AN ANALYSIS OF THE MOST PROFITABLE FARM ORGANIZATION UNDER ALTERNATIVE FARM PROGRAMS

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PREFACE

The author is indebted to many people for their assistance throughout the course of this study. Deepest appreciation is extended to Dr. Odell L. Walker, graduate committee chairman, for his advice and untiring patience. Dr. James S. Plaxico, Head of the Department of Agricultural Economics, is extended a special "thank you" for his timely counsel and encouragement. Thanks are also due Dr. Leo V. Blakley and Dr. Larry J. Connor, other committee members for their helpful suggestions.

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CHAPTER I

INTRODUCTION

Efficient decision making procedures suited to a continually changing environment are a key prerequisite for a viable, progressive farm manager. Farm plans must be continually evaluated in response to changes in economic and technical conditions and governmental programs. Of these changes, those that occur annually in government farm programs are perhaps the most consequential to farm managers. The time normally required to assimilate and integrate institutional changes, technological advances, and price variations is too long for maximum efficiency in planning for the forthcoming production period. Because of the time involved in a complete analysis, a simple yet effective technique is needed to evaluate program changes.

The Extension Challenge

Educators have an obligation to inform the public, farmers and non-farmer alike, about the changes in government programs, and the possible effects of the changes on farm organization. Informing the farmer, however, is not sufficient since difficulty may be encountered by the farmer in making decisions. Extension educators are in a unique position to aid farmers because (1) trained personnel are available to interpret program alternatives, (2) the Extension-farmer relationship is well established, and (3) the evaluations will be unbiased. Extension,

however, does not have sufficient resources to aid each farmer during periods of decision making. Generally assistance must be provided at the group level.

Research has a two-fold basic role in determining farm adjustment alternatives. First, resource (land, labor, capital and management) availability and potential enterprise combinations must be considered to ensure that the extension educators are aware of alternatives open to farmers in the different areas of the state. Second, new techniques of analysis must be tried to improve the time-lag factor. Time-lag results from the time needed to (1) understand institutional changes and newly released research data, (2) analyze the farmers' choices, and (3) disseminate results of the analysis to farm managers.

With a time deadline, the most effective educational program will range between the completion of an analysis of each farm and the distribution of a circular that generalizes the alternatives open to farmers for the coming year. The latter offers little guidance in the analysis of alternatives and at best must be applicable over a rather large farming area. The idea of linear programming of production alternatives available to each farm operator is negated because of the time and expense involved. Also, only a few farms could be programmed before decisive action becomes necessary. The time available between the announced institutional programs and the committing of resources to a particular program is often very short. In the case of the 1967 program for wheat, a complete interpretation was not available to farmers until after September 1, 1966. This left only two weeks for wheat to be planted in a part of the state. There is therefore, a necessity for an effective, limited-time method of analysis of government farm programs.

After analyzing program choices, information must be presented to farmers by extension field personnel. This information must be presented in a form that can be easily adapted to each individual farm, by the farmer himself. In the most imperfect form, it must be understandable with only a short letter of explanation or a verbal interpretation at group meetings. The ease of adapting the choice alternatives to each farm will be one of the key determinants of the effectiveness of this extension program.

Objectives

The overall objective of this study is to develop an efficient method for analyzing current government farm programs. The specific objectives are:

1. To develop a general linear programming tableau, capable of determining profit maximizing enterprise organizations for a given set of resources when all government programs are considered.
2. To develop an efficient technique for adapting institutional changes into a linear programming analysis of benchmark farms.
3. To develop benchmark farms for two areas in Oklahoma as a guide for farmer decision making.

Area of Study

The western one third of Oklahoma (See Figure 1) has large acreages of crops restricted by government programs. Wheat is grown on 40 to 45% of the cropland while grain sorghum is produced on 10 to 15%. In the

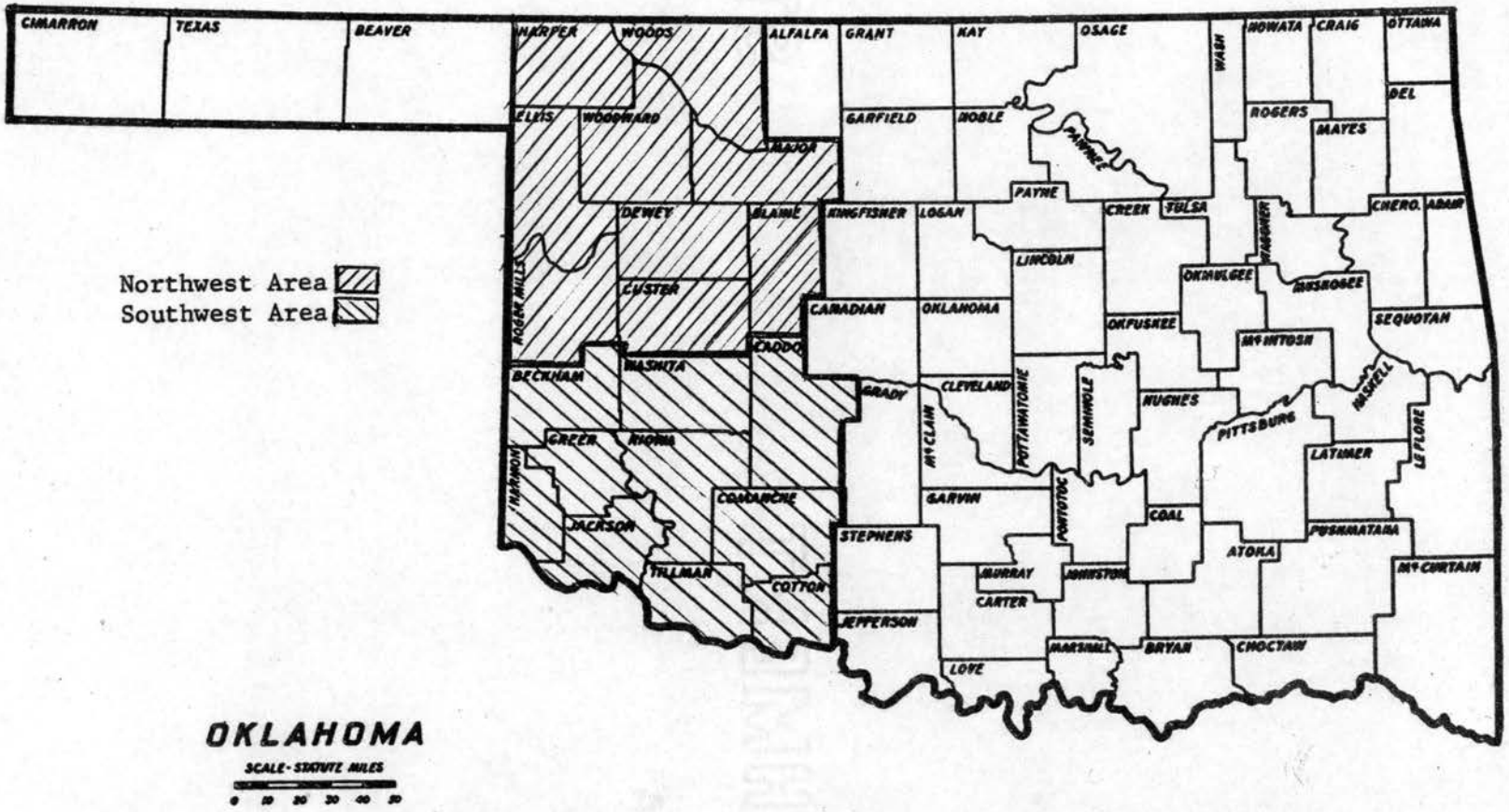

Figure 1. Map of Oklahoma Showing the Area of Study.

Southwest area approximately 15% of the land is used for cotton production.[1] The area is characteristically described as level to rolling prairies and is well suited to large machine operations.

Data used to describe the benchmark farm of the Northwest Oklahoma area have been taken from the counties of Ellis, Harper, Woodward, Woods, Major and Dewey. The Southwest area data were taken from the counties of Washita, Greer, Kiowa, Beckham, Caddo, and Commanche. The typical farm of the Northwest area has approximately 960 acres of cropland, while the typical Southwest farm has approximately 750 acres of cropland.

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[1] U.S. Department of Commerce, U.S. Census of Agriculture, 1959. Vol. 1, Part 36, Oklahoma (Washington, D. C., Bureau of Census, 1959), pp. 226-249.

CHAPTER II

THE ANALYTICAL FRAMEWORK

One benchmark farm situation is developed for each of two areas of Western Oklahoma. Linear programming models are developed to obtain the maximum profit solutions. The government programs for wheat, grain sorghum and cotton are explained and interpreted as resource restrictions and activities for the farm.

The Benchmark Farm Concept

A benchmark farm can be defined as a representative farm typical of farms in the study area. A benchmark farm is not necessarily similar to any particular farm in the area. Rather it approximates farm situations common to the area.

For the benchmark farm to be representative of an area, the resource composition must be selected carefully. A complete inventory of acreage and its productivity, labor, capital, and management is important. The institutional restrictions also must be considered. The allotted acres for wheat, feed grain, and cotton are the institutional restrictions considered in this study.

