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INFLUENCE OF SELECTED RESTRAINTS on NORMATIVE SUPPLY RELATIONSHIPS for DRYLAND CROP FARMS on LOAM SOILS, SOUTHWESTERN OKLAHOMA

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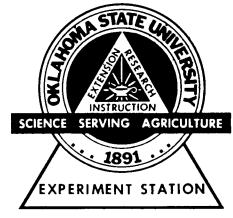

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The overall purposes of this project are: (1) to provide guides to farmers choosing among alternative production opportunities, especially as those opportunities are affected by changes in prices and technology, and (2) to provide guides to farmers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

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Influence of Selected Restraints on Normative Supply Relationships For Dryland Crop Farms on Loam Soils, Southwestern Oklahoma

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Adequate appraisal of alternative policy proposals designed to improve the economic position of farmers hinges on estimating aggregate agricultural output. Statistical methods, linear programming, and related techniques have been employed in making such estimates (17, 22). Supply relationships developed by the statistical approach have been referred to as "positive," "descriptive," and "predictive" (7). In effect, they describe the quantitative relationships among variables that determine supply as they exist at a point in time or have existed through time.

Supply relationships developed by linear programming and budgeting techniques are referred to as "normative" in that they describe what would exist given certain assumptions. Normative supply relationships are predicated on the assumption that firms adjust to the combination of enterprises and production practices that maximize net returns to owned factors. The levels of output associated with the change in the combination of enterprises in response to these stimuli constitute the normative supply function for the individual farm.

Frequently, all meaningful restraints for individual resource situations are not imposed. Consequently, the assumption is made that some restraints on the optimum farm organization have no influence on the optimum plan for the individual farm or the aggregate supply for the area. The asset structure of the farm and perhaps other variables may need to be considered in any study of supply (20).

OBJECTIVE

The objective of this study is to determine the influence of selected

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variables on the optimum combination of enterprises for representative farm situations on level loam soils of southwestern Oklahoma. The specific objective is to analyze effects of alternative prices of cotton, rates of interest on capital, tenure of the farm operator, level of machinery cost, and the level of technology on the optimum combination of enterprises for representative farm situations.

GEOGRAPHIC AREA

This study applies to the level loam soils of State Economic Area Four in 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.

Figure 1. Shaded area shows location of State Economic Area Four in southwestern Oklahoma.

The agriculture of the area is characterized by 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.

SOILS

Within economic area four, there are three major groups of soils—

clays, sands, and loams—differentiated primarily on the basis of physical soil characteristics. Loam soils are characterized by medium-texture and moderately permeable subsoils. The loam soils are further classified into productivity classes on the basis of topography and depth of topsoil. Productivity classes are designated at L_a, L_b, L_c, L_d, and L_e (2) described as follows:

L_a—Land Capability Class I. Deep, level (0 to 1 percent slope) with negligible to moderate erosion.

L_b—Land Capability Class II. Deep, moderately sloping (1 to 3 percent slopes) with negligible to moderate erosion.

L_c—Land Capability Class III. Sloping (3 to 5 percent slopes) with negligible to moderately severe erosion or moderately sloping (L_b slopes) with shallow soils or moderately severe erosion.

L_d—Land Capability Class IV. Rolling (5 to 8 percent slopes) or shallow soils on lesser slopes or severe erosion.

L_e—All other capability classes of cropland. Very shallow soils or severely eroded on variable slopes.

There are two generally recognized phases of the loam soils, namely, the rolling phase and the level phase. The principal difference is the proportion of land in the various productivity classes. About 60 percent of the level phase is classified as L_a and only about 10 percent is included in the L_c, L_d, and L_e classifications. The level loam phase is confined to soils of the level stream terraces, high terraces, and nearly level old alluvial plains.

Although about nine percent of the loam soil cropland in the area is irrigated, only the nonirrigated cropland is included in this analysis. An estimated total of 844,974 acres of dryland cropland is classified as level loam soils. Of this, 469,193 acres are classified as L_a cropland, 289,565 acres as L_b cropland, 79,881 acres as L_c cropland, and 6,335 acres as L_e cropland. The level phase of loam soils is found generally throughout the area but about 66 percent of the total acreage is located in Caddo, Grady, Jackson, Kiowa, and Tillman counties.

METHOD OF ANALYSIS

Technical coefficients for enterprises adapted to the level loam soils were obtained from published sources, estimates of agricultural scientists, and judgments of professional agricultural workers in the

area. The resource requirements, costs, and expected returns for owner-operated situations employing an advanced level of technology, as reported by Connor, *et al.* (2) served as the basic input-output data for the situations analyzed. It was necessary to modify these data to depict tenant-operated situations, present technology, and fixed machinery cost.[1]

Basic resource situations for representative farms were developed from a survey of farmers, Agricultural Conservation and Stabilization records, and the judgment of agricultural specialists familiar with the area. The resource situations analyzed consisted of small and large farms operated by owners and by tenants under different assumptions with respect to the level of technology, price of cotton, cost of capital, and machinery cost.

Linear programming was used to determine the optimum combination of enterprises or the micro-supply parameters for different resource situations included in this study.

CONCEPTUAL DEVELOPMENT

Two methodological approaches to the study of economic problems are generally recognized—positive and normative. The positive approach was first conceived as a body of systematized knowledge dealing with "what is" or as a "positive, abstract, deductive" science (11). It dealt with abstract economic problems, seeking uniformities and deducing laws or general relationships among economic variables. Later, positive economics was conceived as a body of tentatively accepted generalizations about economic phenomena that can be used to predict the consequences of changes in circumstances (4). It is primarily from the latter that positive analysis of economic problems has become associated with the predictive or objective analysis which is void of value judgments.

In contrast, the normative approach was conceived as a body of systematized knowledge relating to criteria of what "ought to be," and was concerned with the ideal rather than the actual (11). Proponents of this approach were concerned with the classification of motives that prompt economic activity and with weighing and comparing their moral merit. In general, the normative approach to economic analysis

[1]Estimates of power and equipment costs, labor requirements, and operating capital required for the crop and livestock enterprises under the various assumptions of this study are available in an unpublished Ph.D. thesis; James Harold White, "The Influence of Selected Restraints on Normative Supply Relationships," Oklahoma State University, August, 1962.

implies value judgments, hence is a subjective analysis which bears moral and/or ethical connotations.

Normative economic analysis has been redefined as "what would be" given certain assumptions (13). This concept departs from that previously held in that it is devoid of subjective valuations and/or ethical and moral considerations. Viewed this way, the normative approach to the analysis of economic problems analyzes what would be, given certain assumptions.

To infer that any methodological approach will predict the future with certainty would be erroneous. Knight (12) suggests that the aim of any science is to predict the future for the purpose of making our conduct intelligent. He emphasizes that intelligence predicts through analysis, by isolating different forces or tendencies in a situation and studying the character and effects of each separately. And, that we have no way of discussing a force or change except to describe its effects or results under given conditions.

The approach employed in this study is normative, and based on the assumption that farmers seek to maximize income from an aggregate of fixed resources. The combination of enterprises that maximize returns from a set of owned factors under alternatively assumed conditions is indicative of the output the firm would plan to produce if the entrepreneur intended to maximize income.

CONCEPT OF SUPPLY

Supply is defined as a schedule of quantities of a product (or products) that would be forthcoming or offered for sale at different prices, other things remaining the same. Marshall visualizes supply as having both time and space dimensions and divides supply into three time periods: (1) the short period, (2) the long period, and (3) the very long period (16).

THE PRODUCTION FUNCTION Explicit in the notion of a production function are the technique of production or state of the arts, a given set of fixed resources, and different intensities of use of variable resources (10). Although the production function is a technological relationship, it has economic implications as a determinant of supply. This is the case since supply depends upon the cost of production which in turn is determined by the price of resources used in the production process and the production function.

Under conditions of perfect knowledge with respect to all variable resources, the static supply function for a firm can be derived from the

production function. With a given technique and a given set of fixed resources to which variable resources are applied, supply becomes the marginal cost curve of producing additional units of output, between the minimum average variable cost and the capacity of the firm.

Difficulties may be encountered with variations in external and internal economies of scale; however, general relationships have been developed between cost curves implied by the production function and the supply of a firm and industry under conditions of constant, increasing, and decreasing cost.

LENGTH OF RUN In the concept of supply and in the production function the importance of specifying the length of run or planning period is apparent. The length of run is not related to time *per se,* but to the classification of productive resources into fixed and variable categories. All resources are variable in the long-run while at least one resource is fixed in a short-run analysis. The length of the planning period for a firm is thus related to the manner in which resources are fixed and which are variable as viewed by the entrepreneur.

The length of run influences the responsiveness of output to changes in product prices. The short-term supply function is less elastic than the long-term supply function because of factor immobility, capital limitations, and a fixed production function.

SHIFTS IN THE SUPPLY FUNCTION The production function, prices of the variable resources, and the relative proportion of fixed and variable factors determine the slope and position of the static supply function. Since the restrictive *ceteris paribus* conditions of supply are relaxed in the notion of the response relation, dynamic elements may enter and cause supply to shift (6, 14, 18, 20).

Technological change and the rate of adoption by firms affect supply by shifting the production function. In the aggregate the effect of improved technology depends upon whether the new innovation instantaneously replaces the old technique or whether adoption of the innovation is delayed. If, the adoption of the new technique is delayed until capital for existing techniques is amortized, then the shift in the supply function will be less pronounced.

Although the rate of adoption of technological innovations is unpredictable, the possibility of evaluating alternatively assumed levels of technology is not precluded if conditions representing the new or advanced levels of technology can be measured.

It is within the framework of a perfectly competitive economic sys-

tem that the intermediate term supply response relationship is examined in this study. It is assumed that the firm faces a perfectly elastic demand in the factor and product markets in that prices are constant over all ranges of input and output. Also, since costs are assumed to be constant, the sum of the actions of each firm with respect to inputs and outputs in the industry represents the actions for the industry or a geographic area.

ANALYTICAL MODEL

The linear programming model requires specification of the basic resource situations to be analyzed, and specification of alternative enterprises, the levels of technology, tenure of the farm operator, levels of machinery costs, capital levels and requirements, and assumed prices of factors and products.

Two farm sizes, 480 and 960 acres of total land, were selected to represent the basic resource situations for analysis of the adjustment potential in the area. Although the farms selected were not "average farms" nor "modal farms" as they exist in the area, they were considered to be representative regarding adjustment opportunities. Farm size is defined both in terms of equipment and acres. Small farms are operated with two-row equipment and large farms with four-row equipment.

Total acres of land, cropland by productivity classes, and native pasture or range land for both large and small farms are presented in Table 1. It was assumed that additional land could not be rented.

A preliminary investigation indicated no differences in the distribution of land by productivity classes on small and large farms. Consequently, proportion of cropland by productivity classes was used for both farm sizes.

In addition to the land resource, a specified amount of operator labor was assumed to be available on both large and small representative farms. The estimated distribution of available seasonal operator labor by farm size is presented in Table 1. The difference in total operator labor available for the various periods on small and large farms is explained by the difference in time required for management, larger farms requiring more time for management than smaller farms.

Land was assumed to be fixed in quantity and limited to amounts shown for the two farm sizes. However, the amount of labor used was not restricted to the amount of operator labor shown for each farm size. It was assumed that additional labor could be hired in all months

Table 1.—Resource Availability for Two Sizes of Farms, Level Loam Soils, Southwestern Oklahoma

Resource	Unit	Small Farm	Large Farm
Total land	Acre	480	960
Cropland:[1]			
L_a	Acre	210	420
L_b	Acre	130	260
L_c	Acre	30	60
L_e	Acre	5	10
Total Cropland	Acre	375	750
Native Pasture[2]	Acre	85	175
Farmstead, Roads, etc.	Acre	20	35
Labor[3]			
Jan.-Apr.	Hour	667	581
May-July	Hour	605	539
Aug.-Sept.	Hour	418	374
Oct.-Dec.	Hour	561	495

[1]Based on Soil Inventory Form N-2, Oklahoma.

