# Effect of Product Prices on Farm Organization and Income –SANDYLAND FARMS– Southwestern Oklahoma

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The overall purposes of this project are: (1) to provide guides to farmers choosing among alternative production opportunities, especially as those opportunities are affected by changes in prices and technology, and (2) to provide guides to farmers and other persons engaged in developing and administering public agricultural programs.

This is the eighth in a series of publications which have been developed from the Regional Project and Oklahoma Agricultural Experiment Station Project 1040.

**Agricultural Experiment Station**
**Oklahoma State University, Stillwater**

**and**

**Farm Production Economics Division**
**Economic Research Service**
**U. S. Department of Agriculture**

# Effect of Product Prices on Farm Organization and Income –SANDYLAND Farms– Southwestern Oklahoma

**James R. Martin*, William F. Lagrone*, James S. Plaxico****

This bulletin reports some of the results of a study in which estimates were made of the optimum (most profitable) combination of farm enterprises on representative farms with various soil types and cropland productivities in southwestern Oklahoma. The most profitable combinations were influenced by alternative prices of cotton, grain, and beef cattle.

Adjusting to changing conditions, both within and without agriculture, is one of the major problems facing farmers of our time. American agriculture has changed, in a relatively short time, from problems associated with providing adequate food and fiber for an expanding population to problems resulting from aggregate production of some commodities greater than demand at current prices.

## OBJECTIVE

The general objective of the overall study (S-42) is to provide information for farmers, farm policymakers, and the general public which will be useful in appraising alternative means of solving current farm adjustment problems. The specific objective of this report is to provide information useful in appraising the effect of changes in product prices on organization, production, and income on farms with sandy soils in southwestern Oklahoma.

The analysis is based on consideration of one farm situation which is assumed to be representative of all sandyland farms. Thus, the data may not fit exactly a specific individual farm. However, adaptations or adjustments can be easily made for other situations.

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## GEOGRAPHIC AREA

This report applies to the sandy soils of 11 counties in the Rolling Plains area of southwestern Oklahoma (Figure 1). According to the 1959 United States Census of Agriculture, the area contained approximately 16 percent of all land in farms in Oklahoma, 22 percent of the total cropland harvested, 70 percent of the cotton, 20 percent of the wheat, and about 13 percent of the cattle and calves on farms.

The agriculture of the area is composed of farms which primarily produce field crops—cotton, wheat, and other small grains—with supplementary livestock enterprises, and by ranching operations interspersed throughout the area. Cash grain and cotton farms account for about one-half of all the farms and total land in farms, and about two-thirds of the cropland harvested. Livestock farms account for about 11 percent of all farms and occupy about 18 percent of the total land. Cattle and calves were reported on about 80 percent of all farms in the area in 1959.

The Rolling Plains area is composed of three broad groups of soil resources: (1) clay soils, (2) loam soils, and (3) sandy soils. Each of these three soil resource groups occur in relatively homogeneous blocks over extensive areas. Each soil resource group has been divided into cropland

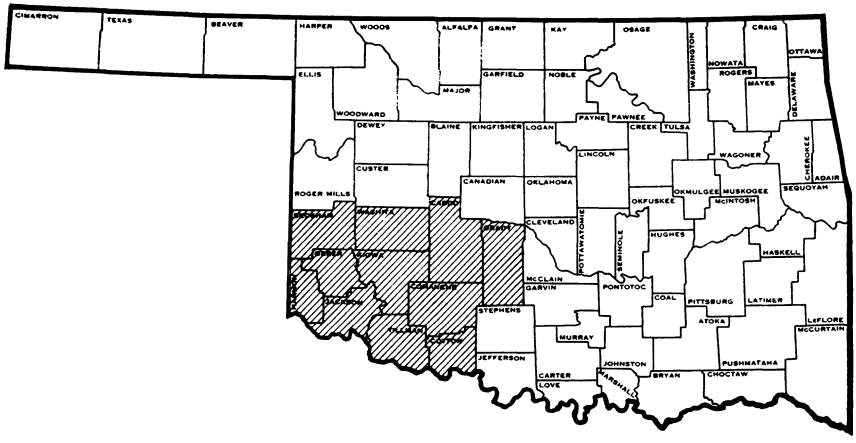


**Figure 1. Map Indicating the General Area of Study, Rolling Plains Area of Oklahoma**

productivity classes. The productivity ratings are based on soil surveys conducted by the Soil Conservation Service of the Department of Agriculture.

## METHOD OF ANALYSIS

The procedure used in this analysis involved (1) selecting a representative farm resource situation, (2) assembling data pertaining to price and assumed price relationships, (3) constructing yield and input budgets for adapted crops and classes of livestock, and (4) determining optimum farm organizations which would be most profitable under the various alternative situations assumed. Linear programming technique was used to determine optimum farm organizations.

The procedure involved analyses of the influence of various prices of cotton, wheat, grain sorghum, and beef cattle, and costs of capital on the optimum combination of enterprises for a representative sandyland farm in southwestern Oklahoma. A total of 30 optimum combinations of enterprises were developed, based on five cotton prices, three grain and beef cattle prices, and two different charges for the use of capital.

### A Representative Sandyland Farm

The major resource assumptions for the representative sandyland farm are shown in Table 1. The average size of a sandyland farm at present is smaller than the 640 acres of total land and 500 acres of cropland assumed as the representative situation. However, the average farm size is increasing and available data indicates that farmers operating 500 acres or more now control a large proportion of the area's sandy soil cropland. Very little change in farm organization occurs for different sizes of farms if the farm is of average size or larger. Sandy soil farms account for about 28 percent of all nonirrigated cropland in the area. Sandy soils as defined in this study range from moderately permeable fine sandy loams to more rapidly permeable loamy fine sands. In general, sandy cropland soils respond well to fertilizer treatment and other improved practices. The cropland of the representative sandy farm situation has been divided into four productivity classes—b, c, d, and e on the basis of topsoil depth, slope, and erosion condition (Table 1). These correspond to Soil Conservation Service capability classes II, III, IV, and VI. Because of a wind erosion hazard, no sandy soil was classified in productivity class a.