Just as important as physical and institutional factors are the farm firm's objectives and planning scope for the future. Representative farms are analyzed in a static framework of decision making, and the assumption employed is that managers use resources in such a manner that

profits are maximized. Profit maximization can be regarded as a common objective of most family-type farms because many family wants can be satisfied best if high profits are made. For example, if the plans of the family include such things as education of the children and a comfortable standard of living, then it can be assumed that maximizing profits will work toward these objectives.

A careful appraisal of any real farm situation must be made for objective comparison with the benchmark farms presented in the analysis. Allowances must be made for differences that actually exist. A description of the two benchmark farm situations used in this study is presented in the following section.

The Linear Programming Model

A general purpose linear programming tableau is used to determine the profit maximizing enterprise organizations for a given complement of resources. Choice alternatives are as broad as the farm resources allow, ranging at one extreme from nonparticipation to the other extreme of participation in all government feed grain, wheat, and cotton programs including cross compliance requirements.

Government Programs

An explanation of the 1967 wheat and feed grain programs and the 1966 cotton program will be helpful in relating the farm situations set forth in this thesis to the tableaus shown in Appendix A, Tables I-IV.

1967 Wheat and Feed Grain Programs

The 1967 wheat program requires no diversion of cropland for

participation. Elimination of the diversion requirement is a change from past wheat programs. Several alternative uses are possible for the acres generally described as the wheat allotment acres. One alternative is to plant less than the farm wheat allotment. A second alternative is to overplant wheat and sell wheat in the cash market. A third alternative is the substitution of feed grain for wheat. The fourth and final alternative also provides for substitution of wheat for barley, oats, and rye. Only the substitution of grain sorghum for wheat and vice versa are considered in this study because these two crops have been the major alternatives used by farmers in Western Oklahoma.

In the 1967 wheat program, farmers are eligible for domestic marketing certificates on thirty-five percent of the projected production of the farm allotment. The total wheat allotment for the Northwest benchmark farm is 376 acres with an average projected yield of 18 bushels per acre. Hence, the maximum certificates available to the farm are 2367.48 = .35 x 376 x 18. These certificates were valued at $1.34 in 1966, so this is used as the best estimate for 1967. The average price support loan for the two study areas is $1.25 per bushel. Eligibility for maximum domestic marketing certificates is retained if thirty-five percent of the allotment is planted and other program requirements are met.

To qualify for feed grain price support payments, it is necessary to divert twenty percent of the feed grain base to conserving uses. There is no payment for diverted feed grain acres, a change from past feed grain programs. Also, if grain sorghum is substituted for wheat, compliance with the wheat program must be maintained. In addition, the conserving base acreage must be maintained.

With the above program in mind, it is possible to consider several broad alternatives. One alternative is to plant less than (but at least fifty percent of) the feed grain base, and maintain cross compliance. This would allow collection of the $0.53 per cwt. price support payment. A second major alternative is to substitute feed grain for wheat or wheat for feed grain. If either is done, 35 percent of the wheat allotment or 50 percent of the feed grain allotment must be planted to collect the maximum wheat certificates and price support payments. Planting less than those percentages reduces payments accordingly. A third alternative is nonparticipation in the feed grain program and planting in excess of the feed grain base. The last choice makes support payments unavailable for feed grain.

The 1967 feed grain payment is restricted on a given farm. The maximum restriction is fifty percent of the feed grain base times the historic yield of the farm. On the Northwest benchmark farm, the feed grain base is three hundred acres. The projected yield is 11.60 cwt. per acre. The amount of 1741.5 cwt. (.50 x 300 x 11.61) is the maximum production eligible to receive a support payment of fifty-three cents per cwt.

The support payment is in addition to the national average loan rate of $1.52. The $1.52 national average loan rate tends to set a minimum price or floor on grain sorghum prices.

These choices and regulations must be considered in determining a maximum income combination of enterprises, as they affect not only the grain sorghum income but other enterprise income as well.

1966 Cotton Program

The 1966 cotton program is the most recent program available for the analysis. Present inquiry indicates that few changes will appear in the 1967 program. The cotton alternatives are not considered in the Northwest Oklahoma area because cotton is of minor importance there.

The program provides a choice of three levels of diverting cotton acreages for payment. The three levels are 12.5, 25, or 35 percent of the 1966 allotment. Each farm with a cotton allotment is assigned a projected yield based on the farm's crop history. Diverted acreage payments are calculated on the farm's projected yield per acre times 10.5 cents for each acre diverted in one of the three alternatives of 12.5, 25, or 35 percent of the allotment.

A producer with a cotton allotment who plants no cotton may qualify for diversion payments on 12.5 percent of his farm allotment, providing he maintains the 12.5 percent in conserving use in addition to the farm conserving base. It is not necessary to participate in other commodity programs as a condition of eligibility for the 1966 cotton program.

Price support payments are derived by multiplying the domestic allotment (65 percent of the allotment base) times the projected yield in hundredweight times $9.42. The projected yield on the 149 acre allotment is 1.9 cwt. per acre. In the tableau for the Southwest Oklahoma area, this appears as a restriction of 184 cwt. (.65 x 149 x 1.9) of cotton. Cotton is supported at $21.00 cwt. nationally for middling one-inch-average location. The above conditions set forth the bounds within which a farm organization can operate.

Resource Restrictions of the Northwest and Southwest Benchmark Farms

Enterprises for the two area benchmark farms are those used extensively in the area. Wheat, cotton, grain sorghum, sudan, small grain pasture, four stocker steer systems and one cow-calf system comprise the major enterprises. For the sake of simplicity, the least prevalent crop and livestock activities such as oats and chickens are omitted. By omitting less significant crops and livestock, a clear comparison of the institutionally-controlled wheat, grain sorghum, and cotton crops can be made for the given farm conditions. The activities for the Northwest and Southwest areas are included in Appendix B, Tables I, II, and III. The activities are based on previous studies.[1] The available resources for the benchmark farms constructed to represent the typical farm of the two Oklahoma areas as described in Table I.

Land and Allotments

Loam soil is used because it accounts for about seventy percent of the soil in Northwest Oklahoma and about forty-five percent in Southwest Oklahoma. The cropland is divided into the four land classes,

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[1] Robert W. Greve, James S. Plaxico, and William F. Lagrone, Resource Requirements, Costs and Expected Returns; Alternative Crop and Livestock Enterprises; Rolling Plains, Northwestern Oklahoma, Oklahoma Agricultural Experiment Station, Processed Series P-390 (Stillwater, 1961); Larry J. Connor, William F. Lagrone and James S. Plaxico, Resource Requirements, Costs, and Expected Returns; Alternative Crop and Livestock Enterprises; Loam Soils of the Rolling Plains of Southwestern Oklahoma, Oklahoma Agricultural Experiment Station, Processed Series P-368 (Stillwater, 1961); Larry J. Connor; Roy E. Hatch, and Odell L. Walker, Alternative Crop Enterprises on Loam and Sandy Soils of Northwest Oklahoma, Oklahoma Agricultural Experiment Station, Processed Series P-552 (Stillwater, 1966).

TABLE I

RESOURCE SITUATION ON BENCHMARK FARMS FOR SOUTHWEST AND NORTHWEST OKLAHOMA

Item	Unit	Northwest	Southwest
Cropland[a/]	Acre	960	750
Class L_a	Acre	0	100
Class L_b	Acre	317	185
Class L_c	Acre	403	225
Class L_d	Acre	240	150
Range	Acre	200	175
Waste	Acre	0	35
Total	Acre	1,160	960
Wheat Allotment	Acre	376	299
Feed Grain Base	Acre	300	157
Cotton Allotment	Acre	0	149
Conservation Base		110	80
Capital	Dol.	Unrestricted at 6% interest	Unrestricted at 6% interest
Labor			
January-April	Hrs.	710	710
May-July	Hrs.	638	638
August-September	Hrs.	440	440
October-December	Hrs.	594	594
Buildings	--	Those necessary for efficient management assumed available.	
Machinery and Equipment	--	Assumed available as needed and suitable for any enterprise choices.	

[a/] L_a - Tipton or Spur soil.

L_b - Tipton or Spur soil in Southwest; Carey silt loam soil in Northwest.

L_c - Quinlan or Tipton soil in Southwest; Enterprise sandy loam and Quinlan - Woodward loam soils in Northwest.

L_d - Quinlan or Tipton soil in Southwest; Enterprise sandy loam soil in Northwest.

L_a, L_b, L_c, and L_d. The differences in yield of a particular crop reflect the productivity differences of the land classes.

The large balanced farming operation of the Northwest area has been defined as 960 acres of cropland, 864 acres of range, and 96 acres of waste.[2] The range is reduced to 200 acres for this study to avoid large livestock numbers. The assumption is made that additional livestock would not have a significant effect on the optimum combination of crops under government programs.

The wheat and feed grain allotments for the Northwest benchmark farm have been determined with the use of Agricultural Stabilization and Conservation Service records and agricultural census data.[3]

Government restrictions would limit wheat production to 376 acres. To maintain eligibility for government program participation, a conservation base acreage of 110 acres must be maintained. This is sometimes referred to as the historic conservation base.