[2]Native pasture equals total land minus cropland minus 5 acres for farmstead minus 5 acres for wasteland, roads, etc. per 160 acres of total land.

[3]Assumes 22 working days per month except February in which there are 20 working days. Allows 8 hours per day December through March; 9 hours per day April, May, and November; and 10 hours per day June through October for non-management time, less ½ hour per day for small farms and 1 and ½ hours per day for large farms for management time.

at $1 per hour; hence, hired labor was assumed to be a perfect substitute (technically) for operator labor.

ALTERNATIVE ENTERPRISES

For each farm size, crop alternatives were limited to cotton, wheat, grain sorghum-fallow rotation, alfalfa hay, small grain hay, small grain, sudan for grazing, and reseeding cropland to native grasses. The grain sorghum-fallow rotation, which involved five years grain sorghum and one year fallow (or one-sixth of the grain sorghum acreage was fallowed each year), was restricted to 60 percent of the cropland. Alfalfa hay was restricted to 25 percent of the cropland. Grazing crops, other than native pasture were limited to the amount required for the livestock enterprises. Reseeding cropland to native grass was not permitted on tenant-operated farms since most leases were on a one-year basis.

Livestock enterprises for both farm sizes were limited to beef cow herds and three systems of producing stocker cattle. The system for

handling the beef cow herd involved use of native range for pasture with a wintering ration of cottonseed cake. Calves were assumed to be born in the spring, not creep-fed, and sold in early fall as good to choice feeder calves. Stocker cattle were assumed to be produced by three methods with variations in the buying and selling dates and in the ration (2). Livestock enterprises were not limited by the amount of hay and grain produced on the farm. Instead, the model permits purchasing additional hay and concentrates when profitable to do so.

Alterations in the programming model for the different resource situations involved changing the selling price of lint cotton, the interest rate on borrowed capital, and appropriate input-output coefficients for the various activities. Since it was assumed that returns were maximized to the tenant's owned factors, additional changes in the input-output coefficients were necessary for tenant operated farms. Adjustments were made such that production costs included only the tenant's share and returns included value of the products after rent was paid. Other adjustments made on tenant farms, in the technical coefficients, were the amount of small grain grazing available and amount of hay produced (tenant's share).

LEVELS OF TECHNOLOGY

This analysis assumes two levels of technology—present and advanced—which, in effect, represents two levels of management. The different levels of technology were defined primarily in terms of production practices and associated differences in crop yields. The present level of technology was defined as the central tendency of existing production practices for the various crop enterprises. Advanced technology assumes the best known practices now in the early adoption stage or used by farmers on a limited basis.

A summary of the estimated crop yields per acre for present and advanced levels of technology by land productivity classes is presented in Table 2.

Although differences in the level of technology are recognized for crops adapted to the area, only one level of technology was assumed for livestock enterprises. More efficient feeds and feed additives (i.e., vitamins, minerals, and hormones) constitute recent technological developments in beef cattle production.

TENURE OF THE FARM OPERATOR

A summary of the assumed rental arrangements between the tenant and landlord for crops produced on loam soils is shown in Table 3. In

Table 2.—Estimated Crop Yields Per Acre By Land Productivity And Level of Technology, Loam Soils, Southwestern Oklahoma.

Enterprise	Unit	Productivity Class			
		L_a	L_b	L_c	L_e
Present Technology:					
Cotton Lint	Lbs.	250	200	150	--
Wheat	Bu.	19.0	15.0	11.0	--
Grain Sorghum	Lbs.	1,250	1,100	950	--
Alfalfa Hay	Tons	2.5	2.0	--	--
Small Grain Hay	Tons	1.8	1.6	1.4	--
Graze Out Small Grain	A.U.M.[1]	3.6	3.1	2.6	1.6
Sudan	A.U.M.	2.9	2.3	1.6	1.0
Small Grain Grazing	A.U.M.	.5	.4	.3	--
Reseeding Cropland	A.U.M.	--	--	--	1.0
Advanced Technology:					
Cotton Lint	Lbs.	275	225	185	--
Wheat	Bu.	23.0	18.0	14.0	--
Grain Sorghum	Lbs.	1,600	1,450	1,200	--
Alfalfa Hay	Tons	3.0	2.5	--	--
Small Grain Hay	Tons	2.0	1.8	1.5	--
Graze Out Small Grain	A.U.M.	4.0	3.5	3.0	2.0
Sudan	A.U.M.	3.0	2.4	1.7	1.0
Small Grain Grazing	A.U.M.	.6	.5	.4	--
Reseeding Cropland	A.U.M.	--	--		1.0

[1]An animal unit month (A.U.M.) of grazing is the forage requirement for one month for one cow, a bull, or for two steers or heifers whose average weight is 500 pounds.

general, the tenant receives ¾ of the cotton and ⅔ of all other crops. For this share of the product the tenant supplies ¾ of the fertilizer, insecticide, and ginning and wrapping for cotton and ⅔ of the fertilizer and insecticide used on other crops.

Because livestock share leases are not common in the area it is assumed the tenant is owner of all the livestock, and that rent is paid on land used by the livestock enterprise based on the most profitable and/or most usual alternative use of the land. Rental rates on cropland used for hay and pasture are based on the usual estimated rent on the land if it were planted to grain sorghum. On this basis, the annual rent for land operated under conditions of present technology is less than rent on land of comparable quality when an advanced level of technology is employed.

Table 3.—Summary of Rental Arrangements, Level Loam Soils, Southwestern Oklahoma[1]

Item	Cotton	Wheat	Alfalfa Hay	Grain Sorghum	Small Grain Hay
			Tenants' Share		
Output:					
Cotton Lint	3/4	---	---	---	---
Cotton Seed	3/4	---	---	---	---
Grain	---	2/3	---	2/3	---
Grazing[2]	---	2/3	---	---	2/3
Hay	---	---	2/3	---	2/3
Input:					
Fertilizer	3/4	2/3	2/3	---	2/3
Insecticide	3/4	---	2/3	---	---
Ginning and Wrapping	3/4	---	---	---	---
Baling	---	---	---	---	2/3

[1]For input items not specifically mentioned in the table, the tenant pays all costs.

[2]Annual rent per acre for land used for grazed out small grain and sudan grazing is based on grain sorghum yields and is as follows for the different levels of technology and productivity classes of land:

Item	Productivity Class of Land L_a	L_b	L_c	L_e
	Annual Rent Dollars Per Acre			
Present Technology	5.91	5.20	4.49	2.21
Advanced Technology	7.55	6.84	4.66	3.03

Annual rent on native range = $3.00 per acre.

LEVELS OF MACHINERY COSTS

It was assumed that two levels of investment in machinery and equipment existed for each of the two levels of technology and tenure. The first level, in which the machinery costs are fixed, represents a situation in which adjustments in output are made within the framework of existing machinery and equipment. In this situation the optimum enterprise combination is not influenced by the depreciation cost on machinery and equipment.

The second situation assumes all machinery costs are variable. In effect, each enterprise is charged with a proportionate part (based on hours of use) of the depreciation on machinery and equipment required to operate the enterprise.

CAPITAL LEVELS AND REQUIREMENTS

The cost of operating capital is assumed to affect the optimum, enterprise combination for the basic resource situations; consequently two price levels for capital use have been assumed, six percent and 18 percent. The price of capital, i.e., the rate of interest, is considered to be an opportunity rate of return on capital. The six percent capital level is assumed to be analogous to the market rate of interest which implies unlimited capital. The 18 percent capital price level implicitly assumes that enterprises that earn less than 18 percent return on capital will be excluded.

Operating capital requirements for the various enterprises are divided into total and annual capital. The total operating capital requirement represents the cost of seed, fertilizer, insecticide, power and machinery, etc. Some of the capital required for these items such as seed and fertilizer is not used for the entire year. Capital required for those items used less than one year is adjusted to an annual basis. Thus, annual operating capital is total operating capital annualized on the basis of the time the capital is employed.

Operating capital requirements differ for the same enterprise when operated under alternative assumptions with respect to the level of technology, tenure of the farm operator, size of the equipment, and level of machinery investment.

ASSUMED PRICES

The assumed prices of input items and of products for each of the alternative enterprises are based largely on price projections. Specific assumed prices paid and received by farmers in the level loam soil area are presented in Table 4. Prices received for all crops and livestock except cotton are assumed to remain constant and at the level shown for the planning period under consideration.

Table 4.—Assumed[1] Prices Paid and Received by Farmers, Southwestern Oklahoma

Item	Unit	Price
Prices Paid		
Seed and Feed:		
Cottonseed	Cwt.	8.00
Wheat Seed	Bu.	1.60
Alfalfa Seed	Lb.	.50
Grain Sorghum Seed	Cwt.	7.00

Table 4.—Assumed[1] Prices Paid and Received by Farmers, Southwestern Oklahoma, Continued

Item	Unit	Price
Oats Seed	Bu.	1.10
Sudan, Sweet	Cwt.	6.00
Native Grass Seed (30-40% PLS)	Lb.	.60
Cottonseed Cake	Ton	76.00
Mineral (Livestock)	Lb.	.03
Fertilizer:		
16-20-0	Cwt.	4.45
0-46-0	Cwt.	4.00
Custom Rates:		
Combining Wheat and Grain Sorg.	Acre	3.00
Cotton Stripping	Cwt. Seed Cotton	.75
Cotton Snapping (Hand)	Cwt. Seed Cotton	2.00
Hauling:		
Cotton	Cwt. Seed Cotton	.25
Wheat	Bu.	.07
Grain Sorghum	Cwt.	.10
Cotton Defoliation	Acre	2.00
Cotton Insecticide	Acre	3.50
Cotton Hoeing	Acre	2.00
Cotton Ginning and Wrapping	Cwt. Seed Cotton	.85
Cotton Pre-emerge Chemical	Acre	2.50
Hay Baling	Bale	.16
Load, Haul, and Store Hay	Bale	.08
Fuel and Lubricant:		
Gasoline	Gal.	.20
LP Gas	Gal.	.09
Diesel Oil	Gal.	.16
Kerosene	Gal.	.15
Motor Oil	Gal.	1.00
Lubricant	Lb.	.20
Prices Received		
Cotton Lint (SLM 15/16)	Lb.	[2]
Cotton Seed	Ton	50.00
Wheat	Bu.	1.25
Alfalfa Hay	Ton	17.60
Grain Sorghum	Cwt.	1.70

[1]These price assumptions are not to be interpreted as predictions of prospective prices.
[2]Assumed prices of cotton are 17.6, 22.0, and 26.4 cents per pound of lint.

Three levels of cotton prices were assumed—17.6, 22.0, and 26.4 cents per pound of lint cotton. The base price of 22.0 cents is comparable to the other product prices in Table 4.

Based on these assumptions, no acreage allotments for cotton or wheat, and the appropriate enterprise coefficients, the optimum combination of enterprises was developed for each basic farm size.

RESOURCE SITUATIONS

Eight resource situations were included in the study; I through IV pertain to small farms and V through VIII to large farms. Within each farm size, additional classifications were made as follows:

I and V. Present technology, owner operated farm
- A. Machinery cost fixed
- B. Machinery cost variable

II and VI. Present technology, tenant operated farm
- A. Machinery cost fixed
- B. Machinery cost variable

III and VII. Advanced technology, owner operated farm
- A. Machinery cost fixed
- B. Machinery cost variable

IV and VIII. Advanced technology, tenant operated farm
- A. Machinery cost fixed
- B. Machinery cost variable

For owner operated situations, the total quantity of various products and returns to owned factors are included in the tables. In those situations where machinery costs are fixed, the overhead cost of machinery is not included in the enterprise costs. Consequently, returns for those situations are returns to land, capital invested in machinery, and operator labor and management. In all situations where machinery costs are variable the returns shown are to land and operator labor and management.

