	45	2	15	45
Shop equipment		10	23		10	32		10	36
Total			2,691			5,243			7,600

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