**Table 1.—Resource assumptions for the representative 640-acre sandyland farm**

| Resource | Unit | Quantity |
|---|---|---|
| Total land | Acre | 640 |
| Cropland | | |
| Class b | " | 125 |
| Class c | " | 230 |
| Class d | " | 125 |
| Class e | " | 20 |
| Total cropland | | 500 |
| Native pasture | " | 115 |
| Farmstead, etc. | " | 25 |
| Operator labor | Hour | |
| Jan.-Apr. | " | 624 |
| May-July | " | 572 |
| Aug.-Sept. | " | 396 |
| Oct.-Dec. | " | 528 |
| Total | " | 2,120 |
| Hired labor | " | [1] |
| Capital | Dollar | [2] |
| Technology | | [3] |

[1] Hired labor is available at a cost of $1.00 per hour.

[2] Capital is restricted to an amount that can be used in combination with other resources such that returns are at least 6 or 18 percent (whichever is specified) for each unit of capital used.

[3] Best presently available.

## Enterprise Alternatives

Levels of yields for alternative crops on the various productivity classes are shown in Table 2. Cotton, grain sorghum, and wheat are the major crop alternatives for sandyland farms in the area. Alfalfa is also grown on sandyland farms within the area. On an area-wide basis, most of the other feasible crop alternatives are limited to hay or pasture used by grazed cattle. These include small grain hay, small grain grazed and sudan grazed. Cotton production is confined to b and c productivity groups and may be produced under different levels of mechanization. Grain production is confined to b, c, and d productivity groups and alfalfa is confined to b and c productivity groups. No irrigated crops or pasture are included.

Various systems of beef cow-calf operations and of buy-sell stocker cattle production are considered feasible for the sandyland situation. Alternative systems for cow-calf beef production include spring or fall calving, creep and noncreep fed calves with various levels of winter rations. Alternative systems of stocker cattle production include fall buying, spring and summer selling of yearling feeder cattle, and different levels of pasture and winter rations.

**Table 2.—Crop and pasture yields by soil productivity groups, sandy soils**

| Crop | Unit | Yield by soil productivity group b | c | d | e |
|---|---|---|---|---|---|
| Cotton[1] | Lb. lint | 325 | 275 | 150 | --- |
| Wheat[2] | Bu. | 18 | 14 | 8 | --- |
| Grain sorghum[3] | Lb. | 1,750 | 1,300 | 1,000 | --- |
| Alfalfa[4] | | | | | |
| Hay only | Ton | 2.5 | 2.0 | --- | --- |
| Hay and seed basis | Ton hay | 2.0 | 1.5 | --- | --- |
| | Lb. seed | 75 | 50 | --- | --- |
| Small grain hay[2] | Ton | 1.7 | 1.5 | 1.2 | --- |
| Forage sorghum[3] | Ton | 2.0 | 1.7 | 1.3 | --- |
| Grazing[5] | | | | | |
| Sudan[6] | AUM | 2.7 | 1.9 | 1.3 | .9 |
| Grazed out small grain | AUM | 3.3 | 2.8 | 2.3 | 1.5 |
| Harvested small grain | AUM | .4 | .3 | .2 | --- |
| Rye cover crop | AUM | .5 | .4 | .3 | --- |

[1] 100 lbs. 10-20-10 and rye cover crop.

[2] 100 lbs. 13-39-0.

[3] 100 lbs. 16-20-0.

[4] 100 lbs. 8-32-16 for establishment and 100 lbs. of 0-46-0 during life of stand (4 years). Not more than 25 percent of cropland in each adapted class may be in alfalfa.

[5] Permanent pasture grazing yield is 1 AUM per acre of range. The acreage of cropland and rangeland for livestock budgets can be calculated from this table.

[6] 150 lbs. 16-20-0.

Source: William F. Lagrone, et. al., *Resource Requirements, Costs, and Expected Returns; Alternative Crop and Livestock Enterprises; SANDY Soils of the Rolling Plains of Southwestern Oklahoma,* Okla. Agr. Expt. Sta. Processed Ser. P-369, February 1961.

More detailed production information on all included crop and livestock enterprises with descriptions of classes of cropland, cropland and range productivity levels may be obtained from an earlier publication.[1] Estimates of yield levels and enterprise inputs are based on results obtained from agricultural experiment station research, survey data, and estimates by agricultural scientists. They represent advanced farm technology (the best presently available.)

Acreages of cotton and grain are not assumed to be limited by acreage allotments or production controls.

## Product Prices and Costs

Assumed prices received for products are shown in Table 3. A detailed listing of assumed prices paid by farmers is presented in Appendix Table 1. The levels of prices received and of costs items is based on prior analyses but they are not predictions or forecasts of future prices.

[1] Oklahoma Agricultural Experiment Station Processed Series P-369, February 1961.