Results for tenant situations differ from those for owners since only the tenant's share of the products and the tenant's returns are included in the various tables. Because a share of the crop is assumed to be paid for rent, this amount is deducted from the total quantities produced. Similarly, only the tenant's share of the costs are included in the enterprise budgets. Returns to owned factors for tenant operated situations with machinery cost fixed is a return to capital invested in machinery and operator labor and management. For similar situations with variable machinery cost the return is to operator labor and management.

SMALL FARM SITUATIONS

Tables 5 through 12 show the optimum combinations of enterprises for various small farm situations.

LEVEL OF MACHINERY COST The relative fixity of machinery and equipment cost has very little influence on the optimum plan when the rate of interest on capital is six percent per annum (Figure 2). At both the lowest and highest assumed price for cotton the optimum plan is essentially the same regardless of whether machinery costs are fixed or variable. When the price of cotton is in the medium price range, relatively more cotton and less wheat, small grain forage, and stocker cattle are in the optimum plan if machinery costs are fixed.

With an 18 percent rate of interest on capital, again there is essentially no difference in the optimum plan between fixed and variable machinery cost situations at the two extremes in cotton prices (Figure 3). When machinery costs are variable, no cotton is produced on tenant farms until the price of cotton is 26.4 cents per pound compared to over 200 acres of cotton in the optimum plan when machinery costs are fixed. Thus, at the higher rate of interest relatively less cotton and more wheat are in the optimum combination of enterprises if machinery costs are variable. This is logical since the machinery cost is higher for cotton than for wheat and when these costs are assumed to be fixed, the variable cost of producing cotton is decreased relative to wheat.

LEVEL OF TECHNOLOGY The level of technology has the same general effect on the optimum combination of enterprises on small farms regardless of the price of cotton, the rate of interest, or the level of machinery costs. In general, the optimum combination of enterprises for the advanced level of technology includes more cotton and alfalfa hay and less wheat and stocker cattle.

When the price of cotton is 22 cents per pound, cotton is not produced on tenant-operated farms under present technology assumptions. Under advanced technology conditions some cotton is included in the optimum combination of enterprises for owner-operated farms at the 17.6 cent cotton price and on tenant-operated farms when the price of cotton is 22 cents per pound. At the higher price of cotton, all of the available land is planted to cotton on both owner-operated and tenant farms under conditions of advanced level of technology, while tenant farms produce some wheat under present technology conditions.

Alfalfa hay is not in the optimum combination of enterprises on small farms under present technology conditions. Under conditions of

advanced technology it becomes relatively more profitable than wheat on the better grades of land; thus, it appears in the optimum plan at the two lower prices of cotton.

Essentially these same general relationships hold if the assumption of fixed machinery cost is relaxed. Under this situation there are no differences in the optimum plans for tenants except that no alfalfa is produced. Instead, the acreage of wheat increases on tenant farms as the machinery costs are made variable.

When the price of cotton is increased to 22 cents per pound, again tenant farms produce less cotton and alfalfa hay than owner operated farms. However, the former produce more wheat and stocker cattle at the lower interest rate and more wheat and grain sorghum at the higher rate than do the latter. When the assumed price of cotton is 26.4 cents per pound all of the available cropland is in cotton and no stocker cattle appear in the optimum plan.

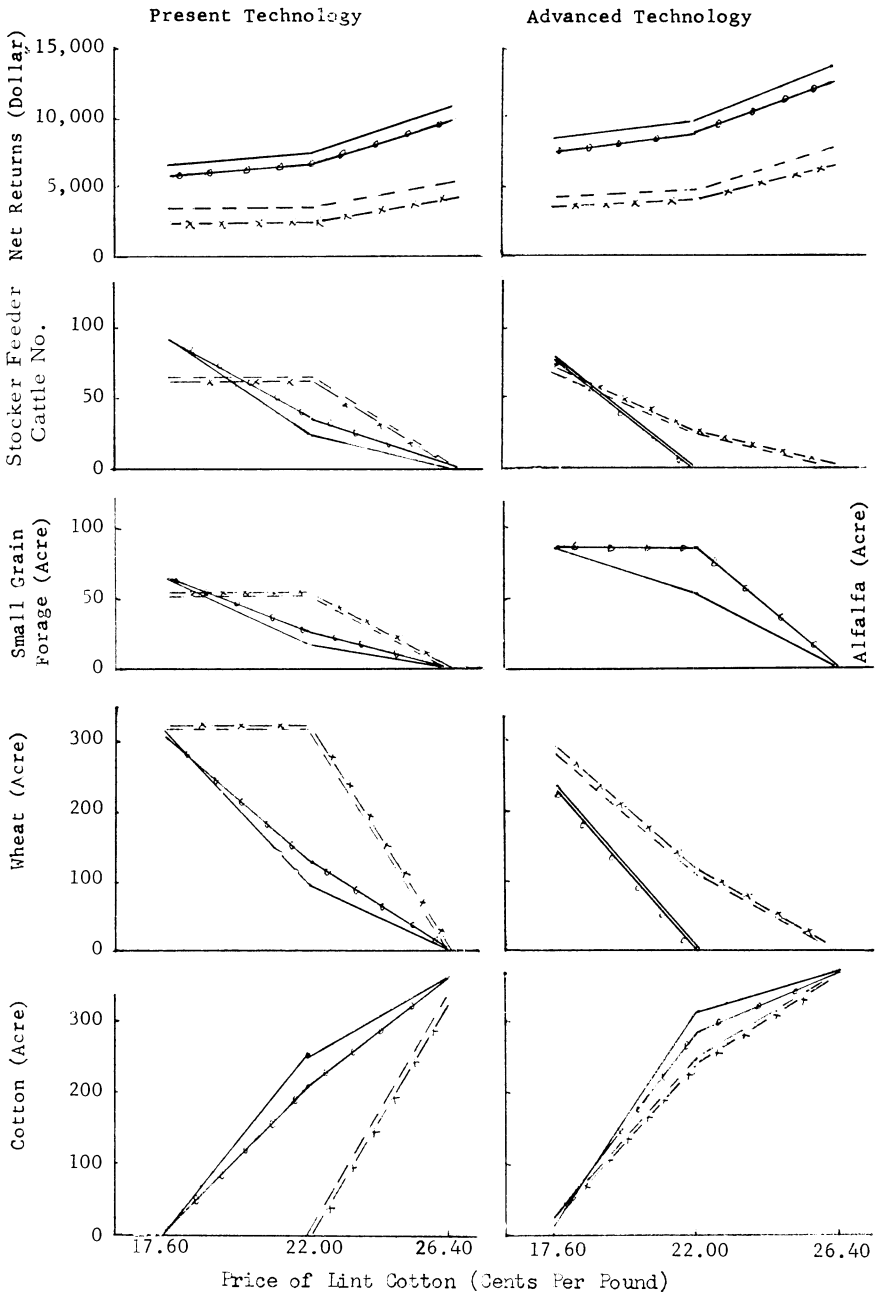
For the advanced level of technology, the influence of tenure on the optimum combination of enterprises on small farms is essentially the same as for present technology. That is, relatively less cotton and more wheat appear in the optimum plans of tenant-farms and tenants produce less stocker cattle and alfalfa than do owner-operated situations.

LARGE FARM SITUATIONS

Tables 13 through 20 show the optimum combinations of enterprises for the various large farm situations.

LEVEL OF MACHINERY COST The assumed levels of machinery cost do not have the same influence on the optimum plan for large farm situations at the different levels of technology and rates of interest on capital. With 18 percent capital, the level of machinery cost has essentially no influence on the optimum plan regardless of the tenure of the operator or the level of technology (Figure 5). The only differences are on tenant-operated situations and only when the price of cotton is 22 cents per pound. Under these conditions, relatively less cotton and more grain sorghum and wheat are produced.

Apparently the level of machinery cost has a greater influence on the optimum plan for large farm situations at the lower rate of interest if present technology practices are employed than when advanced technology is assumed (Figure 4). However, under these conditions the influence is greatest when the price of cotton is 22 cents per pound. On both owner- and tenant-operated farms less cotton and more wheat, small grain forage, and stocker cattle are in the optimum plan when



—— Owner oper., mach. cost fixed – – – Tenant oper., mach. cost fixed
—•—•— Owner oper., mach. cost var. —x—x— Tenant oper., mach. cost var.

Figure 2. Relation of Tenure, Level of Machinery Costs, and Technology to Acreage of Specified Crops, Numbers of Stocker Cattle and to Net Returns at Three Prices of Cotton and Six Percent Interest Rate—Small Farm

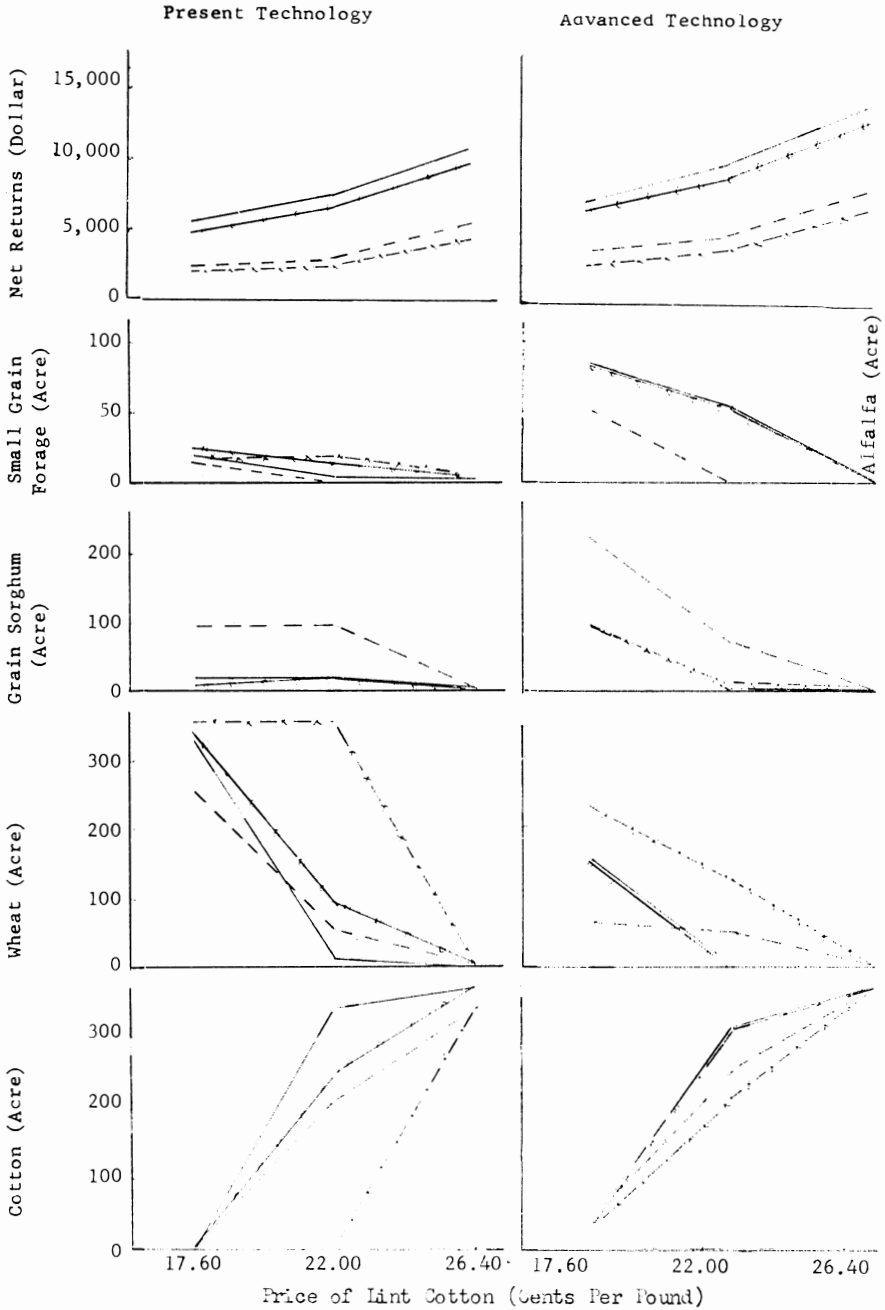


Figure 3. Relation of Tenure, Level of Machinery Cost, and Technology to Acreage of Specified Crops, Numbers of Stocker Cattle and to Net Returns at Three Prices of Cotton and Eighteen Percent Interest Rate—Small Farm