The benchmark farm considered typical of Southwest Oklahoma farms is defined as 750 acres of cropland, 175 acres of native pasture, and 35 acres of waste.[4] The allotment acres for wheat and cotton before adjustment for the 1967 program changes are the same as reported in

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[2]Wallace G. Aanderud, James S. Plaxico, and William F. Lagrone, Income Variability of Alternative Plans, Selected Farm and Ranch Situation, Rolling Plains of Northwest Oklahoma, Oklahoma Agricultural Experiment Station, Bulletin B-646 (Stillwater, 1966), 21.

[3]Oklahoma State Agricultural Stabilization and Conservation Service records of crop acres and farm numbers for Oklahoma counties, 1966.

[4]Fred Sobering, "Adjustment Implications of Government Cotton Programs for Southwestern Oklahoma," (Unpublished Ph.D. thesis, Oklahoma State University, 1966), 19.

previous research by Sobering.[5] The feed grain base is synthesized from county acreage data reported in the 1959 United States Agricultural Census.[6] After the 20 percent diversion is considered, a total of 157 acres of feed grain are available for production. Government restrictions would limit wheat production to 299 acres, cotton production to 149 acres, and would require 80 acres for the historic conservation base.

Capital Availability

It is assumed that the farm manager may borrow all the capital that is necessary at an annual cost of six percent as long as the return is equal to or greater than the interest charge. This method insures that the optimum combination of controlled crops is not modified because of a capital shortage.

The capital charge for each enterprise is the annual capital times the six percent interest rate. Annual capital is the total capital required for an enterprise, adjusted to an annual basis and includes machinery capital. Interest is charged only for the length of time the money is used for a given enterprise. Operating capital is the total investment level required for the enterprise, exclusive of machinery capital for crop enterprises.

Examples of annual and operating capital follow. If a steer were purchased October 1 and sold six months later, the capital was used in the enterprise for only one-half year. If the steer cost $150, the

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[5] Ibid., 23.

[6] U. S. Department of Commerce, U. S. Census of Agriculture, 1959. Vol. I, Part 36, Oklahoma (Washington, D. C.: Bureau of Census, 1959), 226-249.

annual capital would be $75. Assuming no additional costs were involved, the operating capital would be $150.

Labor

One man year of operator labor is considered available for enterprise work. The labor available is divided into four work periods (Table II): (1) January-April, (2) May-July, (3) August-September, and (4) October-December. These are major labor-use time divisions for the livestock and crop enterprises of Oklahoma.

Additional labor can be hired to supplement the operator labor throughout the year. If hired labor is required, a charge of $1.00 per hour is used for January-April and October-December months, while $1.25 per hour is used in the spring and summer months when labor demand is greatest in Oklahoma.

TABLE II

OPERATOR LABOR AVAILABLE FOR ENTERPRISES

Period	Hours Available
January-April	710
May-July	638
August-September	440
October-December	594

Building, Machinery, Management, and Technology

An above-average level of technology is assumed for the study. Better than average management is also assumed as complementary to the

improved techniques being employed. The building facilities and machinery complement reflects recent adoption of new techniques deemed economical by experiment station researchers. The budget data used for crops is based upon the use of four-plow power and the accompanying machinery complement.

Diverted Acres

The acres of conservation fallow required to participate in each government program are shown in Table III. Since it is not necessary to operate within the government programs, nonparticipation in government programs also is considered in finding the most profitable organization. The acres of fallow land required to participate in the different government programs are presented to gain a better view of the benchmark farm choices.

TABLE III

REQUIRED CONSERVING AND DIVERTED ACREAGE FOR ELIGIBILITY TO PARTICIPATE IN THE GOVERNMENT PROGRAMS FOR BENCHMARK FARMS

Item	Unit	Northwest	Southwest
Feed Grain Diversion	Acre	60	32
Historic Conservation Base	Acre	110	80
12½% Cotton Diversion	Acre	0	19
25% Cotton Diversion	Acre	0	38
35% Cotton Diversion	Acre	0	52

If the alternative selected is nonparticipation in government programs, the acreage needed to meet conservation requirements can be used for crops or pasture. The choice to participate in government programs requires maintaining the conservation base acreage, and in the case of feed grain and/or cotton, an additional amount of diverted land. The conservation base and diverted acres can be used for winter pasture production. Such a choice necessitates a complementary livestock enterprise. If no pasture is produced on the conservation base and diverted acres, a fallow cost of two dollars is charged.

Flexibility of the Tableau

The general linear programming tableau has several versatile features that will be of value as conditions change. A changing situation is likely, due to institutional variations which result from the annual modifications which have regularly occurred in the agricultural programs. Flexibility is also needed to incorporate price changes that occur and to reflect technological changes leading to increased yields and lower production costs.

If the required wheat or feed grain diversion acres change, as they have between 1966 and 1967, these can be substituted in the tableau in the diversion row. In the event the farm conservation base acres change, a minor change in the conservation base row is required. If the base price of the crop changes, a change in the "sell column price" is made. If wheat certificates are worth more or less in another year, this change also can be incorporated with little difficulty by changing the wheat certificate column price. The same is true for cotton or feed grain program variations. Although the tableau is for two specific

areas of Oklahoma, any area can be adapted by using different budget costs and resource situations that reflect other farming conditions.

Projected and Expected Yields

Projected yields are based on historic records of the farm and are used as the basis for the Agricultural and Stabilization and Conservation Service's historic farm yield for individual crops. Expected yields are the yields the farmer expects to occur in a given production period. The expected yields are influenced by local farm conditions reflecting yearly weather variations and the soil production potential.

If the farm manager's expected yields are higher than the Agricultural Stabilization and Conservation Service's projected farm yields, then the production row of a commodity can be increased in the tableau to reflect this expectation. The certificate row, however, would be based on the projected yields. This procedure reflects actual farmer actions and allows for a continuance of the insurance portion of the government program. If the expected yields are high enough, as they might be for some outstanding farm managers on very productive farms, the farmer need not participate in the government programs.

Price and Flexibility

Two price levels are used for wheat and cotton, while all other enterprise prices have only one price level. The two price levels will give some flexibility in adapting the resulting solutions to a particular farm situation for comparative purposes. The prices used are in a range deemed most likely to occur in the immediate future. The stability range of each price in a solution should be of value in selecting

a solution for comparison that most nearly reflects the current price situation.

Enterprise Costs

The relationship between the costs of production of different enterprises is the key factor in making choice alternatives. Each alternative must be evaluated for different farm operations. Costs or income for each enterprise used in this study are shown in Appendix B, Tables IV and V.

To adapt the results of this study to a real farm operation, each enterprise cost shown must be compared with the cost of production for the real farm. If the costs of production for crops, the net income for livestock enterprises and the set of resources used for the benchmark farms are similar for a real farm, the results of this study can be adapted to the real farm situation. For example, the cost of producing one acre of wheat on Class L_b land is $12.65 for the Northwest benchmark farm. If the cost to produce one acre of wheat on Class L_b land of a real farm is close to $12.65 per acre and the resources and livestock income are similar, the results of this study can be easily adapted. If the costs vary significantly from $12.65, partial budgeting might become necessary to analyze a real farm situation.

The cost stability range also can be considered and will aid in finding the differences between the benchmark farm and a real farm. It is possible that higher costs will be accompanied by increased yields. To aid in the analysis of costs for a real farm, sample budgets for crop and livestock enterprises are included in Appendix C. The

sample budgets outline all the costs to be considered for comparisons with this study (Appendix C, Tables I and II).

Programming Procedure

Four activities are included to reflect the alternative choices a farmer must make: (1) the combination of wheat and feed grain acres that will comply with institutional restrictions commonly called "the government farm programs"; (2) participation in the wheat program but nonparticipation in the feed grain program; (3) participation in the feed grain program but not in the wheat program; and (4) nonparticipation in government programs. These four alternatives appear as activities in the tableaus (Appendix A, Tables I and III). Only one of these activities can be in a plan.

Northwest Benchmark Farm

The maximum profit combination of enterprises is determined by linear programming each of the four program participation alternatives described. As a particular case is programmed, the other choices are masked or removed from consideration. The resulting combination of activities is the maximum profit organization for the case under consideration. All four case solutions are determined, and the resulting organizations and profits are compared. Two different organizations of each case are presented in following chapters because the combinations of enterprises are influenced by the price changes. The first organization is for a wheat price of $1.25 and grain sorghum price of $1.75. The second organization is for a wheat price of $1.50 and grain

sorghum price of $1.75. The maximum profit combinations of enterprises are described to compare the changes in income and farm organization.

Southwest Benchmark Farm

The choices relevant to the Northwest area are also relevant in the Southwest area. As a particular case is programmed, the other choices are masked from consideration. The addition of the cotton program and corresponding activities is the primary difference. The decision to participate in the cotton program is independent of the decision to participate in other government programs. Because of this independent decision, cotton allotment transfer activities are used to allow the four cotton participation program choices to be considered within each of the four basic cases under consideration. The four cotton choices are: (1) raise no cotton, but divert 12.5 percent of the cotton allotment for diversion payments, (2) raise cotton, and divert 12.5 percent of the cotton allotment, (3) raise cotton, and divert 25 percent of the cotton allotment, and (4) raise cotton, and divert 35 percent of the allotment.

Organizations and profit levels are presented for different prices. Two levels of prices are used for wheat and cotton while the grain sorghum price is held at one level. The resulting changes in profits and organizations due to the price changes indicate the effects of different price situations on the choice of government programs in Southwest Oklahoma.