**Table 3.—Assumed prices of farm products**

| Item | Unit | Base price | Variation in base price considered |
|---|---|---|---|
| | Dollars | Percent | |
| Cotton lint | Lb. | 0.22 | ±20, ±40 |
| Cotton seed | Ton | 50.00 | none |
| Wheat | Bu. | 1.25 | ±30 |
| Grain sorghum | Cwt. | 1.70 | ±30 |
| Alfalfa hay | Ton | 20.00 | |
| Alfalfa seed | Lb. | .21 | |
| Beef cattle | | | ±30 |
| Stocker and feeder steers* | | | |
| Good, 716# May sale | Cwt. | 22.50 | |
| Good, 800# August sale | Cwt. | 20.75 | |
| Stocker steer calves | | | |
| Good-choice, 485# September sale | Cwt. | 23.00 | |
| Stocker and slaughter heifer calves | | | |
| Good-choice, 460# September sale | Cwt. | 21.00 | |
| Cull cows, 987# | Cwt. | 13.50 | |

*Assumes comparable prices if stocker heifers used.

The prices of major products were varied to determine their effect on the farm organization. Cotton prices are varied ±20 and ±40 percent from the assumed base level of 22 cents per pound of lint cotton. Therefore, cotton prices range from 13.20 cents to 30.80 cents per pound of lint cotton. Wheat, grain sorghum, and beef cattle prices are varied ±30 percent of their base price levels. For purposes of the study, the base price of wheat is $1.25 per bushel with a range in price of $0.88 to $1.62 per bushel and the base price of grain sorghum is $1.70 with ranges in price of $1.19 to $2.21 per hundredweight. Although beef cattle prices are varied by the same magnitude as grain, the base prices assumed depend upon the kind of cattle and the time they are sold. All cost items, except the charge for capital, are assumed to remain at a constant level.

## EFFECT OF PRICE CHANGES

The linear programming model used to determine the optimum organizations requires the specification of land resources, fixed labor supply, and cost and income for alternative crop and livestock enterprises. In addition, capital requirements are estimated in order that the effect of different charges for capital may be evaluated. The most profitable farming system (providing maximum net returns to the fixed

land resources, 640 acres, and to the farm operator's labor, 2,120 hours) is obtained by examining various possible combinations of farm enterprises.

In comparing the results of the analysis, the basic assumption should be understood; namely, that the time period for adjustment is of sufficient length that no cost is associated with adjusting from one optimum farm organization to another. In a time period shorter than that assumed (next year, for example) certain costs may be associated with large adjustments in organization. Each organization is one which maximizes returns to the farm operator's land and labor under the specified prices and costs.

## Optimum Organizations with Six Percent Capital

With grain and beef cattle prices at the base level, cotton is included in the optimum organization at every cotton price level (Table 4). However, at the lowest cotton price, 13.2 cents per pound, only 17 acres or less than 4 percent of cropland is included. Grain sorghum is the major cash crop and occupies 178 acres or about 36 percent of the cropland. Alfalfa for sale is produced on 89 acres. Almost one-third of the total cropland (19 acres of small grain hay, 31 acres of small grain grazing, and 114 acres of cropland reseeded to a native grass mixture) is used for 15 beef cows and 66 beef stockers. Spring calves from the beef cow herd are sold in September and the buy-sell stocker cattle are sold off small grain pasture in May. The small cotton acreage is produced on the highest quality of cropland, class b. Grain sorghum, alfalfa, and wheat are produced on both class b and class c cropland (Appendix Table 2). Small grain hay is produced on class c cropland. Class d cropland is devoted to 31 acres of small grain grazed out and 94 acres reseeded to native grass. The 20 acres of class e cropland is reseeded to native grass at all price relationships.

At 17.6 cents per pound of cotton lint and base prices for other products cotton is grown on more than one-half of all cropland. It replaces all grain sorghum and wheat at this price level. Although the acreage in cropland pasture decreases, additional winter grazing from the rye cover crop planted on cotton land permits an increase in the stocker cattle enterprise to 71 head. The requirement of a winter cover crop to reduce wind erosion on sandy soils results in a complementary relationship between cotton and cattle production.

A lint price of 22 cents per pound results in 355 acres of cotton produced on all of the class b and class c cropland. When cotton is priced