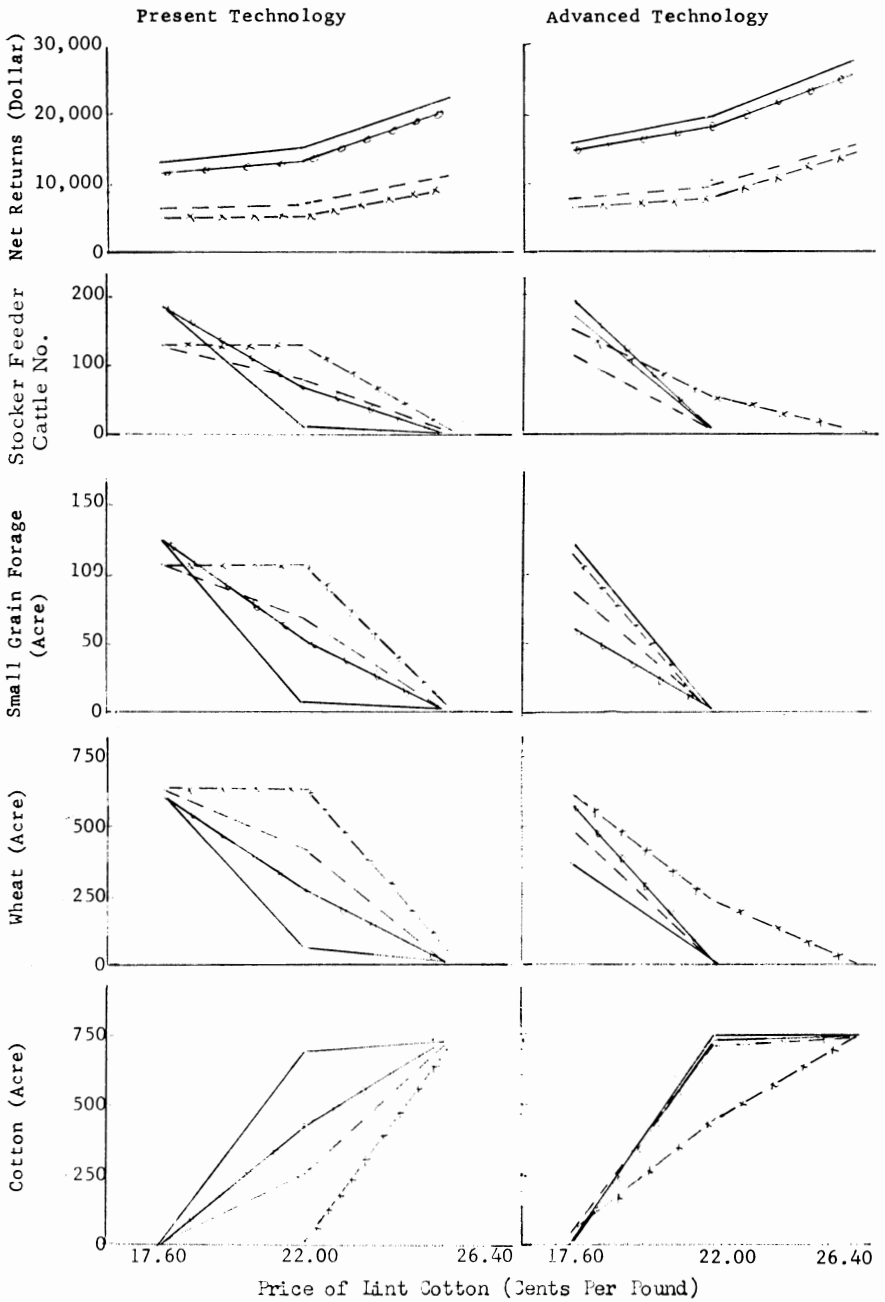


Figure 4. Relation of Tenure, Level of Machinery Costs, and Technology to Acreage of Specified Crops, Numbers of Stocker Cattle and to Net Returns at Three Prices of Cotton and Six Percent Interest Rate—Large Farm

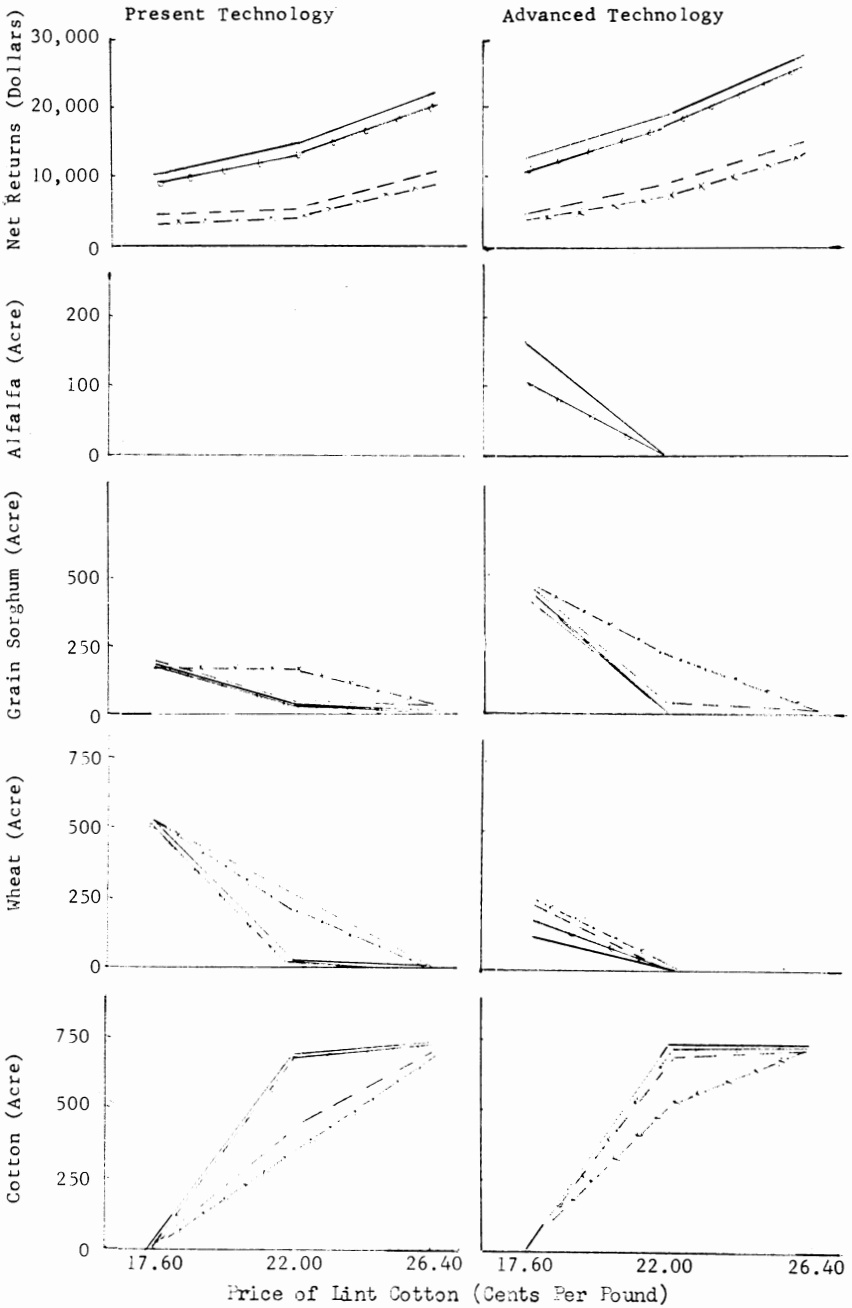


Figure 5. Relation of Tenure, Level of Machinery Costs, and Technology to Acreage of Specified Crops, Numbers of Stocker Cattle and to Net Returns at Three Prices of Cotton and Eighteen Percent Interest Rate—Large Farm

machinery costs are variable. These relationships are expected since the cotton enterprise uses proportionately more machinery and equipment than the other enterprises. As the price of cotton is increased it is more profitable to have relatively larger acreages of cotton with machinery cost fixed than when they are variable, since the cost of producing cotton is less (or returns greater) under the assumption of fixed machinery cost.

LEVEL OF TECHNOLOGY The level of technology has no influence on the optimum use of resources on large farms at the 26.4 cent price of cotton. Essentially all of the adapted cropland is in cotton regardless of the tenure of the operator, the interest rate on capital, or the level of machinery cost. However, at the two lower prices of cotton there are some differences in the optimum enterprise combinations between the two levels of technology.

With 17.6 cent cotton, six percent interest, and present technology owner-operated farms do not produce alfalfa hay or cotton but under advanced technology assumptions both appear in the optimum organization. The grain sorghum rotation is included for the advanced level of technology on tenant operated farms. Thus, at the lower price of cotton and rate of interest, under conditions of present technology most of the cropland is in wheat, but with the advanced level of technology alfalfa and grain sorghum replace wheat on both owner- and tenant-operated farms.

These same general relationships hold true under similar conditions at the 18 percent rate of interest. However, at the higher rate of interest no stocker cattle are produced under conditions of advanced technology and only a relatively small number are produced under present technology conditions. Cropland used for small grain forage and part of the land used for wheat at the lower level of interest is in grain sorghum at the higher rate of interest. Under conditions of advanced technology relatively more of the cropland used for wheat and small grain forage is in grain sorghum than for the present level of technology. Thus, at the lower price of cotton relatively larger acreages of grain sorghum and less wheat are in the optimum program for advanced technology situations.

If the price of cotton is 22 cents per pound, more cotton is in the optimum organization for both tenure levels with advanced technology than with present technology. This is true regardless of the rate of interest or the level of machinery cost. In fact, under conditions of advanced technology essentially all of the cropland is in cotton for both levels of tenure and on owner-operated farms at both levels of machinery

costs. However, with machinery cost variable, tenant farms produce some wheat at the lower rate of interest and some grain sorghum at the higher rate of interest.

In general, advanced technology conditions are more favorable than present technology for cotton production at the two lower cotton prices. Some of the cropland used for wheat and small grain forage with present technology is used for alfalfa hay and grain sorghum with advanced technology, and less stocker cattle are produced with advanced technology.

SUMMARY

This study was designed to determine the influence of selected variables on the optimum combination of enterprises for representative farm situations in the nonirrigated level loam soils of southwestern Oklahoma.

Two representative farm situations were developed to depict major adjustment opportunities to changing technical, economic, and institutional conditions. Fixed or owned factors on representative farms were assumed to be land and operator labor. Small farm situations consisted of 375 acres of cropland, 85 acres of native pasture and 2,251 hours of operator labor. Large farm situations consisted of 750 acres of cropland, 175 acres of native pasture and 1,989 hours of operator labor. Cropland on the representative farm situations was classified into productivity classes based on depth of topsoil, slope, and degree of erosion.

The price of cotton has a decided influence on the optimum combination of enterprises and returns to owned factors for both small and large farm situations. In general, at the lowest price of cotton, essentially all of the cropland is used for wheat, grain sorghum, alfalfa hay, and small grain forage production for cattle enterprises. As the price of cotton is increased, less land is used for these crops and fewer livestock appear in the optimum organization. Cotton production becomes relatively more profitable than other enterprises as cotton price increases, and income to owned factors increases with the price of cotton.