CHAPTER III

MAXIMUM PROFIT ORGANIZATIONS FOR NORTHWEST OKLAHOMA

Profit maximizing farm organizations for the four governmental program choices on the benchmark farm in Northwest Oklahoma are compared in this chapter. A maximum profit organization is given for two wheat prices, while other prices (grain sorghum and livestock) are held at one level. The range over which prices can vary without changing the optimum combination is also given.

Alternatives Compared

Income does not change a great deal from the least profitable to the most profitable organization for the two wheat price levels (Tables IV and V). Return over variable costs is used to indicate the maximum profit organization. Cost items such as interest on investment in land, building maintenance, truck expenses and real estate taxes are not included. It is assumed that these costs for an individual farm are fixed regardless of the output level and can be allocated only arbitrarily among enterprises.

Maximum Profit Organization With $1.25 Wheat

Using a wheat price of $1.25 per bushel and a grain sorghum price of $1.75 per cwt., a maximum income of $13,381.00 is obtained by participating in the wheat and feed grain programs. To aid the understanding

TABLE IV

MAXIMUM PROFIT ENTERPRISE ORGANIZATIONS OF THE FOUR PROGRAM ALTERNATIVES FOR THE NORTHWEST BENCHMARK FARM, WHEAT PRICE $1.25, GRAIN SORGHUM $1.75

Item	Unit	Participation in Wheat and Feed Grain	Participation in Wheat Only	Participation in Feed Grain Only	Nonparticipation in Wheat and Feed Grain
Crop Enterprise					
Wheat					
L_b	Acres	317		299.6	317
L_c	Acres	299	376	403	403
L_d	Acres				55.5
Grain Sorghum					
L_b	Acres		317	17.4	
L_c	Acres		27		
L_d	Acres		130	70.	
Pasture					
Native	Acres	200	200	200	200
Small Grain	Acres	141	83.8	170	184.5
Fallow	Acres	202.8	26.1		

TABLE IV (CONTINUED)

Item	Unit	Participation in Wheat and Feed Grain	Participation in Wheat Only	Participation in Feed Grain Only	Nonparticipation in Wheat and Feed Grain
Livestock Enterprise					
Stocker Steers					
Buy October 15, Sell May 15	Head	181.5	107.7	218.5	237.3
Buy October 15 Sell October 15 (native grass)	Head	16.3		6.5	12.1
Buy October 15 Sell October 15 (Sorghum Stubble and native)	Head		29.8	10	
Buy October 15 Sell March 1 (Small grain pasture)	Head				
Cow-Calf (Sell October 15)	Head				
Labor	Hours	1568	1740.4	1936	1946
Capital Requirements					
Operating Capital	Dollars	30,002.00	23,128.00	35,835.00	37,815.00
Annual Capital	Dollars	24,636.00	23,811.00	29,910.00	30,719.00
Return Over Variable Costs	Dollars	13,381.00	13,198.00	13,008.00	12,879.00

TABLE V

MAXIMUM PROFIT ENTERPRISE ORGANIZATION OF THE FOUR PROGRAM ALTERNATIVES FOR THE NORTHWEST BENCHMARK FARM, WHEAT PRICE $1.50, GRAIN SORGHUM $1.75

Item	Unit	Participation in Wheat and Feed Grain	Participation in Wheat Only	Participation in Feed Grain Only	Nonparticipation in Wheat and Feed Grain
Crop Enterprise					
Wheat					
L_b	Acres	317	317	317	317
L_c	Acres	299	59	403	403
L_d	Acres			55.5	55.5
Grain Sorghum					
L_b	Acres				
L_c	Acres		344		
L_d	Acres		130		
Pasture					
Native	Acres	200	200	200	200
Small Grain	Acres	141	97.9	184.5	184.5
Fallow	Acres	202.8	12.1		
Livestock Enterprise					
Stocker Steers					
Buy October 15, Sell May 15	Head	181.4	125.9	237.3	237.3
Buy October 15 Sell October 15 (native grass)	Head	16.3		12.1	12.1

TABLE V (CONTINUED)

Item	Unit	Participation in Wheat and Feed Grain	Participation in Wheat Only	Participation in Feed Grain Only	Nonparticipation in Wheat and Feed Grain
Buy October 15 Sell October 15 (Sorghum Stubble and Native)	Head		27.9		
Buy October 15 Sell March 1 (Small Grain Pasture)	Head				
Cow-Calf (Sell October 15)	Head				
Labor	Hours	1568	1801	1946	1946
Capital Requirements					
Operating Capital	Dollars	30,002.00	25,242.00	37,815.00	37,815.00
Annual Capital	Dollars	24,636.00	24,968.00	30,719.00	30,719.00
Return Over Variable Costs	Dollars	16,391.00	14,918.00	16,551.00	16,551.00

of the maximum income organization a budgeting type analysis is shown in Table VI in which the activities, their incomes and costs are shown. Table VII shows the cropland use by land class, the substitution of wheat for feed grain, the source of pasture, the source of fallow land, the livestock enterprises utilized and the capital required. A significant fact in the organization is the substitution of wheat for grain sorghum. A total of 616 acres of wheat is produced which is the wheat allotment acres plus the feed grain acres.

All the livestock activities are land based. The pasture provided by the small grain does not meet all the pasture requirements; native grass is needed in the livestock activities considered. Native pasture is the restriction that limits livestock numbers and results in some land being left idle (fallow). Sudan fulfills the native grass requirement, but it is not produced in any of the four solutions. It can be concluded that is is not profitable to grow sudan as a substitute for native pasture with the costs, yield and livestock returns used in this study.

Maximum Profit Organization With $1.50 Wheat

The four combinations of activities are now considered with a higher wheat price, $1.50 per bushel, while the grain sorghum price remains at $1.75 (Table V). The spread from the most profitable to least profitable organization is $1583 at the higher wheat price. Table VIII gives the cropland organization, livestock enterprises, and capital requirements of the most profitable organization with wheat priced at $1.50 per bushel. The maximum income is $16,551.00 with the wheat price increased to $1.50 per bushel. Two of the alternatives yield the

TABLE VI

COST AND INCOME OF ACTIVITIES IN NORTHWEST OPTIMUM SOLUTION, PARTICIPATION IN WHEAT AND FEED GRAIN, WHEAT PRICE $1.25, GRAIN SORGHUM $1.75

Activity	Income Determination	Cost Determination
Wheat Allotment	(77 ac.)(21 Bu.)($1.25)	($12.65)(77 ac.)
Wheat Allotment	(299 ac.)(18 Bu.)($1.25)	($12.45)(299 ac.)
Wheat Substitute for Grain Sorghum	(240 ac.)(21 Bu.)($1.25)	($12.65)(240 ac.)
Total	$15,048.75	$7,732.60
Wheat Certificates	(2367.48 cwt.)($1.32)	
Total	$3,125.07	
Wheat Pasture		(31.2 ac.)($9.11)
Historical Conservation Base (Wheat Pasture)		(110 ac.)($9.11)
		$1,286.33
Fallow, for Feed Grain Program		(60 ac.)($2.00)
Fallow, Voluntary		(142.8 ac.)($2.00)
Total		$405.60
Stocker Steers (May sell)	(181.5 head)($31.40)	
Total	$5,699.10	
Stocker Steers (October sell)	(16.3 head)($25.24)	
Total	$411.41	
Interest on Annual Capital		($24,636)(.06 int.)
Total		$1,478.16
Grand Total	$24,284.33	$10,902.69
Return over Variable Costs	$13,381.64	

TABLE VII

THE MAXIMUM PROFIT ORGANIZATION FOR NORTHWEST BENCHMARK,
FARM PARTICIPATION IN WHEAT AND FEED GRAIN,
WHEAT PRICE $1.25, GRAIN SORGHUM $1.75

Cropland Activities

Description	Land Class	Acres
Wheat	L_b	77.0
Wheat	L_c	299.0
Substitute Wheat for Feed Grain	L_b	240.0
Wheat Pasture	--	31.2
Historic Conservation Reserve (Wheat Pasture)	--	110.0
Feed Grain Forced Fallow	--	60.0
Fallow	--	142.8
Total		960

Livestock Activities

Description	Number of Head
Stocker Steer, Buy October 15, Sell May 15	181.5
Stocker Steer on Range, Buy October 15, Sell October 15	16.3

Capital Required

Operating Capital	$30,002
Annual Capital	$24,636
Return over Variable Costs	$13,381

TABLE VIII

THE MAXIMUM PROFIT ORGANIZATION FOR NORTHWEST BENCHMARK FARM, NONPARTICIPATION IN WHEAT AND FEED GRAIN (OR PARTICIPATION IN FEED GRAIN), WHEAT PRICE $1.50, GRAIN SORGHUM $1.75

Cropland Activities

Description	Land Class	Acres
Wheat Production	L_b	317
Wheat Production	L_c	403
Wheat Production	L_d	55.5
Winter Wheat Pasture	L_d	184.5
Total		960

Livestock Activities

Description	Number of Head
Stocker Steers, Buy October 15, Sell May 15	237
Stocker Steers, Native Grass, Buy October 15, Sell October 15	12

Capital Required

Operating Capital	$37,815
Annual Capital	$30,719
Return over Variable Costs	$16,551

same income. One alternative is nonparticipation in the wheat and feed grain programs. The second solution with the same income is participation in only the feed grain program. Nonparticipation in the wheat program plus substituting wheat for grain sorghum on the feed grain acres gave the identical income result and still complied with the feed grain fallow and the historic conservation base requirements. Under nonparticipation, the most profitable organization is a wheat-stocker steer operation. The wheat-stocker steer plan places 775 acres in wheat, and the remaining land in winter pasture for the steer program. When wheat is priced at $1.50 per bushel, all L_b and L_c and some L_d land is used to produce wheat. The low yield on L_d land of 14 bushels of wheat per acre, combined with the $31.40 profit per steer excluded wheat grain production in favor of winter pasture. The increased pasture allowed the addition of more stocker steers in the organization.