## Table 4.—Optimum organizations at different cotton prices at six percent interest on nonland capital

| Enterprise | Unit | Cotton prices (cents per pound) 13.2 | 17.6 | 22.0 | 26.4 | 30.8 |
|---|---|---|---|---|---|---|
| *Feed grain and cattle at base prices* | | | | | | |
| Cotton | Acre | 17 | 266 | 355 | 394 | 430 |
| Wheat | Acre | 17 | ---- | ---- | ---- | ---- |
| Grain sorghum | Acre | 178 | ---- | ---- | ---- | ---- |
| Alfalfa | Acre | 89 | 89 | ---- | ---- | ---- |
| Hay | Acre | 19 | 26 | 35 | 37 | ---- |
| Pasture | Acre | 145 | 119 | 110 | 69 | 70 |
| Fallow | Acre | 35 | ---- | ---- | ---- | ---- |
| Cotton produced | Cwt. | 55 | 778 | 1,039 | 1,098 | 1,152 |
| Wheat produced | Bu. | 245 | ---- | ---- | ---- | ---- |
| Grain sorghum | Cwt. | 2,583 | ---- | ---- | ---- | ---- |
| Beef cows | Head | 15 | 12 | 10 | 6 | 6 |
| Beef stockers | Head | 66 | 71 | 95 | 102 | 104 |
| Operator labor | Hour | 1,757 | 2,016 | 2,120 | 2,120 | 2,120 |
| Hired labor | Hour | 179 | 337 | 208 | 357 | 378 |
| Nonland capital | Dollar | 24,955 | 30,031 | 32,345 | 33,529 | 35,129 |
| Net returns* | Dollar | 5,021 | 5,841 | 10,306 | 14,969 | 19,814 |
| *Feed grain and cattle prices 30 percent below base* | | | | | | |
| Cotton | Acre | 20 | 266 | 355 | 480 | 480 |
| Grain sorghum | Acre | 62 | ---- | ---- | ---- | ---- |
| Alfalfa | Acre | 89 | 89 | ---- | ---- | ---- |
| Hay | Acre | 9 | ---- | ---- | ---- | ---- |
| Pasture | Acre | 32 | 20 | 20 | 20 | 20 |
| Fallow | Acre | 12 | ---- | ---- | ---- | ---- |
| Idle | Acre | 276 | 125 | 125 | ---- | ---- |
| Cotton produced | Cwt. | 66 | 778 | 1,039 | 1,226 | 1,226 |
| Grain sorghum | Cwt. | 1,073 | ---- | ---- | ---- | ---- |
| Beef cows | Head | 9 | 10 | 10 | 10 | 10 |
| Beef stockers | Head | 30 | ---- | ---- | ---- | ---- |
| Operator labor | Hour | 1,475 | 1,858 | 1,969 | 2,118 | 2,118 |
| Hired labor | Hour | ---- | 192 | 8 | 326 | 326 |
| Nonland capital | Dollar | 12,953 | 16,126 | 15,217 | 20,087 | 20,087 |
| Net returns* | Dollar | 2,367 | 3,893 | 8,054 | 13,056 | 18,450 |
| *Feed grain and cattle prices 30 percent above base* | | | | | | |
| Cotton | Acre | 10 | 15 | 355 | 355 | 430 |
| Wheat | Acre | 48 | 102 | ---- | ---- | ---- |
| Grain sorghum | Acre | 240 | 240 | 33 | 33 | ---- |
| Hay | Acre | 58 | 29 | 37 | 37 | ---- |
| Pasture | Acre | 96 | 66 | 69 | 69 | 70 |
| Fallow | Acre | 48 | 48 | 6 | 6 | ---- |
| Cotton produced | Cwt. | 33 | 50 | 1,039 | 1,039 | 1,152 |
| Wheat produced | Bu. | 697 | 1,568 | ---- | ---- | ---- |
| Grain sorghum | Cwt. | 3,206 | 3,206 | 329 | 329 | ---- |
| Beef cows | Head | 3 | 6 | 6 | 6 | 6 |
| Beef stockers | Head | 134 | 97 | 102 | 102 | 104 |
| Operator labor | Hour | 1,922 | 1,760 | 2,120 | 2,120 | 2,120 |
| Hired labor | Hour | 95 | 36 | 238 | 238 | 378 |
| Nonland capital | Dollar | 30,521 | 25,372 | 32,724 | 32,724 | 35,129 |
| Net returns* | Dollar | 8,562 | 8,731 | 12,249 | 16,819 | 21,697 |

*Returns to land, operator labor, risk and management (includes returns to unallocated overhead costs).

at 26.4 cents per pound, cotton production is further expanded to include 39 acres of class d cropland. Finally, at a cotton price of 30.8 cents per pound, more than 85 percent of the total cropland is devoted to cotton production. Also, 50 acres of grazed out small grain on class d cropland and the 20 acres of class e cropland reseeded to native grasses are included in the optimum organization. The beef cattle enterprise includes 6 beef cows and 104 beef stockers.

At the base prices for feed grain and beef cattle, operator labor requirements increase about 400 hours and hired labor about 200 hours annually, from the lowest to the highest cotton price and production. Operator labor requirements increase during the January-April and August-September periods (Appendix Table 3). At cotton prices of 22 cents or more per pound all available operator labor is used during peak periods. Most of the hired labor is required during the May-July period.

The amount of nonland capital increases as cotton prices and production increase because of more stocker cattle permitted with additional winter grazing from the rye cover crop required on cotton land.

Net returns for the various organizations range from a low of $5,021 to a high of $19,814. At cotton prices above the 17.6 cent level, the increase in net returns results for the most part from increasing cotton prices rather than changes in enterprise organization (Table 4). With the price of cotton between 13.2 and 16.8 cents per pound the organization including 17 acres of cotton (Table 4) is optimum in terms of maximum net returns. The organization which includes 266 acres of cotton (programmed with cotton at 17.6 cents) results in maximum net returns over a relatively small cotton price range, from 16.8 cents to 18.0 cents per pound. Essentially all of the difference in net returns from the optimum organization with 22 cent cotton and optimum organization with higher prices of cotton is due to cotton prices. The 394 acres of cotton in the optimum plan at 26.4 cents per pound has an advantage of only $91 over the 355 acres of cotton also at a price of 26.4 cents. If 30.8 cents per pound were received for the cotton produced on the 355 acres of cotton (optimum at 22 cents) the net income would be only $365 less (19,449) than the income received with 430 acres of cotton (19,814). Therefore, the organization with 355 acres of cotton is optimum or near optimum over a range of cotton prices from 18.1 to 30.8 cents per pound of lint.

## Effect of Varying Major Alternative Product Prices

Compared with base prices for alternative products, only a moderate increase in cotton production occurs when the prices of feed grain and beef cattle are 30 percent below their base prices. Major effects on the optimum organizations compared with base prices include smaller livestock enterprises and large acreages of idle cropland at cotton prices of 22 cents and below (Table 4). At a cotton price of 13.2 cents per pound, grain sorghum and much of the pasture acreage on class c land is replaced by 151 acres of idle land. Alfalfa hay remains at 89 acres and cotton acreage increases from 17 to 20 acres. All 125 acres of class d land is left idle but 20 acres of class e land continue to be reseeded to native grasses. The sharply reduced acreages of pasture and hay are utilized by 9 beef cows and 30 beef stockers.

At cotton prices of 17.6 and 22.0 cents per pound, the principal difference in the optimum organizations is the sharp reduction in pasture and hay crops and livestock enterprises at the 30 percent below base prices for feed grain and livestock. All of the class d land is left idle. There is no beef stocker enterprise and only 10 beef cows in the optimum organization.