In effect, increasing the rate of interest limits the use of capital and influences the optimum combination of enterprises on both small and large farm situations. Increasing the rate of interest from six to 18 percent decreased livestock production and increased cash crop production. With low cotton prices and an interest rate of six percent, relatively large amounts of capital were profitably employed in livestock enterprises. At the higher rate of interest, capital was limited; hence, capital

extensive enterprises—cash crops—become more profitable but total returns to owned factors are reduced. This suggests that the internal earning rate on capital for livestock production is greater than six percent but less than 18 percent. At higher prices of cotton the rate of interest on capital has essentially no influence on the optimum combination of enterprises since essentially all adapted land is in cotton regardless of the rate of interest on capital.

The level of technology influences the combination of enterprises in that advanced technology is relatively more favorable for cotton production than present technology. Some of the cropland used for wheat and small grain forage under present technology is used for alfalfa hay and grain sorghum under advanced technology, and fewer stocker cattle are produced under advanced technology conditions.

Tenure of the farm operator has some effect on the optimum combination of enterprises, but the influence is different for two farm size situations. On small farms the influence of tenure shows that more wheat and less cotton are produced on tenant operated farms; when cotton prices are relatively high, tenants continue to produce small acreages of wheat while owners produce only cotton. Fewer stocker cattle are on tenant-operated farms when cotton prices are low, but more cattle appear when cotton prices move upward. On the large farm, tenure of the operator has essentially no influence on the optimum plan at the two extremes in assumed cotton prices.

The level of assumed machinery costs had essentially no influence on the optimum organization for the various resource situations except when cotton was 22 cents per pound. When machinery costs are assumed to be fixed, relatively more cotton and less wheat and stocker cattle are in the optimum organization for both small and large farm situations than when machinery costs are variable.

Table 5.—RESOURCE SITUATION IA: Optimum Enterprise Combination With Present Technology, Fixed Machinery Costs, Owner-Operated Small Farm With Three Levels of Cotton Prices and Two Interest Rates

Cotton Price Per Lb. Lint (¢)		17.6		22.0		26.4	
Capital Price Level (Per Cent)		6	18	6	18	6	18
Item	Unit						
Cotton	Acre	0	0	252	340	370	370
Cotton Lint	Cwt.	0	0	609	785	830	830
Feed Grains	Acre	311	347	99	25	0	0
Feed Grains	Cwt.	3,299	3,611	867	185	0	0
Stocker Cattle	Head	92	29	25	2	0	0
Cows	Head	3	5	6	6	7	6
Hired Labor	Hour	87	0	264	529	594	588
Tot. Opr. Cap.	$	16,716	7,347	9,660	7,094	7,290	7,159
Ann. Opr. Cap.	$	14,417	6,271	7,228	4,659	4,682	4,579
Return[1]	$	6,539	5,357	7,361	7,223	10,865	10,825
Land Use:							
L_a Land							
Cotton	Acre	0	0	210	210	210	210
Wheat	Acre	210	210	0	0	0	0
L_b Land							
Cotton	Acre	0	0	42	130	130	130
Wheat	Acre	101	122	88	0	0	0
Graze Out Small Grain	Acre	29	8	0	0	0	0
L_c Land							
Cotton	Acre	0	0	0	0	30	30
Wheat	Acre	0	0	11	10	0	0
Grain Sorghum	Acre	0	15	0	15	0	0
Fallow	Acre	0	3	0	3	0	0
Graze Out Small Grain	Acre	1	3	11	1	0	0
Small Grain Hay	Acre	29	9	8	1	0	0
L_e Land							
Graze Out Small Grain	Acre	5	0	0	0	0	0
Reseeded	Acre	0	0	5	0	5	0
Unused	Acre	0	5	0	5	0	5

[1]Return to land, machinery depreciation and investment, general overhead, and operator's labor and management.

Table 6.—RESOURCE SITUATION IB: Optimum Enterprise Combination With Present Technology, Variable Machinery Costs, Owner-Operated Small Farm With Three Levels of Cotton Prices and Two Interest Rates

Cotton Price Per Lb. Lint (¢)		17.6		22.0		26.4	
Capital Price Level (Per Cent)		6	18	6	18	6	18
Item	Unit						
Cotton	Acre	0	0	210	245	370	370
Cotton Lint	Cwt.	0	0	525	594	830	830
Feed Grains	Acre	307	346	130	110	0	0
Feed Grains	Cwt.	3,262	3,609	1,170	976	0	0
Stocker Cattle	Head	92	31	36	16	0	0
Cows	Head	3	5	5	6	7	6
Hired Labor	Hour	78	0	236	247	594	588
Tot. Opr. Cap.	$	20,444	11,183	16,378	13,905	14,254	14,052
Ann. Opr. Cap.	$	18,078	10,052	13,937	11,730	11,610	11,471
Return[1]	$	5,977	4,844	6,491	6,292	9,804	9,798
Land Use:							
L_a Land							
Cotton	Acre	0	0	210	210	210	210
Wheat	Acre	210	210	0	0	0	0
L_b Land							
Cotton	Acre	0	0	0	35	130	130
Wheat	Acre	97	130	130	95	0	0
Graze Out Small Grain	Acre	8	0	0	0	0	0
Small Grain Hay	Acre	25	0	0	0	0	0
L_c Land							
Cotton	Acre	0	0	0	0	30	30
Sudan	Acre	0	0	3	0	0	0
Grain Sorghum	Acre	0	6	0	15	0	0
Fallow	Acre	0	1	0	3	0	0
Graze Out Small Grain	Acre	30	13	15	7	0	0
Small Grain Hay	Acre	0	10	12	5	0	0
L_e Land							
Reseeded	Acre	5	0	5	0	5	0
Unused	Acre	0	5	0	5	0	5

[1]Return to land, general overhead, and operator's labor and management.

Table 7.—RESOURCE SITUATION IIA: Optimum Enterprise Combination With Present Technology, Fixed Machinery Costs, Tenant-Operated Small Farm With Three Levels of Cotton Prices and Two Interest Rates

Cotton Price Per Lb. Lint (¢)		17.6		22.0		26.4	
Capital Price Level (Per Cent)		6	18	6	18	6	18
Item	Unit						
Cotton	Acre	0	0	0	210	340	340
Cotton Lint[1]	Cwt.	0	0	0	394	589	589
Feed Grains	Acre	316	339	316	132	27	0
Feed Grains[1]	Cwt.	2,235	2,356	2,235	779	117	0
Stocker Cattle	Head	63	18	63	0	3	0
Cows	Head	4	0	4	0	7	0
Hired Labor	Hour	49	0	49	181	498	357
Tot. Opr. Cap.	$	12,622	4,221	12,622	3,597	7,292	5,045
Ann. Opr. Cap.	$	10,963	3,568	10,963	2,205	4,997	2,913
Return[2]	$	3,340	2,437	3,340	2,648	5,266	5,209
Land Use:							
L_a Land							
Cotton	Acre	0	0	0	210	210	210
Wheat	Acre	210	210	210	0	0	0
L_b Land							
Cotton	Acre	0	0	0	0	130	130
Wheat	Acre	106	49	106	52	0	0
Grain Sorghum	Acre	0	65	0	65	0	0
Fallow	Acre	0	13	0	13	0	0
Small Grain Hay	Acre	24	0	24	0	0	0
Graze Out Small Grain	Acre	0	3	0	0	0	0
L_c Land							
Wheat	Acre	0	0	0	0	27	0
Grain Sorghum	Acre	0	15	0	15	0	0
Fallow	Acre	0	3	0	3	0	0
Small Grain Hay	Acre	3	8	3	0	2	0
Gr. Out Sm. Gr.	Acre	27	4	27	0	1	0
Unused	Acre	0	0	0	12	0	30
L_e Land							
Unused	Acre	5	5	5	5	5	5

[1]Tenant's share.

[2]Return to tenant-operator's machinery depreciation and investment, general overhead, and tenant's labor and management.

Table 8.—RESOURCE SITUATION IIB: Optimum Enterprise Combination With Present Technology, Variable Machinery Costs, Tenant-Operated Small Farm With Three Levels of Cotton Prices and Two Interest Rates

Cotton Price Per Lb. Lint (¢)		17.6		22.0		26.4	
Capital Price Level (Per Cent)		6	18	6	18	6	18
Item	Unit						
Cotton	Acre	0	0	0	0	340	340
Cotton Lint[1]	Cwt.	0	0	0	0	589	589
Feed Grains	Acre	317	354	317	354	27	30
Feed Grains[1]	Cwt.	2,233	2,410	2,233	2,410	117	132
Stocker Cattle	Head	63	21	63	21	3	0
Cows	Head	4	0	4	0	6	0
Hired Labor	Hour	48	0	48	0	498	401
Total Operating Capital	$	16,066	8,424	16,066	8,424	13,189	10,975
Annual Operating Capital	$	14,476	7,591	14,476	7,591	11,615	9,621
Return[2]	$	2,778	2,051	2,778	2,051	4,277	4,204
Land Use:							
L_a Land							
Cotton	Acre	0	0	0	0	210	210
Wheat	Acre	210	210	210	210	0	0
L_b Land							
Cotton	Acre	0	0	0	0	130	130
Wheat	Acre	104	114	104	114	0	0
Small Grain Hay	Acre	26	9	26	9	0	0
Graze Out Small Grain	Acre	0	7	0	7	0	0
L_c Land							
Wheat	Acre	3	30	3	30	27	30
Small Grain Hay	Acre	0	0	0	0	2	0
Graze Out Small Grain	Acre	27	0	27	0	1	0
L_e Land							
Unused	Acre	5	5	5	5	5	5

[1]Tenant's share.
[2]Return to tenant-operator's general overhead, and labor and management.

Table 9.—RESOURCE SITUATION IIIA: Optimum Enterprise Combination With Advanced Technology, Fixed Machinery Costs, Owner-Operated Small Farm With Three Levels of Cotton Prices and Two Interest Rates

Cotton Price Per Lb. Lint (¢)		17.6		22.0		26.4	
Capital Price Level (Per Cent)		6	18	6	18	6	18
Item	Unit						
Cotton	Acre	22	31	318	318	370	370
Cotton Lint	Cwt.	58	73	782	782	925	925
Feed Grains	Acre	218	239	0	0	0	0
Feed Grains	Cwt.	2,761	3,056	0	0	0	0
Stocker Cattle	Head	80	0	0	0	0	0
Cows	Head	3	6	7	6	7	6
Hired Labor	Hour	181	184	513	506	577	571
Tot. Opr. Cap.	$	17,059	4,949	7,273	7,135	7,022	6,884
Ann. Opr. Cap.	$	13,827	3,343	4,708	4,601	4,764	4,657
Return[1]	$	8,241	7,139	9,930	9,921	13,894	13,886
Land Use:							
L_a Land							
Cotton	Acre	19	19	158	158	210	210
Wheat	Acre	139	139	0	0	0	0
Alfalfa	Acre	52	52	52	52	0	0
L_b Land							
Cotton	Acre	0	0	130	130	130	130
Wheat	Acre	79	20	0	0	0	0
Alfalfa	Acre	32	32	0	0	0	0
Grain Sorghum	Acre	0	65	0	0	0	0
Fallow	Acre	0	13	0	0	0	0
Small Grain Hay	Acre	19	0	0	0	0	0
L_c Land							
Cotton	Acre	3	12	30	30	30	30
Grain Sorghum	Acre	0	15	0	0	0	0
Fallow	Acre	0	3	0	0	0	0
Graze Out Small Grain	Acre	27	0	0	0	0	0
L_e Land							
Graze Out Small Grain	Acre	5	0	0	0	0	0
Reseeded	Acre	0	0	5	0	5	0
Unused	Acre	0	5	0	5	0	5

[1]Return to land, machinery depreciation and investment, general overhead, and operator's labor and management.