Crop Enterprises

The crop organization of the optimum organization with wheat priced at $1.25 includes only wheat. Wheat is substituted in the feed grain program and no grain sorghum is grown. With a wheat price of $1.50 per bushel, again an all wheat enterprise is optimal. Small grain for winter pasture is grown in both cases to be used in the livestock enterprise.

Livestock Enterprises

The livestock enterprises for the two optimal organizations involve stocker steers. Both organizations use May-sell and October-sell (native grass) steers. The number of head is less when government programs are followed.

Labor

The labor required for the maximum income organization with the $1.25 wheat price is 1568 hours, less than a full man year. No hired labor is used in this organization. With a wheat price of $1.50, additional labor must be hired. However, the total labor required is less than a full man year.

Capital

The capital required for the different alternatives can be compared in Tables IV and V. The greatest amount of capital is required for the nonparticipation alternative. The annual capital requirements are less but nearly the same for the two alternatives of participation in both programs and participation in wheat only at both wheat price levels.

Stability of Solutions

The cost and price stability ranges are helpful in evaluating the optimum organizations. For example, farm organization may have more appeal to managers if the enterprises remain stable over the range that costs and prices are likely to vary. Uncertainty also must be considered by the farm manager; and a knowledge of stability ranges will be of value in planning for the uncertain future.

Livestock Enterprise Stability

The two livestock systems in the optimum organizations have a net income per unit of $31.40 for the May-sell enterprise and $25.24 for the stockers on native grass. If the net income of these two enterprises were to fall to $28.57 or $22.99, respectively for $1.25 wheat, then a

change in the livestock program would be required. For example, if the net income of the stockers on native grass were below $22.99, they would be replaced by the cow-calf operation. For a wheat price of $1.50, the stability income range is $28.91 and $21.90 for the two livestock enterprises.

The Cost Range

The range over which costs of production can vary and still not change the organization is of interest. The upper and lower cost limits act as a guide in comparing real farm costs with those used for the benchmark farm. If the real farm costs fall within these bounds, the cost will not dictate a change in the optimum organization. The costs used in the benchmark farm plan as well as the upper and lower costs are given in Table IX.

Price Range

Clearly, changes in prices also affect the choice of participation alternatives. A $.25 per bushel increase in wheat price changed the choice to nonparticipation. Further study including an analysis of the latter effect of price changes is in progress.[1]

The price range for grain sorghum is from $1.08 to $1.81 per cwt., when wheat is priced at $1.25 per bushel. The lower limit of $1.08 is unimportant in this organization since no grain sorghum is being grown.

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[1]Larry L. Bitney, et al., "Stability of Government Farm Programs in Linear Programming Results," (unpublished material, Oklahoma State University, 1967).

TABLE IX

COST RANGE FOR WHEAT AND GRAIN SORGHUM BY LAND CLASS FOR OPTIMUM ORGANIZATIONS OF NORTHWEST BENCHMARK FARM

Item	Land Class	Benchmark Farm Cost	Cost Range for Which Optimum Organization is Stable			
			Wheat $1.25		Wheat $1.50	
			Low	High	Low	High
Wheat	L_b	12.65	$ 9.21	$13.90	$10.16	$12.65
Wheat	L_c	12.45	11.19	15.88	0	12.45
Wheat Substituted for Feed Grain	L_b	12.65	0	13.62	0	0
Wheat	L_d	12.25	0	0	12.25	14.61

The upper limit of $1.81 per cwt. means that if the price of grain sorghum rose by more than six cents per cwt. a reorganization would be in order and grain sorghum would be produced on Class L_b land. In the advent of a higher grain sorghum price, the maximum profit would be even greater than $13,381.00. With wheat priced at $1.50 per bushel, grain sorghum will not enter the solution until it is priced at $1.89 per cwt.

Evaluation

The maximum profit organization at $1.25 wheat and $1.75 feed grain indicates that participation in both wheat and feed grain is most profitable. Substituting for feed grain within this alternative means however, that only wheat will be grown. Second in profitability is participation in the wheat program and nonparticipation in the feed grain program. Third, in profitability is nonparticipation in the wheat program, but participation in the feed grain program. Most of the land is in wheat production with less than 90 acres in grain sorghum. The least profitable of the four choice alternatives is nonparticipation in both wheat and feed grain programs. Each change in organization is accompanied by approximately $200 less income. The change in net income from the most profitable to the least profitable is less than $600 which indicates other factors such as personal preference might outweigh the profit loss.

The optimum organization with wheat price at $1.50 per bushel is nonparticipation in wheat and feed grain or participation in feed grain only. Both organizations are centered around an all wheat plan.

The nonparticipation organization is the same at both wheat prices considered, and the participation in wheat and feed grain has the same organization at both price levels.

CHAPTER IV

MAXIMUM PROFIT ORGANIZATIONS FOR SOUTHWEST OKLAHOMA

The most profitable organization of activities for the Southwest Oklahoma area is presented here. The four alternative choices are compared and the optimum organization is analyzed for three different price situations. The maximum profit organization is given with wheat and cotton priced at two levels while other prices are held constant. Capital requirements, labor, and crop and livestock programs are compared for the different alternatives. Price and cost stability ranges are presented for the maximum income organizations at the different price levels used for wheat and grain sorghum.

Alternatives Compared

The four wheat-feed grain program choices are the same as those used in the Northwest area. Since it is not necessary to participate in the wheat or feed grain program to participate in the cotton program, the choice of an option within the cotton program depends entirely on its relative contribution to the farm income. The organizations of enterprises and the prices combinations used are shown in Table X (wheat $1.30, Grain sorghum $1.75, cotton $21.00), Table XI (wheat $1.50, grain sorghum $1.75, cotton $21.00), and Table XII (wheat $1.30, grain sorghum $1.75, cotton $15.00). Return over variable cost comparions

TABLE X

MAXIMUM PROFIT ENTERPRISE ORGANIZATIONS FOR THE FOUR PROGRAM ALTERNATIVES FOR THE SOUTHWEST BENCHMARK FARM, WHEAT PRICE $1.30, GRAIN SORGHUM, $1.75, COTTON $21.00

Item	Unit	Participation in wheat and feed grain - 35% cotton diversion	Participation in wheat only - 35% cotton diversion	Participation in feed grain only - 35% cotton diversion	Nonparticipation in wheat and feed grain - 35% cotton diversion
Crop Enterprise[1]					
Wheat					
L_a	Acres	3.0	3.0	3.0	3.0
L_b	Acres	101	101	185	
L_c	Acres			100	
L_d	Acres			76	
Grain Sorghum					
L_a	Acres				
L_b	Acres	83.5	84		185
L_c	Acres	225	225	125	225
L_d	Acres	11	108		108
Cotton					
L_a	Acres	97	97	97	97
L_b	Acres				
L_c	Acres				
L_d	Acres				
Pasture					
Native	Acres	175	175	175	175
Small Grain	Acres	229	132	164	132
Fallow	Acres				

TABLE X (CONTINUED)

Item	Unit	Participation in wheat and feed grain - 35% cotton diversion	Participation in wheat only - 35% cotton diversion	Participation in feed grain only - 35% cotton diversion	Nonparticipation in wheat and feed grain - 35% cotton diversion
Livestock Enterprise					
Stocker Steers					
Buy Oct. 15, Sell May 15	Head	100	69	134.5	42
Buy Oct. 15, Sell Oct. 15 (native grass)	Head	1		10	
Buy Oct. 15, Sell Oct. 15 (sorghum stubble and native)	Head	23	28	8	31
Buy Oct. 15, Sell Mar. 1 (small grain pasture)	Head				
Cow-Calf (sell Oct. 15)	Head				
Labor	Hours	1,875	1,850	1,847	1,831
Capital Requirements					
Operating Capital	Dol.	21,112	19,247	24,690	24,777
Annual Capital	Dol.	20,676	17,752	21,645	18,101
Return over Variable Costs	Dol.	16,757	17,166	14,256	14,456

[1]Crop enterprise shown by land class.