At cotton prices of 26.4 cents or more per pound, all cropland, 480 acres, is planted to cotton except the 20 acres of class e land reseeded to native grasses.

At low prices for feed grain and beef cattle, both labor and nonland capital requirements are reduced at all cotton price levels. Although cotton acreages are slightly higher, the amount of idle cropland at the lower cotton prices and smaller cattle numbers at the two highest cotton prices account for the reduced labor requirements. Smaller cattle numbers at all cotton prices are primarily responsible for lower nonland capital requirements.

Compared with base prices, all net returns are reduced with lower prices for feed grain and beef cattle with greatest reductions at the three lowest cotton prices.

When the prices of feed grain and beef cattle are 30 percent above their base prices, cotton is of minor importance in the optimum organizations at cotton prices below 22 cents per pound. Both grain sorghum and wheat are more important in the organizations at the two lowest cotton prices. The optimum organization at both the 22 and 26.4 cents per pound for cotton is similar to the organization at a cotton price of 22 cents and base prices for feed grains and cattle. However, grain sorghum

replaces part of the pasture on class d cropland at the higher feed grain and cattle price. The organization at the highest cotton price, 30.8 cents per pound, is the same with base or with 30 percent above base prices for feed grain and beef cattle. With higher prices for feed grain and beef cattle, net returns are greater for each cotton price comparison.

### Optimum Organizations with 18 Percent Capital

At a cost of 18 percent for the use of all nonland capital, investment in crop or beef cattle enterprises must return 18 cents for each dollar used. At base prices for feed grain and beef cattle, the highr capital cost results in a sharp reduction in the beef cattle enterprises. No beef stockers are included in the optimum organizations at any cotton price level (Table 5). At both the 13.2 and 17.6 cents price levels for cotton, wheat is the major crop and cotton acreage is limited to 20 acres. Cotton acreage increases to 355 acres at both the 22.0 and 26.4 cents cotton price levels and to 480 acres at 30.8 cents per pound for cotton. At a cotton price of 26.4 cents per pound or less, all of the class d cropland is idle.

At feed grain and beef cattle prices 30 percent below base, only 22 acres of cotton and 89 acres of alfalfa are produced at the lowest cotton price of 13.2 cents per pound. The remaining 389 acres of cropland is idle (Table 5). At other cotton prices, cotton acreage is either less than or equal to the acreage with six percent capital. All cropland not in alfalfa or cotton is left idle at all cotton prices.

With feed grain and cattle prices 30 percent above base, wheat is an important cash crop at both 13.2 and 17.6 cent cotton prices. Otherwise, the optimum organizations for the various cotton prices are similar at both capital cost levels. Except for price levels resulting in the same organizations, both nonland capital and labor requirements are less with an 18-percent capital cost than with a six-percent capital cost because of smaller beef cattle enterprises.

## SUMMARY

This report is designed to provide information useful in appraising the effects of changes in price relationships on organization, production, and income on farms with sandy soils in southwestern Oklahoma. A total of 30 various price relationships were analyzed, based on five price levels of cotton, three prices for feed grains and beef cattle, and two different charges for the use of capital.

## Table 5.—Optimum organizations at different cotton prices at a charge of 18 percent interest on nonland capital

| Enterprise | Unit | Cotton prices (cents per pound) 13.2 | 17.6 | 22.0 | 26.4 | 30.8 |
|---|---|---|---|---|---|---|
| *Feed grain and cattle at base prices* | | | | | | |
| Cotton | Acre | 20 | 20 | 355 | 355 | 480 |
| Wheat | Acre | 172 | 172 | ---- | ---- | ---- |
| Grain sorghum | Acre | 62 | 62 | ---- | ---- | ---- |
| Alfalfa | Acre | 89 | 89 | ---- | ---- | ---- |
| Pasture | Acre | 20 | 20 | 20 | 20 | 20 |
| Fallow | Acre | 12 | 12 | ---- | ---- | ---- |
| Idle | Acre | 125 | 125 | 125 | 125 | ---- |
| Cotton produced | Cwt. | 66 | 66 | 1,039 | 1,039 | 1,226 |
| Wheat produced | Bu. | 2,408 | 2,408 | ---- | ---- | ---- |
| Grain sorghum | Cwt. | 1,071 | 1,071 | ---- | ---- | ---- |
| Beef cows | Head | 10 | 10 | 10 | 10 | 10 |
| Operator labor | Hour | 1,565 | 1,565 | 1,988 | 1,988 | 2,117 |
| Hired labor | Hour | 56 | 56 | 8 | 8 | 326 |
| Nonland capital | Dollar | 11,232 | 11,232 | 15,217 | 15,217 | 20,087 |
| Net returns* | Dollar | 3,600 | 3,892 | 8,504 | 13,074 | 18,728 |
| *Feed grain and cattle prices 30 percent below base* | | | | | | |
| Cotton | Acre | 22 | 119 | 355 | 355 | 480 |
| Alfalfa | Acre | 89 | 89 | ---- | ---- | ---- |
| Idle | Acre | 389 | 292 | 145 | 145 | 20 |
| Cotton produced | Cwt. | 73 | 374 | 1,039 | 1,039 | 1,226 |
| Beef cows | Head | 9 | 9 | 9 | 9 | 9 |
| Operator labor | Hour | 1,253 | 1,569 | 1,949 | 1,949 | 2,099 |
| Hired labor | Hour | ---- | ---- | 3 | 3 | 321 |
| Nonland capital | Dollar | 6,603 | 10,153 | 14,857 | 14,857 | 19,728 |
| Net returns* | Dollar | 2,093 | 3,431 | 8,201 | 12,771 | 18,427 |
| *Feed grain and cattle prices 30 percent above base* | | | | | | |
| Cotton | Acre | 6 | 15 | 355 | 355 | 394 |
| Wheat | Acre | 136 | 127 | ---- | ---- | ---- |
| Grain sorghum | Acre | 215 | 215 | 33 | 33 | ---- |
| Hay | Acre | 35 | 35 | 37 | 37 | 37 |
| Pasture | Acre | 65 | 65 | 69 | 69 | 69 |
| Fallow | Acre | 43 | 43 | 6 | 6 | ---- |
| Cotton produced | Cwt. | 21 | 50 | 1,039 | 1,039 | 1,098 |
| Wheat produced | Bu. | 2,080 | 1,917 | ---- | ---- | ---- |
| Grain sorghum | Cwt. | 2,959 | 2,959 | 329 | 329 | ---- |
| Beef cows | Head | 7 | 6 | 6 | 6 | 6 |
| Beef stockers | Head | 95 | 95 | 102 | 102 | 102 |
| Operator labor | Hour | 1,706 | 1,751 | 2,120 | 2,120 | 2,120 |
| Hired labor | Hour | ---- | 40 | 238 | 238 | 347 |
| Nonland capital | Dollar | 24,859 | 25,121 | 32,724 | 32,724 | 33,529 |
| Net returns* | Dollar | 8,452 | 8,688 | 12,249 | 16,819 | 21,623 |