Table 10.—RESOURCE SITUATION IIIB: Optimum Enterprise Combination With Advanced Technology, Variable Machinery Costs, Owner-Operated Small Farm With Three Levels of Cotton Prices and Two Interest Rates

Cotton Price Per Lb. Lint (¢)		17.6		22.0		26.4	
Capital Price Level (Per Cent)		6	18	6	18	6	18
Item	Unit						
Cotton	Acre	22	31	286	318	370	370
Cotton Lint	Cwt.	58	73	710	782	925	925
Feed Grains	Acre	218	239	0	0	0	0
Feed Grains	Cwt.	2,761	3,056	0	0	0	0
Stocker Cattle	Head	80	0	0	0	0	0
Cows	Head	3	6	7	6	7	6
Hired Labor	Hour	181	184	477	510	581	574
Tot. Opr. Cap.	$	22,069	10,251	14,865	14,321	13,986	13,777
Ann. Opr. Cap.	$	18,255	8,063	11,491	11,425	11,960	11,548
Return[1]	$	7,559	6,414	8,863	8,830	12,789	12,784
Land Use:							
L_a Land							
Cotton	Acre	19	19	158	158	210	210
Wheat	Acre	139	139	0	0	0	0
Alfalfa	Acre	52	52	52	52	0	0
L_b Land							
Cotton	Acre	0	0	98	130	130	130
Wheat	Acre	79	20	0	0	0	0
Alfalfa	Acre	32	32	32	0	0	0
Grain Sorghum	Acre	0	65	0	0	0	0
Fallow	Acre	0	13	0	0	0	0
Small Grain Hay	Acre	19	0	0	0	0	0
L_c Land							
Cotton	Acre	3	12	30	30	30	30
Grain Sorghum	Acre	0	15	0	0	0	0
Fallow	Acre	0	3	0	0	0	0
Graze Out Small Grain	Acre	27	0	0	0	0	0
L_e Land							
Graze Out Small Grain	Acre	5	0	0	0	0	0
Reseeded	Acre	0	0	5	0	5	0
Unused	Acre	0	5	0	5	0	5

[1]Return to land, general overhead and operator's labor and management.

Table 11.—RESOURCE SITUATION IVA: Optimum Enterprise Combination, Advanced Technology, Fixed Mach. Costs, Ten.-Oper. Small Farm, 3 Levels of Cotton Prices and 2 Int. Rates

Cotton Price Per Lb. Lint (¢)		17.6		22.0		26.4	
Capital Price Level (Per Cent)		6	18	6	18	6	18
Item	Unit						
Cotton	Acre	22	32	246	250	370	370
Cotton Lint[1]	Cwt.	44	58	486	492	694	694
Feed Grains	Acre	281	249	110	109	0	0
Feed Grains[1]	Cwt.	2,364	2,009	790	823	0	0
Stocker Cattle	Head	68	0	24	0	0	0
Cows	Head	4	0	5	0	0	0
Hired Labor	Hour	0	99	81	141	489	439
Tot. Opr. Cap.	$	14,309	2,396	9,021	3,738	5,127	5,125
Ann. Opr. Cap.	$	12,191	1,465	7,165	2,435	3,188	3,186
Return[2]	$	4,257	3,302	4,940	4,583	7,720	7,720
Land Use:							
L_a Land							
Cotton	Acre	22	20	210	210	210	210
Wheat	Acre	170	12	0	0	0	0
Alfalfa	Acre	18	52	0	0	0	0
Grain Sorghum	Acre	0	105	0	0	0	0
Fallow	Acre	0	21	0	0	0	0
L_b Land							
Cotton	Acre	0	0	6	10	130	130
Wheat	Acre	111	52	110	54	0	0
Grain Sorghum	Acre	0	65	0	55	0	0
Fallow	Acre	0	13	0	11	0	0
Small Grain Hay	Acre	19	0	9	0	0	0
Gr. Out Sm. Gr.	Acre	0	0	5	0	0	0
L_c Land							
Cotton	Acre	0	12	30	30	30	30
Grain Sorghum	Acre	0	15	0	0	0	0
Fallow	Acre	0	3	0	0	0	0
Small Grain Hay	Acre	7	0	0	0	0	0
Gr. Out Sm. Gr.	Acre	23	0	0	0	0	0
L_e Land							
Gr. Out Sm. Gr.	Acre	5	0	5	0	0	0
Unused	Acre	0	5	0	5	5	5

[1]Tenant's share.

[2]Return to tenant-operator's machinery depreciation and investment, general overhead, and tenant's labor and management.

Table 12.—RESOURCE SITUATION IVB: Optimum Enterprise Combination With Advanced Technology, Variable Machinery Costs, Tenant-Operated Small Farm With Three Levels of Cotton Prices and Two Interest Rates

Cotton Price Per Lb. Lint (¢)		17.6		22.0		26.4	
Capital Price Level (Per Cent)		6	18	6	18	6	18
Item	Unit						
Cotton	Acre	25	27	240	210	370	370
Cotton Lint[1]	Cwt.	44	56	475	433	694	694
Feed Grains	Acre	291	315	113	129	0	0
Feed Grains[1]	Cwt.	2,502	2,669	812	933	0	0
Stocker Cattle	Head	72	0	25	0	0	0
Cows	Head	4	0	5	0	0	0
Hired Labor	Hour	0	0	61	0	489	489
Tot. Opr. Cap.	$	18,389	5,795	14,783	8,486	12,020	12,018
Ann. Opr. Cap.	$	16,384	5,327	12,948	7,350	10,081	10,079
Return[2]	$	3,646	2,504	4,073	3,539	6,693	6,693
Land Use:							
L_a Land							
Cotton	Acre	8	27	210	210	210	210
Wheat	Acre	202	183	0	0	0	0
L_b Land							
Cotton	Acre	17	0	0	0	130	130
Wheat	Acre	89	52	113	125	0	0
Grain Sorghum	Acre	0	65	0	4	0	0
Fallow	Acre	0	13	0	1	0	0
Small Grain Hay	Acre	24	0	9	0	0	0
Graze Out Small Grain	Acre	0	0	8	0	0	0
L_c Land							
Cotton	Acre	0	0	30	0	30	30
Grain Sorghum	Acre	0	15	0	0	0	0
Fallow	Acre	0	3	0	0	0	0
Small Grain Hay	Acre	2	0	0	0	0	0
Gr. Out Sm. Gr.	Acre	28	0	0	0	0	0
Unused	Acre	0	12	0	30	0	0
L_e Land							
Unused	Acre	5	5	5	5	5	5

[1]Tenant's share.

[2]Return to tenant-operator's general overhead, and labor and management.

Table 13.—RESOURCE SITUATION VA: Optimum Enterprise Combination With Present Technology, Fixed Machinery Costs, Owner-Operated Large Farm With Three Levels of Cotton Prices and Two Interest Rates

Cotton Price Per Lb. Lint (¢)		17.6		22.0		26.4	
Capital Price Level (Per Cent)		6	18	6	18	6	18
Item	Unit						
Cotton	Acre	0	0	680	680	740	740
Cotton Lint	Cwt.	0	0	1,570	1,570	1,660	1,660
Feed Grains	Acre	613	684	52	52	0	0
Feed Grains	Cwt.	6,525	7,125	344	389	0	0
Stocker Cattle	Head	185	32	10	0	0	0
Cows	Head	7	12	13	13	14	13
Hired Labor	Hour	337	151	955	954	1,040	1,028
Tot. Opr. Cap.	$	34,107	10,711	16,673	14,794	15,947	15,625
Ann. Opr. Cap.	$	29,294	9,141	11,146	9,575	10,244	10,007
Return[1]	$	12,969	10,187	14,925	14,785	22,144	22,127
Land Use:							
L_a Land							
Cotton	Acre	0	0	420	420	420	420
Wheat	Acre	420	420	0	0	0	0
L_b Land							
Cotton	Acre	0	0	260	260	260	260
Wheat	Acre	193	104	0	0	0	0
Grain Sorghum	Acre	0	130	0	0	0	0
Fallow	Acre	0	26	0	0	0	0
Small Grain Hay	Acre	50	0	0	0	0	0
Graze Out Small Grain	Acre	17	0	0	0	0	0
L_c Land							
Cotton	Acre	0	0	0	0	60	60
Wheat	Acre	0	0	52	24	0	0
Grain Sorghum	Acre	0	30	0	30	0	0
Fallow	Acre	0	6	0	6	0	0
Small Grain Hay	Acre	0	10	4	0	0	0
Graze Out Small Grain	Acre	60	14	4	0	0	0
L_e Land							
Reseeded	Acre	10	0	10	0	10	0
Unused	Acre	0	10	0	10	0	10

[1]Return to land, machinery depreciation and investment, general overhead, and operator's labor and management.

Table 14.—RESOURCE SITUATION VB: Optimum Enterprise Combination With Present Technology, Variable Machinery Costs, Owner-Operated Large Farm With Three Levels of Cotton Prices and Two Interest Rates

Cotton Price Per Lb. Lint (¢)		17.6		22.0		26.4	
Capital Price Level (Per Cent)		6	18	6	18	6	18
Item	Unit						
Cotton	Acre	0	0	420	680	740	740
Cotton Lint	Cwt.	0	0	1,050	1,570	1,660	1,660
Feed Grains	Acre	613	684	268	54	0	0
Feed Grains	Cwt.	6,525	7,125	2,397	389	0	0
Stocker Cattle	Head	185	32	69	0	0	0
Cows	Head	7	12	11	13	14	13
Hired Labor	Hour	337	151	618	954	1,040	1,028
Tot. Opr. Cap.	$	40,652	17,268	30,756	24,867	26,371	25,977
Ann. Opr. Cap.	$	35,803	15,698	25,682	19,660	20,644	20,372
Return[1]	$	11,939	9,155	13,303	13,037	20,326	20,311
Land Use:							
L_a Land							
Cotton	Acre	0	0	420	420	420	420
Wheat	Acre	420	420	0	0	0	0
L_b Land							
Cotton	Acre	0	0	0	260	260	260
Wheat	Acre	193	104	260	0	0	0
Grain Sorghum	Acre	0	130	0	0	0	0
Fallow	Acre	0	26	0	0	0	0
Small Grain Hay	Acre	50	0	0	0	0	0
Graze Out Small Grain	Acre	17	0	0	0	0	0
L_c Land							
Cotton	Acre	0	0	0	0	60	60
Wheat	Acre	0	0	8	24	0	0
Grain Sorghum	Acre	0	30	0	30	0	0
Fallow	Acre	0	6	0	6	0	0
Small Grain Hay	Acre	0	10	22	0	0	0
Graze Out Small Grain	Acre	60	14	30	0	0	0
L_e Land							
Reseeded	Acre	10	0	10	0	10	0
Unused	Acre	0	10	0	10	0	10

[1]Return to land, general overhead, and operator's labor and management.

Table 15.—RESOURCE SITUATION VIA: Optimum Enterprise Combination With Present Technology, Fixed Machinery Costs, Tenant-Operated Large Farm With Three Levels of Cotton Prices and Two Interest Rates

Cotton Price Per Lb. Lint (¢)		17.6		22.0		26.4	
Capital Price Level (Per Cent)		6	18	6	18	6	18
Item	Unit						
Cotton	Acre	0	0	250	420	740	704
Cotton Lint[1]	Cwt.	0	0	468	788	1,244	1,204
Feed Grains	Acre	633	684	420	290	0	30
Feed Grains[1]	Cwt.	4,470	4,750	2,792	1,715	0	155
Stocker Cattle	Head	126	0	79	0	0	0
Cows	Head	8	0	10	0	13	0
Hired Labor	Hour	281	67	333	278	1,028	818
Tot. Opr. Cap.	$	25,551	2,685	21,294	7,787	15,507	11,530
Ann. Opr. Cap.	$	22,120	2,048	17,447	4,768	10,294	6,770
Return[2]	$	6,562	4,184	6,603	5,583	10,936	10,858
Land Use:							
L_a Land							
Cotton	Acre	0	0	250	420	420	420
Wheat	Acre	420	420	170	0	0	0
L_b Land							
Cotton	Acre	0	0	0	0	260	260
Wheat	Acre	213	104	250	260	0	0
Grain Sorghum	Acre	0	130	0	0	0	0
Fallow	Acre	0	26	0	0	0	0
Small Grain Hay	Acre	47	0	10	0	0	0
L_c Land							
Cotton	Acre	0	0	0	0	60	24
Grain Sorghum	Acre	0	30	0	30	0	30
Fallow	Acre	0	6	0	6	0	6
Small Grain Hay	Acre	5	0	26	0	0	0
Graze Out Small Grain	Acre	55	0	34	0	0	0
Unused	Acre	0	24	0	24	0	0
L_e Land							
Unused	Acre	10	10	10	10	10	10

[1]Tenant's share.