TABLE XI

MAXIMUM PROFIT ENTERPRISE ORGANIZATION FOR THE FOUR PROGRAM ALTERNATIVES FOR THE SOUTHWEST BENCHMARK FARM, WHEAT PRICE $1.50, GRAIN SORGHUM $1.75, COTTON $21.00

Item	Unit	Participation in wheat and feed grain - 35% cotton diversion	Participation in wheat only - 35% cotton diversion	Participation in feed grain only - 35% cotton diversion	Nonparticipation in wheat and feed grain - 35% cotton diversion
Crop Enterprise[1]					
Wheat					
L_a	Acres	100	100	100	100
L_b	Acres	185	185	185	185
L_c	Acres	50		50	128
L_d	Acres	11	14	76	108
Grain Sorghum					
L_a	Acres				
L_b	Acres				
L_c	Acres	78	128	78	
L_d	Acres		94		
Cotton					
L_a	Acres				
L_b	Acres				
L_c	Acres	97	97	97	97
L_d	Acres				
Pasture					
Native	Acres	175	175	175	175
Small Grain	Acres	229	132	164	132
Fallow	Acres				

TABLE XI (CONTINUED

Item	Unit	Participation in wheat and feed grain - 35% cotton diversion	Participation in wheat only - 35% cotton diversion	Participation in feed grain only - 35% cotton diversion	Nonparticipation in wheat and feed grain - 35% cotton diversion
Livestock Enterprise					
Stocker Steers					
Buy Oct. 15, Sell May 15	Head	165	124	154	166
Buy Oct. 15, Sell Oct. 15, (native grass)	Head	10	7	11	14
Buy Oct. 15, Sell Oct. 15, (sorghum stubble and native)	Head	5	14	5	
Buy Oct. 15, Sell Mar. 1 (small grain pasture)	Head				
Cow-Calf (sell Oct. 15	Head				
Labor	Hours	1,803	1,746	1,930	1,837
Capital Requirements					
Operating Capital	Dol.	28,050	23,628	26,894	28,087
Annual Capital	Dol.	23,189	21,405	22,551	22,824
Return over Variable Costs	Dol.	17,638	18,228	15,719	15,410

[1]Crop enterprise shown by land class.

TABLE XII

MAXIMUM PROFIT ENTERPRISE ORGANIZATION FOR THE FOUR PROGRAM ALTERNATIVES FOR THE SOUTHWEST BENCHMARK FARM, WHEAT PRICE $1.30, GRAIN SORGHUM $1.75, COTTON $15.00

Item	Unit	Participation in wheat and feed grain	Participation in wheat only	Participation in feed grain only	Nonparticipation in wheat and feed grain
Crop Enterprise[1]					
Wheat					
L_a	Acres	100	100	100	100
L_b	Acres	5	148	185	
L_c	Acres			100	
L_d	Acres			76	
Grain Sorghum					
L_a	Acres				
L_b	Acres	180	37		185
L_c	Acres	128	225	125	225
L_d	Acres	11	108		108
Cotton					
L_a	Acres				
L_b	Acres				
L_c	Acres	97			
L_d	Acres				
Pasture					
Native	Acres	175	175	175	175
Small Grain	Acres	229	132	164	112
Sudan	Acres				20
Fallow	Acres				

TABLE XII (CONTINUED)

Item	Unit	Participation in wheat and feed grain	Participation in wheat only	Participation in feed grain only	Nonparticipation in wheat and feed grain
Livestock Enterprise					
Stocker Steers					
Buy Oct. 15, Sell May 15	Head	104	112	165	67
Buy Oct. 15, Sell Oct. 15, (native grass)	Head			8	
Buy Oct. 15, Sell Oct. 15, (sorghum stubble and native)	Head	25	24	8	35
Buy Oct. 15, Sell Mar. 1, (small grain pasture)	Head				
Cow-Calf (sell Oct. 15)	Head				
Labor	Hours	1,893	1,802	1,799	1,812
Capital Requirements					
Operating Capital	Dol.	21,763	22,272	27,914	18,380
Annual Capital	Dol.	21,026	20,370	22,315	17,822
Return over Variable Costs	Dol.	15,369	16,774	13,768	14,011

[1]Crop enterprise shown by land class.

indicate a spread exceeding $2,500 between the low and high income alternatives for each of the three price combinations used.

Maximum Profit Organization with $1.30 Wheat and $21.00 Cotton

The most profitable organization for the prices of $1.30, $1.75, and $21.00, results in a maximum profit of $17,166. At these selling prices, the most profitable combination of activities is one with participation in the wheat program, participation in the cotton program, but nonparticipation in the feed grain program. Table XIII shows the cropland by land class, the relationship between diverted acres and winter pasture, the livestock enterprises and capital requirements. The first two activities listed are winter pasture grown on the required conservation base of 80 acres and on the 35% diversion from the cotton allotment which is 52 acres. Wheat produced is 104 acres divided between two land classes, L_a and L_b. All of the wheat allotment is not used (104 of 299 acres). Grain sorghum is produced on 417 acres and cotton on 97 acres which allows for the maximum cotton diversion of 35%.

Two important conclusions can be drawn from the resulting combination of activities. First, at the prices used, and with the current relationship between the yields of wheat and grain sorghum it is more profitable to raise grain sorghum on Class L_b land than it is to raise wheat. At 104 acres, the maximum number of domestic wheat certificates has been earned and any additional wheat produced is worth only $1.30 per bushel.

The second important point deals with the cotton allotment. It is evident the most profitable cotton program to enter is the 35% diversion. With 35% diversion, the benchmark farm has "earned" the maximum price

TABLE XIII

THE MAXIMUM PROFIT ORGANIZATION FOR SOUTHWEST BENCHMARK FARM, PARTICIPATION IN WHEAT ONLY, 35% COTTON DIVERSION, WHEAT PRICE $1.30, GRAIN SORGHUM $1.75, COTTON $21.00

Cropland Activities

Description	Land Class	Acres
Wheat Pasture (Historic Conservation Base)	--	80
Winter Pasture (Diverted Acres)	--	52
Wheat Production	L_a	3
Wheat Production	L_b	101
Grain Sorghum	L_b	84
Grain Sorghum	L_c	225
Grain Sorghum	L_d	108
Cotton Production	L_a	97
Total		750

Livestock Activities

Description	Number of Head
Stocker Steers, Buy October 15, Sell May 15	69
Stocker Steers on Native and Sorghum Stubble, Buy October 15, Sell October 15	28

Capital Required

Operating Capital	$19,247
Annual Capital	$17,752
Return over Variable Costs	$17,166

support payments at the 9.42 cents per pound rate. If production were less than 97 acres, all of the cotton price support would not be collected. If a larger cotton acreage were planted, the additional production would be sold at $21.00 per cwt. and no additional support could be earned.

Maximum Profit Organizations with $1.50 Wheat and $21.00 Cotton

The four alternatives are now considered with the wheat price increased to $1.50 per bushel (Table XI). The profit ranges from a high of $18,228, to the low of $15,410. The difference of $2,818 is due primarily to making the right decision concerning government programs. Table XIV gives the most profitable organization.

Again the alternative of participation in wheat only is the most profitable. With the higher wheat price, the full 299 acres of wheat allotment are used. Also cotton is grown on 97 acres with the 35% cotton diversion choice. Livestock numbers are nearly doubled with the additional winter wheat pasture resulting from the price change. It should be noted, however, that livestock numbers are less than for any of the three other alternatives, and the capital required is smallest.

The fact that grain sorghum acreage exceeds the feed grain base in this optimal organization by 65 acres indicates that gains are greater than the income given up from the feed grain support ($.53 x 1/2 feed grain base), and the additional stocker steers that would be handled if the 65 acres were utilized as small grain pasture on diverted acres.

TABLE XIV

THE MAXIMUM PROFIT ORGANIZATION FOR SOUTHWEST BENCHMARK FARM, PARTICIPATION IN WHEAT ONLY, WHEAT PRICE $1.50, GRAIN SORGHUM $1.75, COTTON $21.00

Cropland Activities

Description	Land Class	Acres
Wheat Pasture (Historic Conservation Reserve)	--	80
Winter Pasture (Diversion)	--	52
Wheat Production	L_a	100
Wheat Production	L_b	185
Wheat Production	L_d	14
Grain Sorghum	L_c	128
Grain Sorghum	L_d	94
Cotton Production	L_c	97
Total		750

Livestock Activities

Description	Number of Head
Stocker Steers, Buy October 15, Sell May 15	124
Stocker Steers, Buy October 15, Sell October 15 (Native Grass)	7
Stocker Steers on Native and Sorghum Stubble, Buy October 15, Sell October 15	14

Capital Required

Operating Capital	$23,628
Annual Capital	$21,405
Return over Variable Costs	$18,228

Maximum Profit Organization with $1.30 Wheat and $15.00 Cotton

The four alternatives again are considered, this time with a cotton price of $15.00 per cwt. and at the lower, $1.30 wheat price. The maximum income varies from a low of $13,768 to a high of $16,774 or slightly more than $3,000 (Table XII). Cotton is of no importance in enterprise selection at the price of $15.00 cwt. (Table XV). Cotton grades produced in Southwestern Oklahoma in 1966 were priced rather close to $15.00 per cwt.

The most profitable enterprise organization calls for participation in wheat only. With the lowered cotton price, no cotton is produced and the choice is wheat or grain sorghum. Fifty-one acres of wheat allotment are not used for wheat production. Since all the wheat certificates are collected, a comparison of the costs and yields of wheat and grain sorghum is possible on Class L_b, L_c, and L_d land with wheat priced at $1.30 per bushel and grain sorghum at $1.75 per cwt.