*Returns to land, operator labor, risk and management (includes returns to unallocated overhead costs).

With any combination of feed grain prices and capital charges, large acreages of cotton are included in the optimum combination of enterprises at a cotton price of 22 cents or more per pound of lint. Also, at a cotton price of 17.6 cents and a six percent interest cost on nonland capital, cotton production is important. Grain sorghum production is most important at low cotton prices, base or higher feed grain prices, and a six percent capital cost. Wheat production is greatest at low cotton prices, base or higher feed grain prices, and an 18-percent capital cost. In general, cattle production is important at base or higher prices. A wind erosion hazard requires that a rye winter cover crop be planted on cotton land. The winter grazing provided by the cover crop results in a complimentary relationship between cotton and beef stocker cattle production. Consequently, beef stocker numbers increase with cotton acreage at base or higher cattle prices. With low prices for all products and an 18-percent charge for nonland capital, only 111 acres of the most productive cropland are used and 389 acres are idle. Labor requirements are greatest in organizations containing large cotton acreages and stocker cattle enterprises. Net returns range from a low of about $2,100 at low prices for all products and an 18-percent capital charge to a high of more than $21,000 with high prices for all products and a six percent interest charge. At base prices for feed grains and a capital cost of six percent on nonland capital, an organization with 355 acres of cotton is optimum or near optimum over a range of cotton prices from 18.1 to 30.8 cents per pound.

The results presented are "normative" estimates of what it would pay on the representative farm rather than a prediction of what farmers would do. They reflect the optimum organizations if the farm is operated in the efficient manner assumed, if the farmers have perfect knowledge of prices and costs, and are not limited by acreage allotments or production controls. The study is not intended to predict the actual actions of farmers, nor the actual adjustments farmers might make to the assumed conditions.

## Appendix Table 1.—Assumed prices paid by farmers for specified items

| Item | Unit | Assumed price |
|---|---|---|
| *Seed* | | |
| Alfalfa, improved | Cwt. | $ 30.00 |
| Sudan grass, sweet | Cwt. | 6.00 |
| Seed oats | Bu. | 1.10 |
| Cottonseed | Bu. | 2.50 |
| Seed wheat | Bu. | 2.25 |
| Grain sorghum | Cwt. | 7.00 |
| *Fertilizer* | | |
| 10-20-10 | Ton | 79.00 |
| 13-39-0 | Ton | 105.00 |
| 16-20-0 | Ton | 89.00 |
| 8-32-16 | Ton | 106.00 |
| 0-46-0 | Ton | 79.00 |
| *Custom Rates* | | |
| Grain combining | Acre | 3.00 |
| Cotton stripping | Cwt. seed cotton | .75 |
| Hay baling | Bale | .16 |
| Combining alfalfa | Acre | 5.00 |
| Cotton insecticide | Acre | 2.00 |
| Cotton desiccant | Acre | 2.00 |
| Cotton hoeing | Acre | 2.50 |
| Cotton hauling | Cwt. seed cotton | .25 |
| Cotton ginning and wrapping | Cwt. seed cotton | .85 |
| *Feeds* | | |
| Alfalfa hay | Ton | 25.00 |
| Cottonseed cake | Ton | 76.00 |
| *Fuel and Lubricants* | | |
| LP-gas | Gal. | .09 |
| Gasoline | Gal. | .20 |
| Diesel oil | Gal. | .16 |
| Motor oil | Gal. | 1.00 |
| Grease | Lb. | .20 |
| *Hired Labor* | Hour | 1.00 |
| *Stocker Steer Calves** | | |
| Good-choice 450# September | Cwt. | 23.00 |
| Good-choice 450# October | Cwt. | 22.50 |

*Assumes comparable prices if stocker heifer calves used.