[2]Return to tenant-operator's machinery depreciation and investment, general overhead, and tenant's labor and management.

Table 16.—RESOURCE SITUATION VIB: Optimum Enterprise Combination With Present Technology, Variable Machinery Costs, Tenant-Operated Large Farm With Three Levels of Cotton Prices and Two Interest Rates

Cotton Price Per Lb. Lint (¢)		17.6		22.0		26.4	
Capital Price Level (Per Cent)		6	18	6	18	6	18
Item	Unit						
Cotton	Acre	0	0	0	322	680	680
Cotton Lint[1]	Cwt.	0	0	0	603	1,178	1,178
Feed Grains	Acre	633	654	633	332	53	0
Feed Grains[1]	Cwt.	4,470	4,594	4,470	2,150	235	0
Stocker Cattle	Head	126	0	126	0	7	0
Cows	Head	8	0	8	0	13	0
Hired Labor	Hour	281	35	281	186	937	689
Tot. Opr. Cap.	$	32,028	8,520	32,028	13,985	25,827	20,471
Ann. Opr. Cap.	$	28,597	7,905	28,597	11,658	20,835	15,931
Return[2]	$	5,528	3,158	5,528	3,998	9,266	9,196
Land Use:							
L_a Land							
Cotton	Acre	0	0	0	322	420	420
Wheat	Acre	420	420	420	98	0	0
L_b Land							
Cotton	Acre	0	0	0	0	260	260
Wheat	Acre	213	104	213	104	0	0
Grain Sorghum	Acre	0	130	0	130	0	0
Fallow	Acre	0	26	0	26	0	0
Small Grain Hay	Acre	47	0	47	0	0	0
L_c Land							
Wheat	Acre	0	0	0	0	53	0
Small Grain Hay	Acre	5	0	5	0	4	0
Graze Out Small Grain	Acre	55	0	55	0	3	0
Unused	Acre	0	60	0	60	0	60
L_e Land							
Unused	Acre	10	10	10	10	10	10

[1]Tenant's share.
[2]Return to tenant-operator's general overhead and labor and management.

Table 17.—RESOURCE SITUATION VIIA: Optimum Enterprise Combination With Advanced Technology, Fixed Machinery Costs, Owner-Operated Large Farm With Three Levels of Cotton Prices and Two Interest Rates

Cotton Price Per Lb. Lint (¢)		17.6		22.0		26.4	
Capital Price Level (Per Cent)		6	18	6	18	6	18
Item	Unit						
Cotton	Acre	10	31	740	740	740	740
Cotton Lint	Cwt.	23	61	1,850	1,850	1,851	1,851
Feed Grains	Acre	460	470	0	0	0	0
Feed Grains	Cwt.	5,907	5,877	0	0	0	0
Stocker Cattle	Head	170	0	0	0	0	0
Cows	Head	7	13	14	13	14	13
Hired Labor	Hour	793	634	1,095	1,083	1,095	1,083
Tot. Opr. Cap.	$	35,795	8,755	13,481	13,159	13,478	13,164
Ann. Opr. Cap.	$	29,067	5,916	9,158	8,921	9,155	8,926
Return[1]	$	15,514	13,360	19,263	19,248	27,406	27,391
Land Use:							
L_a Land							
Cotton	Acre	0	0	420	420	420	420
Wheat	Acre	315	93	0	0	0	0
Alfalfa	Acre	105	105	0	0	0	0
Grain Sorghum	Acre	0	185	0	0	0	0
Fallow	Acre	0	37	0	0	0	0
L_b Land							
Cotton	Acre	10	7	260	260	260	260
Wheat	Acre	144	32	0	0	0	0
Alfalfa	Acre	65	65	0	0	0	0
Grain Sorghum	Acre	0	130	0	0	0	0
Fallow	Acre	0	26	0	0	0	0
Small Grain Hay	Acre	41	0	0	0	0	0
L_c Land							
Cotton	Acre	0	24	60	60	60	60
Grain Sorghum	Acre	1	30	0	0	0	0
Fallow	Acre	0	6	0	0	0	0
Gr. Out Sm. Gr.	Acre	59	0	0	0	0	0
L_e Land							
Graze Out Small Grain	Acre	10	0	0	0	0	0
Reseeded	Acre	0	0	10	0	10	0
Unused	Acre	0	10	0	10	0	10

[1]Return to land, general overhead, and operator's labor and management.

Table 18.—RESOURCE SITUATION VIIB: Optimum Enterprise Combination With Advanced Technology, Variable Machinery Costs, Owner-Operated Large Farm With Three Levels of Cotton Prices and Two Interest Rates

Cotton Price Per Lb. Lint (¢)		17.6		22.0		26.4	
Capital Price Level (Per Cent)		6	18	6	18	6	18
Item	Unit						
Cotton	Acre	8	22	740	740	740	740
Cotton Lint[1]	Cwt.	19	60	1,851	1,851	1,851	1,851
Feed Grains	Acre	516	543	0	0	0	0
Feed Grains[1]	Cwt.	6,514	6,519	0	0	0	0
Stocker Cattle	Head	189	0	0	0	0	0
Cows	Head	6	13	14	13	14	13
Hired Labor	Hour	631	445	1,107	1,095	1,107	1,095
Tot. Opr. Cap.	$	46,150	16,649	24,905	24,512	24,905	25,512
Ann. Opr. Cap.	$	39,047	13,849	20,350	20,078	20,349	20,078
Return[2]	$	14,186	11,635	17,552	17,539	25,694	25,681
Land Use:							
L_a Land							
Cotton	Acre	0	22	420	420	420	420
Wheat	Acre	315	58	0	0	0	0
Alfalfa	Acre	105	105	0	0	0	0
Grain Sorghum	Acre	0	197	0	0	0	0
Fallow	Acre	0	38	0	0	0	0
L_b Land							
Cotton	Acre	8	0	260	260	260	260
Wheat	Acre	201	104	0	0	0	0
Grain Sorghum	Acre	0	130	0	0	0	0
Fallow	Acre	0	26	0	0	0	0
Small Grain Hay	Acre	46	0	0	0	0	0
Gr. Out Sm. Gr.	Acre	5	0	0	0	0	0
L_c Land							
Cotton	Acre	0	0	60	60	60	60
Wheat	Acre	0	24	0	0	0	0
Grain Sorghum	Acre	0	30	0	0	0	0
Fallow	Acre	0	6	0	0	0	0
Gr. Out Sm. Gr.	Acre	60	0	0	0	0	0
L_e Land							
Gr. Out Sm. Gr.	Acre	10	0	0	0	0	0
Reseeded	Acre	0	0	10	0	10	0
Unused	Acre	0	10	0	10	0	10

[1]Return to land, general overhead, and operator's labor and management.

Table 19.—RESOURCE SITUATION VIIIA: Optimum Enterprise Combination With Advanced Technology, Fixed Machinery Costs, Tenant-Operated Large Farm With Three Levels of Cotton Prices and Two Interest Rates

Cotton Price Per Lb. Lint (¢)		17.6		22.0		26.4	
Capital Price Level (Per Cent)		6	18	6	18	6	18
Item	Unit						
Cotton	Acre	12	23	704	704	740	740
Cotton Lint[1]	Cwt.	25	47	1,338	1,338	1,388	1,388
Feed Grains	Acre	617	619	30	30	0	0
Feed Grains[1]	Cwt.	5,329	5,135	196	196	0	0
Stocker Cattle	Head	117	0	0	0	0	0
Cows	Head	9	0	0	0	0	0
Hired Labor	Hour	310	139	885	885	920	920
Tot. Opr. Cap.	$	25,007	2,904	9,525	9,524	9,915	9,915
Ann. Opr. Cap.	$	21,327	2,171	5,846	5,845	6,060	6,060
Return[2]	$	7,778	5,804	9,118	9,118	15,211	15,211
Land Use:							
L_a Land							
Cotton	Acre	12	23	420	420	420	420
Wheat	Acre	408	145	0	0	0	0
Grain Sorghum	Acre	0	210	0	0	0	0
Fallow	Acre	0	42	0	0	0	0
L_b Land							
Cotton	Acre	0	0	260	260	260	260
Wheat	Acre	49	104	0	0	0	0
Grain Sorghum	Acre	130	130	0	0	0	0
Fallow	Acre	26	26	0	0	0	0
Small Grain Hay	Acre	43	0	0	0	0	0
Gr. Out Sm. Gr.	Acre	12	0	0	0	0	0
L_c Land							
Cotton	Acre	0	0	24	24	60	60
Grain Sorghum	Acre	30	30	30	30	0	0
Fallow	Acre	6	6	6	6	0	0
Gr. Out Sm. Gr.	Acre	24	0	0	0	0	0
Unused	Acre	0	24	0	0	0	0
L_e Land							
Gr. Out Sm. Gr.	Acre	10	0	0	0	0	0
Unused	Acre	0	10	10	10	10	10

[1]Tenant's share.
[2]Return to tenant-operator's general overhead, and labor and management.

Table 20.—RESOURCE SITUATION VIIIB: Optimum Enterprise Combination With Advanced Technology, Variable Machinery Costs, Tenant-Operated Large Farm With Three Levels of Cotton Prices and Two Interest Rates

Cotton Price Per Lb. Lint (¢)		17.6		22.0		26.4	
Capital Price Level (Per Cent)		6	18	6	18	6	18
Item	Unit						
Cotton	Acre	8	23	443	524	740	740
Cotton Lint[1]	Cwt.	17	47	905	1,042	1,388	1,388
Feed Grains	Acre	618	619	252	160	0	0
Feed Grains[1]	Cwt.	5,269	5,135	1,805	1,223	0	0
Stocker Cattle	Head	152	0	51	0	0	0
Cows	Head	7	0	0	0	0	0
Labor Hired	Hour	330	139	524	681	920	920
Tot. Opr. Cap.	$	37,119	9,615	24,859	17,162	20,912	20,912
Ann. Opr. Cap.	$	32,765	9,004	21,151	14,380	17,058	17,058
Return[2]	$	6,763	4,718	7,492	7,259	13,500	13,500
Land Use:							
L_a Land							
Cotton	Acre	8	23	420	420	420	420
Wheat	Acre	412	145	0	0	0	0
Grain Sorghum	Acre	0	210	0	0	0	0
Fallow	Acre	0	42	0	0	0	0
L_b Land							
Cotton	Acre	0	0	23	104	260	260
Wheat	Acre	205	104	237	0	0	0
Grain Sorghum	Acre	0	130	0	130	0	0
Fallow	Acre	0	26	0	26	0	0
Small Grain Hay	Acre	55	0	0	0	0	0
L_c Land							
Cotton	Acre	0	0	0	0	60	60
Grain Sorghum	Acre	1	30	15	30	0	0
Fallow	Acre	0	6	3	6	0	0
Small Grain Hay	Acre	0	0	22	0	0	0
Graze Out							
Small Grain	Acre	59	0	20	0	0	0
Unused	Acre	0	24	0	24	0	0
L_e Land							
Unused	Acre	10	10	10	10	10	10

[1]Tenant's share.

[2]Return to tenant-operator's general overhead, and labor and management.

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APPENDIX

AGGREGATIVE OUTPUT FOR THE LEVEL LOAM SOILS

An additional objective of this study was to develop normative supply estimates for cotton and the aggregate output of wheat, grain sorghum, stocker cattle, and returns to owned factors, under alternative assumptions, for the level loam soils of southwestern Oklahoma (Appendix Tables 1-3).