Livestock is an important enterprise, but is dictated by the pasture available from grain sorghum and wheat. Sudan grass did not enter any of the solution throughout the study until the final alternatives, when 20 acres appear in the nonparticipation solution.

Crop Enterprise

The crop enterprises of the maximum profit organization are built around the participation in wheat only option. The feed grain program is never included in the optimal solutions. Participation in the cotton program at the 35 percent diversion level is included when cotton is priced at $21.00 per hundredweight. At the lower cotton price of $15.00,

TABLE XV

THE MAXIMUM PROFIT ORGANIZATION FOR SOUTHWEST BENCHMARK FARM, PARTICIPATION IN WHEAT ONLY, WHEAT PRICE $1.30, GRAIN SORGHUM $1.75, COTTON $15.00

Cropland Activities

Description	Land Class	Acres
Wheat Pasture (Historic Conservation Reserve)	--	80
Winter Pasture (Diversion)	--	52
Wheat Production	L_a	100
Wheat Production	L_b	148
Grain Sorghum	L_b	37
Grain Sorghum	L_c	225
Grain Sorghum	L_d	108
Total		750

Livestock Activities

Description	Number of Head
Stocker Steers, Buy October 15, Sell May 15	112
Stocker Steers, Buy October 15, Sell October 15 (Native and Sorghum Stubble)	24

Capital Required

Operating Capital	$22,272
Annual Capital	$20,370
Return over Variable Costs	$16,774

cotton drops out of the crop program. Sizeable acres of grain sorghum are included, exceeding the feed grain base of 157 acres by 50 to 100 acres.

Livestock Enterprises

The livestock enterprises in the three optimal solutions are stock steers, and include nearly 100 head up to 145 head. Nearly 70 percent of the steers are handled as fall buy (October 15) and spring sell (May 15). The livestock enterprises are supplemental to the cropping system, utilizing wheat pasture, grain sorghum stubble and conserving acres in small grain for winter pasture. Winter pasture is produced only on the conserving acres needed to meet the requirements for the wheat and cotton programs, and wheat produced for grain. The cow-calf livestock enterprise did not enter any of the solutions in the study.

Labor

The total labor required is less than a full man year in all three maximum profit solutions. Of the 2,382 hours available, the optimal solutions use from 1,746 hours to nearly 1,900 hours. Hired labor is needed in the second time period (May, June, July), for all three solutions, varying from 79 hours to 129 hours. The peak labor period occurs when wheat harvest and grain sorghum planting and cultivation occur at the same time. The most profitable of the atlernatives is among the lowest labor users for all three price situations considered.

Capital

The capital required for different alternative organizations can be compared in Tables X, XI, and XII. The lowest capital use organizations tend to be the most profitable in the study. Annual capital required by the optimal solutions for the three price combinations ranges from less than $18,000 to nearly $21,500. The most capital required of any combination of enterprises is slightly more than $23,000. The narrow range of variability in capital required indicates the capital requirement is a relatively minor factor of influence in deciding which of the alternative programs a real farm should follow.

Stability of Solutions

Consideration of the stability range of government program alternatives will be helpful in adapting the results of the study to a particular farm situation. Price changes will influence the choice of government program alternatives.[1]

Livestock Enterprise Stability

The three livestock enterprises in the optimal solutions have a restricted range in net income. The net income per head is $31.40 for May sell steers. With $1.30 wheat the stability range for May sell steers in the most profitable organization is $30.77 to $31.73. If net income per unit is outside this range, a change in organization will take place if returns are to be maximized. With wheat priced at $1.50,

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[1]Larry L. Bitney, et. al., "Stability of Government Farm Programs in Linear Programming Results," (Unpublished material, Oklahoma State University, 1967).

the upper price range is increased to $35.76 while the lower limit is unchanged. More important to most farmers are the lower-limits or net returns. For the steers handled as October buy-October sell, the lower-limit net return is $24.95 (native grass) and $24.25 (sorghum stubble), with $1.30 wheat. If net returns per head were to fall one dollar, it would be profitable to reorganize the livestock program. With wheat priced at $1.50, the lower limit is extended to $20.81.

Price Range

The price range over which the optimum organization is stable is of limited value because of the competition between wheat and grain sorghum for the land resource. With $1.30 wheat and $21.00 cotton, the price ranges are: wheat, $1.20-$1.30; grain sorghum, $1.74-$1.86; and cotton, $19.57-$26.08. No cotton is in the solution with the $15.00 cotton price, and the price range for wheat and grain sorghum is one cent in both cases. If prices increase beyond the price ranges given, the farm returns will be increased. However, a shift of land use to the higher priced crop would be necessary to use the farm resources most efficiently.

Evaluation

Under the conditions of this study, the most profitable alternative is to participate in the wheat program and raise grain sorghum on all the remaining acres. The second choice is to participate in both the wheat and feed grain program, recognizing some returns are sacrificed. These two alternatives do not have a large income disparity.

The choice of nonparticipation in the wheat program or nonparticipation in both wheat and feed grain reduces income nearly $3,000.

Livestock enterprises are dominated by the crop enterprises since the livestock activities are all cropland based. Capital requirements are similar for all the alternatives. Price ranges are limited and indicate the optimal organization will be difficult to maintain as price changes occur.

CHAPTER V

SUMMARY AND CONCLUSIONS

Alternative choices of participation in government farm programs were analyzed in this study. The basic purpose was to aid farmers in making decisions by developing a method for comparing government program choices.

The study was developed in three specific steps. The first step required the development of a linear programming tableau in which all government programs could be considered. The second step was to develop a method of adapting the tableau of changes in government programs. Including farm resources in the model for testing a farm situation and evaluating the results for real farm comparisons was the third step in the study.

Wheat-feed grain programs for Oklahoma farmers can be compared through four alternatives open to farm managers. The four basic choices are: (1) participation in both the wheat and feed grain programs, (2) participation in the wheat program only, (3) participation in the feed grain program only, and (4) nonparticipation in the wheat and feed grain programs. Maximum income is used as the determinant of the most desirable organization.

A benchmark farm resource situation was developed for each of two different farming areas of the state. The benchmark farms are

representative of the farms in the Northwest and Southwest areas of Oklahoma.

The farm resource restrictions were incorporated into the linear programming model and analyzed at several price levels appropriate for the controlled crops.

The most profitable alternative for the Northwest farm and $1.25 wheat is participation in both the wheat and feed grain programs. The optimal solution produces no grain sorghum, but substitutes wheat for grain sorghum. The order of preference, with maximizing returns as the guide, continues with participation in wheat only, participation in feed grain only and nonparticipation in both government programs. In each alternative emphasis on wheat production is the obvious central result. Income is reduced approximately $200 with each successive alternative organization.

When the wheat price is increased to $1.50 per bushel, the profit maximizing organization is identical under two alternative choices, participation in feed grain only and nonparticipation in both programs. Thus, the importance of expected wheat prices in determining the program choice is illustrated. Under these conditions, wheat production is least restricted and incomes are highest.

The third alternative, participation in both programs, gives $160 lower returns. The latter choice might be made if the farmer prefers to diversify enterprises or is concerned about crop history for future programs. Another significant factor in the third alternative is a large acreage of fallow. Assuming the 143 acres of fallow would increase the production in the following year, this might be a good

choice. The data in the tableau are averages and do not take account of short-run effects of fallow on yields.

The native pasture restriction of 200 acres used in this study limited livestock numbers to the extent that small grain pasture was not fully utilized by several enterprise organizations. If additional native grass is available, the number of livestock could be increased, utilizing land now being used for fallow only. Since some labor is unused in all of the enterprise organizations, no hired labor would be necessary for considerable expansion in the livestock enterprises. However, an increase in capital investment would occur if an expansion were made.

Chapter IV provides an analysis of the Southwest Oklahoma benchmark farm. The cotton program choices are included in the tableau for consideration since this enterprise is used in the area. Two wheat prices, $1.30 and $1.50 per bushel, and two cotton prices, $21.00 and $15.00 per cwt. are used, while the grain sorghum price is held constant at $1.75 per cwt.

Income is maximized by participation in only the wheat program for each set of alternatives. With a cotton price of $21.00 per cwt., the cotton program comes into the solution with the highest diversion rate allowed, thirty-five percent. With cotton priced at $15.00, cotton is not included in the solution. The second maximizing alternative, participation in both the wheat and feed grain programs, also is the same at all prices considered. Income is reduced from $400 to $1,500 by the second choice organization.

The third and fourth alternatives reduce income an additional $1,500 to $2,300. The income difference between the optimal organization income and the least profitable organization is over $2,500.

Livestock enterprises are important in all the alternatives considered, ranging from less than 100 head to over 200 head of steers. The livestock are used primarily to utilize pasture crops such as wheat, sorghum stubble, and small grain growing on conserving acres required as part of a government program.

Capital requirements are generally lower for the maximum income alternatives and ranged from $17,000 in the Southwest to over $30,000 in the Northwest. The range within each area is less than $10,000.

Price ranges and cost and income coefficients are used to indicate an organization's stability. The ranges were greater in the Northwest, indicating a relatively stable solution. In the Southwest the organization of enterprises is subject to more changes because of much narrower ranges.