## Appendix Table 2.—Optimum organizations: Cropland use by productivity classes with a charge of six percent on nonland capital

| Cropland type | Enterprise | Unit | Cotton prices (cents per pound) 13.2 | 17.6 | 22.0 | 26.4 | 30.8 |
|---|---|---|---|---|---|---|---|
| *Grain and cattle at base prices* | | | | | | | |
| Class b | cotton[1] | Acre | 17 | 94 | 125 | 125 | 125 |
| (125 acres) | wheat | Acre | 2 | -- | -- | -- | -- |
| | grain sorg.-fallow[2] | Acre | 75 | -- | -- | -- | -- |
| | alfalfa | Acre | 31 | 31 | -- | -- | -- |
| Class c | cotton[1] | Acre | -- | 172 | 230 | 230 | 230 |
| (230 acres) | wheat | Acre | 15 | -- | -- | -- | -- |
| | grain sorg.-fallow[2] | Acre | 138 | -- | -- | -- | -- |
| | alfalfa | Acre | 58 | 58 | -- | -- | -- |
| | small grain hay | Acre | 19 | -- | -- | -- | -- |
| Class d | cotton[1] | Acre | -- | -- | -- | 39 | 75 |
| (125 acres) | small grain hay | Acre | -- | 26 | 35 | 37 | -- |
| | small grain grazing | Acre | 31 | 34 | 45 | 49 | 50 |
| | reseed cropland | Acre | 94 | 65 | 45 | -- | -- |
| Class e (20 acres) | reseed cropland | Acre | 20 | 20 | 20 | 20 | 20 |
| *Grain and cattle prices 30 percent below base* | | | | | | | |
| Class b | cotton[1] | Acre | 20 | 94 | 125 | 125 | 125 |
| (125 acres) | grain sorg.-fallow[2] | Acre | 74 | -- | -- | -- | -- |
| | alfalfa | Acre | 31 | 31 | -- | -- | -- |
| Class c | cotton[1] | Acre | -- | 172 | 230 | 230 | 230 |
| (230 acres) | alfalfa | Acre | 58 | 58 | -- | -- | -- |
| | small grain hay | Acre | 9 | -- | -- | -- | -- |
| | small grain grazing | Acre | 12 | -- | -- | -- | -- |
| | idle | Aire | 151 | -- | -- | -- | -- |
| Class d | cotton | Acre | -- | -- | -- | 125 | 125 |
| (125 acres) | idle | Acre | 125 | 125 | 125 | -- | -- |
| Class e (20 acres) | reseed cropland | Acre | 20 | 20 | 20 | 20 | 20 |
| *Grain and cattle prices 30 percent above base* | | | | | | | |
| Class b | cotton[1] | Acre | 10 | 15 | 125 | 125 | 125 |
| (125 acres) | wheat | Acre | 6 | 35 | -- | -- | -- |
| | grain sorg.-fallow[2] | Acre | 75 | 75 | -- | -- | -- |
| | sudan | Acre | 34 | -- | -- | -- | -- |
| Class c | cotton[1] | Acre | -- | -- | 230 | 230 | 230 |
| (230 acres) | wheat | Acre | 42 | 67 | -- | -- | -- |
| | grain sorg.-fallow[2] | Acre | 138 | 138 | -- | -- | -- |
| | small grain hay | Acre | 50 | 25 | -- | -- | -- |
| Class d | cotton[1] | Acre | -- | -- | -- | -- | 75 |
| (125 acres) | grain sorg.-fallow[2] | Acre | 75 | 75 | 39 | 39 | -- |
| | small grain hay | Acre | 8 | 4 | 37 | 37 | -- |
| | small grain grazing | Acre | 42 | 46 | 49 | 49 | 50 |
| Class e (20 acres) | reseed cropland | Acre | 20 | 20 | 20 | 20 | 20 |

[1] Includes a rye winter cover crop to control wind erosion.

[2] Assumes 5 years of grain sorghum and 1 year fallow to control disease.

**Appendix Table 3.—Optimum organizations: Labor requirements with a charge of six percent on nonland capital**

| Item | Unit | Cotton prices (cents per pound) 13.2 | 17.6 | 22.0 | 26.4 | 30.8 |
|---|---|---|---|---|---|---|
| *Grain and cattle at base prices* | | | | | | |
| *Operator labor* | | | | | | |
| Jan.-Apr. | Hour | 462 | 534 | 624 | 624 | 624 |
| May-July | Hour | 572 | 572 | 572 | 572 | 572 |
| Aug.-Sept. | Hour | 195 | 382 | 396 | 396 | 396 |
| Oct.-Dec. | Hour | 528 | 528 | 528 | 528 | 528 |
| *Hired labor* | | | | | | |
| Jan.-Apr. | Hour | --- | --- | 9 | 15 | 55 |
| May-July | Hour | 179 | 337 | 190 | 301 | 275 |
| Aug.-Sept. | Hour | --- | --- | 9 | 41 | 48 |
| *Grain and cattle 30 percent below base* | | | | | | |
| *Operator labor* | | | | | | |
| Jan.-Apr. | Hour | 232 | 399 | 492 | 622 | 622 |
| May-July | Hour | 544 | 572 | 572 | 572 | 572 |
| Aug.-Sept. | Hour | 171 | 359 | 377 | 396 | 396 |
| Oct.-Dec. | Hour | 528 | 528 | 528 | 528 | 528 |
| *Hired labor* | | | | | | |
| May-July | Hour | --- | 192 | 8 | 245 | 245 |
| Aug.-Sept. | Hour | --- | --- | --- | 81 | 81 |
| *Grain and cattle 30 percent above base* | | | | | | |
| *Operator labor* | | | | | | |
| Jan.-Apr. | Hour | 624 | 465 | 624 | 624 | 624 |
| May-July | Hour | 572 | 572 | 572 | 572 | 572 |
| Aug.-Sept. | Hour | 198 | 195 | 396 | 396 | 396 |
| Oct.-Dec. | Hour | 528 | 528 | 528 | 528 | 528 |
| *Hired labor* | | | | | | |
| Jan.-Apr. | Hour | --- | --- | 5 | 5 | 55 |
| May-July | Hour | 95 | 36 | 223 | 223 | 275 |
| Aug.-Sept. | Hour | --- | --- | 10 | 10 | 48 |