Aggregations are made on the assumption that resource costs are constant over all levels of resource use and that product prices are constant at the assumed levels over all levels of output. Under these assumptions, the weighted summation of the output response relationships for the individual firms represents the aggregate response for level loam soils and is consistent with economic theory. The percentage of farms currently tenant operated and the proportion of land in small and large farms provide a basis for weighting the programmed results obtained for the individual resource situations.[1] An additional aggregation was prepared on the basis of S-42 assumptions.[2]

Aggregations were developed for three prices of cotton and two rates of interest on capital for the following situations: (1) present technology with machinery cost fixed; (2) present technology with machinery cost variable; (3) advanced technology with machinery cost fixed; (4) advanced technology with machinery cost variable; and (5) an aggregation based on S-42 assumptions.

A total of ten aggregations was made for each price of cotton on the assumption that complete adjustment is made on all included cropland[3] consistent with the programmed optima for each resource situation. Since it is not possible to determine the proportion of the included cropland on which present and advanced production practices are employed nor the proportion of cropland operated with machinery costs fixed and variable, it is not possible to develop aggregations on this

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[1]Aggregative weights are available in an unpublished Ph. D. thesis; James H. White, "The Influence of Selected Restraints on Normative Supply Relationships," Oklahoma State University, Stillwater, 1962.

[2]Area aggregations were made for Southern Regional Research Project S-42 on the assumption that all farms were owner operated under conditions of advanced technology. S-42 is the designation of the technical committee for the regional project.

[3]Included cropland is the total cropland in level loam soils less the irrigated cropland and the cropland used by the excluded alternatives.

basis. Instead, aggregations were made only for "pure" situations which, in effect, establish the range of output adjustments for crops and livestock to changes in the price of cotton.

The aggregate output of cotton for the included resources in the area represents the normative supply of cotton or the amount of cotton that farmers would plan to produce if they intended to maximize profit or returns to owned factors. As would be expected, if the price of cotton is increased, with costs and prices of other products held constant, the amount of cotton produced in the area increases. Between the prices of 17.6 and 26.4 cents per pound, the output of cotton is highly elastic. At prices outside this range the output of cotton in response to price changes is highly inelastic since the technical maximum amount of cotton is produced in the area when the price of cotton is 26.4 cents per pound.

Over the range of prices considered in this study, the aggregate production of cotton is less for present technology than for advanced technology. The difference in aggregate output can be explained by higher yields of cotton per acre and by larger acreages of cotton in the optimum organization under advanced technology assumptions.

Tenure of the operator has very little influence on the normative supply of cotton. Even though there were differences in the optimum combination of enterprises on owned and tenant farms at some cotton prices, the small percentage of tenant-operated farms resulted in little difference in the aggregate compared with an aggregation assuming all owner-operated farms (S-42).

The level at which machinery costs are fixed influences the normative supply of cotton only when the price of cotton is 22 cents per pound. Under these conditions more cotton is produced if machinery costs are fixed than when they are variable.

Under certain conditions the aggregate output of cotton is as responsive to nonprice variables as it is to increases in the price of cotton. With present technology for crops, aggregate output of cotton increases from about 120,000 to about 250,000 bales when the price of cotton increases from 22 to 26.4 cents per pound. At a cotton price of 22 cents per pound, the aggregate output of cotton increases from 120,000 with present technology to 240,000 bales with advanced technology.

Although returns to owned factors increase with increases in cotton prices, aggregate returns also change with the level of technology and the level at which machinery costs are fixed. Aggregate returns to owned

factors for the area are least for present technology conditions with machinery costs variable and greatest for advanced technology with machinery costs fixed. Between levels of technology, income differences can be explained by different input-output ratios for present and advanced technology. The difference in aggregate income for the area between fixed and variable machinery costs are, in part, due to differences in the assumptions relative to machinery cost.

The results of the study are valid only within the framework of the assumptions and the variables considered. They are not predictive of the actual production response of farmers but are estimates of production farmers would plan to meet as a goal of profit maximization, acting separately and independently. A predictive analysis would need to include consideration of the effect of aggregative changes in production and in aggregate input items on prices and costs. Also, the response of farmers not motivated solely by profit maximization would need to be considered. Since the estimates of the study are essentially timeless, the introduction of time as an adjustment variable would result in production changes.

Appendix Table 1.—Aggregate Output of Selected Commodities for the Loam Soil Area of Southwestern Oklahoma, Lint Cotton Price $17.60 Per Hundredweight

Resource Situation and Item	Unit	Present Technology		Advanced Technology		S-42 Assumptions
		Machinery Cost Fixed	Machinery Cost Variable	Machinery Cost Fixed	Machinery Cost Variable	
Farms	Number	1,199.15[2]	1,199.15[2]	1,199.15[2]	1,199.15[2]	1,199.15[3]
Cropland	Acre	562,101	562,101	562,101	562,101	562,101
Six Percent Capital						
Cotton	Acre	0	0	22,945	22,913	22,182
Cotton Lint	Bale	0	0	12,564	12,192	12,104
Wheat	Acre	466,305	463,922	349,020	376,736	350,752
Wheat Grain	Cwt.	4,950,678	4,925,658	4,465,048	4,789,318	4,435,965
Grain Sorghum	Acre	0	0	15,540	0	0
Grain Sorghum	Cwt.	0	0	148,446	0	0
Other[1]	Acre	95,796	98,179	174,596	162,452	189,167
Stocker Cattle	Head	126,384	126,384	115,708	123,672	128,609
Cows	Head	5,121	5,121	5,201	4,871	4,497
Net Income	Dollar	8,473,496	7,658,510	10,468,981	9,500,071	11,051,083

Eighteen Per Cent Capital						
Cotton	Acre	0	0	36,769	33,585	34,473
Cotton Lint	Bale	0	0	17,808	17,627	17,498
Wheat	Acre	437,951	466,272	167,439	222,313	198,759
Wheat Grain	Cwt.	4,468,991	4,913,441	2,188,895	2,872,012	2,561,160
Grain Sorghum	Acre	92,689	59,242	243,476	215,725	214,349
Grain Sorghum	Cwt.	609,849	450,868	2,458,849	2,156,636	2,141,615
Other[1]	Acre	31,471	36,597	114,416	90,478	114,520
Stocker Cattle	Head	30,413	32,454	0	0	0
Cows	Head	5,909	5,909	6,784	6,784	9,293
Net Income	Dollar	6,676,886	5,937,456	8,882,405	7,747,224	9,256,552

[1]Graze out small grain, small grain hay, sudan grazing, alfalfa hay, reseeded cropland, and unused cropland.
[2]Twenty-seven per cent of all farms are tenant operated.
[3]All farms are owner operated with advanced technology production and harvesting practices.

Appendix Table 2.—Aggregate Output of Selected Commodities for the Level Loam Soil Area of Southwestern Oklahoma, Lint Cotton Price $22.00 Per Hundredweight

Resource Situation and Item	Unit	Present Technology		Advanced Technology		S-42 Assumptions
		Machinery Cost Fixed	Machinery Cost Variable	Machinery Cost Fixed	Machinery Cost Variable	
Farms	Number	1,199.15[2]	1,199.15[2]	1,199.15[2]	1,199.15[2]	1,199.15[3]
Cropland	Acre	562,101	562,101	562,101	562,101	562,101
Six Per Cent Capital						
Cotton	Acre	334,499	229,788	487,444	443,848	479,059
Cotton Lint	Bale	166,091	120,182	255,220	234,859	249,677
Wheat	Acre	187,105	272,432	26,711	46,623	0
Wheat Grain	Cwt.	1,797,559	2,647,665	287,754	514,912	0
Grain Sorghum	Acre	0	0	2,914	1,457	0
Grain Sorghum	Cwt.	0	0	23,820	11,910	0
Other[1]	Acre	40,497	59,881	45,032	70,173	83,042
Stocker Cattle	Head	40,293	64,232	5,828	10,199	0
Cows	Head	8,564	7,309	8,873	8,874	10,493
Net Income	Dollar	9,444,552	8,294,916	12,672,642	11,255,529	13,232,942

Eighteen Per Cent Capital						
Cotton	Acre	457,027	335,731	488,416	464,129	507,838
Cotton Lint	Bale	224,168	167,078	255,627	244,996	263,224
Wheat	Acre	45,488	169,934	13,113	30,354	0
Wheat Grain	Cwt.	383,305	1,622,909	141,589	327,856	0
Grain Sorghum	Acre	45,923	32,324	18,941	16,754	0
Grain Sorghum	Cwt.	316,301	241,858	182,004	160,468	0
Other[1]	Acre	13,664	24,112	41,632	50,864	54,263
Stocker Cattle	Head	1,313	15,603	0	0	0
Cows	Head	6,784	6,784	6,784	6,784	9,293
Net Income	Dollar	9,072,715	7,805,676	12,576,758	11,082,488	13,199,366

[1]Graze out small grain, small grain hay, sudan grazing, alfalfa hay, reseeded cropland, and unused cropland.
[2]Twenty-seven per cent of all farms are tenant operated.
[3]All farms are owner operated with advanced technology production and harvesting practices.

Appendix Table 3.—Aggregate Output of Selected Commodities for the Level Loam Soil Area of Southwestern Oklahoma, Lint Cotton Price $26.40 Per Hundredweight

Resource Situation and Item	Unit	Present Technology		Advanced Technology		S-42 Assumptions
		Machinery Cost Fixed	Machinery Cost Variable	Machinery Cost Fixed	Machinery Cost Variable	
Farms	Number	1,199.15[2]	1,199.15[2]	1,199.15[2]	1,199.15[2]	1,199.15[3]
Cropland	Acre	562,101	562,101	562,101	562,101	562,101
Six Per Cent Capital						
Cotton	Acre	547,323	542,466	554,607	554,604	554,605
Cotton Lint	Bale	257,967	256,478	290,075	290,121	290,129
Wheat	Acre	6,556	10,846	0	0	0
Wheat Grain	Cwt.	42,616	71,148	0	0	0
Grain Sorghum	Acre	0	0	0	0	0
Grain Sorghum	Cwt.	0	0	0	0	0
Other[1]	Acre	8,222	8,789	7,494	7,497	7,496
Stocker Cattle	Head	728	1,295	0	0	0
Cows	Head	10,412	10,168	7,659	7,660	10,493
Net Income	Dollar	14,143,315	12,673,539	18,225,457	16,737,445	19,204,719

Eighteen Per Cent Capital						
Cotton	Acre	544,409	542,467	554,607	554,604	554,605
Cotton Lint	Bale	257,065	256,478	290,075	290,121	290,129
Wheat	Acre	0	7,285	0	0	0
Wheat Grain	Cwt.	0	48,080	0	0	0
Grain Sorghum	Acre	2,914	0	0	0	0
Grain Sorghum	Cwt.	18,838	0	0	0	0
Other[1]	Acre	14,778	12,349	7,494	7,497	7,496
Stocker Cattle	Head	0	0	0	0	0
Cows	Head	6,784	6,784	6,784	6,784	9,293
Net Income	Dollar	14,093,179	12,642,924	18,216,922	16,731,318	19,196,325

[1]Graze out small grain, small grain hay, sudan grazing, alfalfa hay, reseeded cropland, and unused cropland.
[2]Twenty-seven per cent of all farms are tenant operated.
[3]All farms are owner operated with advanced technology production and harvesting practices.

OKLAHOMA'S WEALTH IN AGRICULTURE

Agriculture is Oklahoma's number one industry. It has more capital invested and employs more people than any other industry in the state. Farms and ranches alone represent a capital investment of four billion dollars—three billion in land and buildings, one-half billion in machinery and, one-half billion in livestock.

Farm income currently amounts to more than $700,000,000 annually. The value added by manufacture of farm products adds another $130,000,000 annually.

Some 175,000 Oklahomans manage and operate its nearly 100,000 farms and ranches. Another 14,000 workers are required to keep farmers supplied with production items. Approximately 300,000 full-time employees are engaged by the firms that market and process Oklahoma farm products.

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