## Appendix Table 4.—Optimum organizations: Cropland use by productivity classes with a charge of 18 percent on nonland capital

| Cropland type | Enterprise | Unit | Cotton prices (cents per pound) 13.2 | 17.6 | 22.0 | 26.4 | 30.8 |
|---|---|---|---|---|---|---|---|
| *Grain and cattle at base prices* | | | | | | | |
| Class b | cotton[1] | Acre | 20 | 20 | 125 | 125 | 125 |
| (125 acres) | grain sorg.-fallow[2] | Acre | 74 | 74 | -- | -- | -- |
| | alfalfa | Acre | 31 | 31 | -- | -- | -- |
| Class c | cotton[1] | Acre | -- | -- | 230 | 230 | 230 |
| (230 acres) | wheat | Acre | 172 | 172 | -- | -- | -- |
| | alfalfa | Acre | 58 | 58 | -- | -- | -- |
| Class d | cotton[1] | Acre | -- | -- | -- | -- | 125 |
| (125 acres) | idle | Acre | 125 | 125 | 125 | 125 | -- |
| Class e (20 acres) | reseed cropland | Acre | 20 | 20 | 20 | 20 | 20 |
| *Grain and cattle prices 30 percent below base* | | | | | | | |
| Class b | cotton[1] | Acre | 22 | 94 | 125 | 125 | 125 |
| (125 acres) | alfalfa | Acre | 31 | 31 | -- | -- | -- |
| | idle | Acre | 72 | -- | -- | -- | -- |
| Class c | cotton[1] | Acre | -- | 25 | 230 | 230 | 230 |
| (230 acres) | alfalfa | Acre | 58 | 58 | -- | -- | -- |
| | idle | Acre | 172 | 147 | -- | -- | -- |
| Class d | cotton[1] | Acre | -- | -- | -- | -- | 125 |
| (125 acres) | idle | Acre | 125 | 125 | 125 | 125 | -- |
| Class e (20 acres) | idle | Acre | 20 | 20 | 20 | 20 | 20 |
| *Grain and cattle prices 30 percent above base* | | | | | | | |
| Class b | cotton[1] | Acre | 6 | 15 | 125 | 125 | 125 |
| (125 acres) | wheat | Acre | 44 | 35 | -- | -- | -- |
| | grain sorg.-fallow[2] | Acre | 75 | 75 | -- | -- | -- |
| Class c | cotton[1] | Acre | -- | -- | 230 | 230 | 230 |
| (230 acres) | wheat | Acre | 92 | 92 | -- | -- | -- |
| | grain sorg.-fallow[2] | Acre | 138 | 138 | -- | -- | -- |
| Class d | cotton[1] | Acre | -- | -- | -- | -- | 39 |
| (125 acres) | grain sorg.-fallow[2] | Acre | 45 | 45 | 39 | 39 | -- |
| | small grain hay | Acre | 35 | 35 | 37 | 37 | 37 |
| | small grain grazing | Acre | 45 | 45 | 49 | 49 | 49 |
| Class e (20 acres) | reseeded cropland | Acre | 20 | 20 | 20 | 20 | 20 |

[1] Includes a rye winter cover crop to control wind erosion.

[2] Assumes 5 years of grain sorghum and 1 year fallow to control disease.

**Appendix Table 5.—Optimum organizations: Labor requirements with a charge of 18 percent on nonland capital**

| Item | Unit | Cotton prices (cents per pound) 13.2 | 17.6 | 22.0 | 26.4 | 30.8 |
|---|---|---|---|---|---|---|
| *Grain and cattle at base prices* | | | | | | |
| *Operator labor* | | | | | | |
| Jan.-Apr. | Hour | 201 | 201 | 492 | 492 | 621 |
| May-July | Hour | 572 | 572 | 572 | 572 | 572 |
| Aug.-Sept. | Hour | 264 | 264 | 396 | 396 | 396 |
| Oct.-Dec. | Hour | 528 | 528 | 528 | 528 | 528 |
| *Hired labor* | | | | | | |
| May-July | Hour | 56 | 56 | 8 | 8 | 245 |
| Aug.-Sept. | Hour | --- | --- | --- | --- | 81 |
| *Grain and cattle 30 percent below base* | | | | | | |
| *Operator labor* | | | | | | |
| Jan.-Apr. | Hour | 127 | 228 | 473 | 473 | 603 |
| May-July | Hour | 433 | 572 | 572 | 572 | 572 |
| Aug.-Sept. | Hour | 165 | 241 | 376 | 376 | 396 |
| Oct.-Dec. | Hour | 528 | 528 | 528 | 528 | 528 |
| *Hired labor* | | | | | | |
| May-July | Hour | --- | --- | 3 | 3 | 241 |
| Aug.-Sept. | Hour | --- | --- | --- | --- | 80 |
| *Grain and cattle 30 percent above base* | | | | | | |
| *Operator labor* | | | | | | |
| Jan.-Apr. | Hour | 430 | 439 | 624 | 624 | 624 |
| May-July | Hour | 572 | 572 | 572 | 572 | 572 |
| Aug.-Sept. | Hour | 176 | 212 | 396 | 396 | 396 |
| Oct.-Dec. | Hour | 528 | 528 | 528 | 528 | 528 |
| *Hired labor* | | | | | | |
| Jan.-Apr. | Hour | --- | --- | 5 | 5 | 5 |
| May-July | Hour | --- | 40 | 223 | 223 | 301 |
| Aug.-Sept. | Hour | --- | --- | 10 | 10 | 41 |