The linear programming model is an efficient means of comparing choices among government programs. Masking some alternatives is necessary, however, for easy comparison of the organization results. Additional government programs can be added to the basic model, as illustrated by the cotton program analysis.

Adapting the results of the benchmark farm solutions to farmer use requires additional study. The stability ranges for prices and costs are useful in determining applicability of results presented in this study. In addition, more price combinations need to be considered to reflect the expectations of individual farmers.

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A P P E N D I C E S

APPENDIX A

LINEAR PROGRAMMING TABLEAUS FOR NORTHWEST AND SOUTHWEST OKLAHOMA

APPENDIX A, TABLE I

ACTIVITY IDENTIFICATIONS FOR NORTHWEST LINEAR PROGRAMMING TABLEAU

Program Participation Alternative	Activities		
	Code Letters		Description
Participation in wheat and feed grain	P1	PWFG	Participation in wheat and feed grain
Participation in wheat only	P2	PWON	Participation in wheat only
Participation in feed grain only	P3	PFGO	Participation in feed grain only
Nonparticipation in wheat and feed grain	P68	PWFG	Nonparticipation in wheat and feed grain
	P4	NPWB	Wheat, L_b land
	P5	NPWC	Wheat, L_c land
	P6	NPWD	Wheat, L_d land
	P7	WPST	Winter pasture
	P8	SUDN	Sudan
	P9	NSGB	Feed grain, L_b land
	P10	NSGC	Feed grain, L_c land
	P11	NSGD	Feed grain, L_d land
	P12	PWTB	Wheat, L_b land
	P13	PWTC	Wheat, L_c land
	P14	PWTD	Wheat, L_d land
	P16	WTPT	Winter pasture
	P18	SUDN	Sudan
	P19	PFGB	Feed grain, L_b land
	P20	PFGC	Feed grain, L_c land
	P21	PFGD	Feed grain, L_d land
	P23	WSFB	Substitute wheat for feed grain, L_b land
	P24	SWFC	Substitute wheat for feed grain, L_c land
	P25	SWFD	Substitute wheat for feed grain, L_d land
	P26	SSWB	Substitute feed grain for wheat, L_b land
	P27	SSWC	Substitute feed grain for wheat, L_c land
	P28	SSWD	Substitute feed grain for wheat, L_d land

APPENDIX A, TABLE I (CONTINUED)

Program Participation Alternative	Activities Code Letters	Description
Participation in wheat, nonparticipation in feed grain	P29 PWNS	Wheat, L_b land
	P30 PWNC	Wheat, L_c land
	P31 PWND	Wheat, L_d land
	P33 SUDN	Sudan
	P34 WPST	Winter pasture
	P35 NSGB	Feed grain, L_b land
	P36 NSGC	Feed grain, L_c land
	P37 NSGD	Feed grain, L_d land
Nonparticipation in wheat, participation in feed grain	P38 NWTB	Wheat, L_b land
	P39 NWTC	Wheat, L_c land
	P40 NWTD	Wheat, L_d land
	P41 SUDN	Sudan
	P42 PSTW	Winter pasture
	P43 PGSB	Feed grain, L_b land
	P44 PGSC	Feed grain, L_c land
	P45 PGSD	Feed grain, L_d land
Activities independent of government programs	P47 BOCA	Borrow operating capital
	P48 ANCA	Borrow annual capital
	P49 LVST	Livestock steer, March sell
	P50 LVST	Livestock steer, May sell
	P51 LVST	Livestock steer, October sell (native grass)
	P52 LVST	Livestock steer, October sell (native and sorghum stubble)
	P53 COCF	Cow-calf
	P54 HLAB	Hire labor (January-April)
	P55 HLAB	Hire labor (May-July)
	P56 HLAB	Hire labor (August-Sept.)
	P57 HLAB	Hire labor (October-Dec.)
	P64 WTSL	Wheat sell
	P65 FGSL	Feed grain sell
	P66 WTCT	Wheat certificate payment
	P67 FGSP	Feed grain price support payment
	P69 WPST	Winter pasture (conserving)
	P17 WTPT	Winter pasture (diverted)

APPENDIX A, TABLE I (CONTINUED)

Program Participation Alternative	Activities	
	Code Letters	Description
	P70 SUDN	Sudan (conserving)
	P71 FALL	Fallow (conserving)
	P72 FALL	Fallow (diverted)
	P73 FAL1	Fallow
	P74 FAL2	Fallow
	P75 FAL3	Fallow
	P76 FAL4	Fallow

APPENDIX A, TABLE II

LINEAR PROGRAMMING TABLEAU FOR NORTHWEST OKLAHOMA

Restriction	Row Number	PO	Units	P1 PWFG	P2 PWON	P3 PFGO	P68 PWFG
Total Cropland		960=	Acre	960	960	960	960
Total Cropland	1	0=	Acre				-960
Participating Cropland I	2	0=	Acre	-790			
Participating Cropland II	3	0=	Acre		-850		
Participating Cropland III	4	0=	Acre			-790	
Diversion	5	0=	Acre	-60		-60	
Wheat Allotment	6	C≥	Acre	-376	-376		
Feed Grain Allotment	7	0≥	Acre	-240		-240	
Land L_b	9	317≥	Acre				
Land L_c	10	403≥	Acre				
Land L_d	11	240≥	Acre				
Conservation Base	12	=	Acre	-110	-110	-110	
Labor January-April	13	710≥	Hours				
Labor May-July	14	638≥	Hours				
Labor August-September	15	440≥	Hours				
Labor October-December	16	594≥	Hours				
Wheat Production Inventory	17	0=	Bu.				
Feed Grain Production Inventory	18	0=	Cwt.				
Wheat Certificate Inventory	19	0≥	Bu.				
Feed Grain Price Support Inventory	20	0≥	Cwt.				

APPENDIX A, TABLE II (CONTINUED)

Restriction	Row Number	PO	Units	P1 PWFG	P2 PWON	P3 PFGO	P68 PWFG
Native Pasture	24	200≥	AUM				
Sorghum Grazing (October-February)	25	0≥	AUM				
Small Grain Pasture (March-May 15)	26	0≥	AUM				
Grain Sorghum Stubble Grazing	27	0≥	AUM				
Operating Capital	28	0≥	Dollars				
Annual Capital	29	0≥	Dollars				
Wheat Certificates - Maximum	30	2367.48≥	Bu.				
Feed Grain Price Support - Maximum	31	1741.50≥	Cwt.				
Variable Cost or Return Over Variable Cost							

APPENDIX A, TABLE II (CONTINUED)

Row Number	P69 WPST	P4 NPWB	P5 NPWC	P6 NPWD	P70 SUDN	P7 WPST	P8 SUDN	P71 FALL	P9 NSGB	P10 NSGC
1		1	1	1		1	1		1	1
2										
3										
4										
5										
6										
7										
9		1							1	
10			1							1
11				1						
12	1				1			1		
13					.39		.39		.13	.13
14	.39	.39	.39	.39	.55	.39	.55		1.11	1.11
15	.45	.45	.45	.45		.45			.12	.12
16	.30	.30	.30	.30		.30				
17		-21.00	-18.00	-14.00						
18									-14.56	-11.20
19										
20										
24					-1.80		-1.80			
25	-.20	-.60	-.50	-.40		-.20				
26	-1.8					-1.80				
27									-.20	-.20
28	7.48	7.31	7.31	7.31	4.85	7.48	4.85		5.09	5.09
29	15.08	14.91	14.91	14.91	11.55	15.08	11.54		13.99	13.99
30										
31										
Return or Cost (-)	-9.11	-12.65	-12.45	-12.25	-11.30	-9.11	-11.30	-2.00	-12.73	-12.13

APPENDIX A, TABLE II (CONTINUED)

Row Number	P11 NSGD	P72 FALL	P12 PWTB	P13 PWTC	P14 PWTD	P16 WTPT	P17 WTPT	P18 SUDN	P19 PFGB	P20 PFGC	P21 PFGD
1	1										
2			1	1	1	1		1	1	1	1
3											
4											
5		1					1				
6			1	1	1						
7									1	1	1
9			1						1		
10				1						1	
11	1				1						1
12											
13	.13							.39	.13	.13	.13
14	1.11		.39	.39	.39	.39	.39	.55	1.11	1.11	1.11
15	.12		.45	.45	.45	.45	.45		.12	.12	.12
16			.30	.30	.30	.30	.30				
17			-21.00	-18.00	-14.00						
18	-8.40								-14.56	-11.20	-8.40
19			-18.00	-18.00	-18.00						
20									-11.61	-11.61	-11.61
24								-1.80			
25			-.60	-.50	-.40	-.20	-.20				
26						-1.80	-1.80				
27	-.20								-.20	-.20	-.20
28	5.09		7.31	7.31	7.31	7.48	7.48	4.85	5.09	5.09	5.09
29	13.99		14.91	14.91	14.91	15.08	15.08	11.54	13.99	13.99	13.99
30											
31											
Returns or Cost (-)	-11.88	-2.00	12.65	-12.45	-12.25	-9.11	-9.11	-11.30	-12.73	-12.13	-11.88

APPENDIX A, TABLE II (CONTINUED)

Row Number	P23 SWFG	P24 SWFC	P25 SWFD	P26 SSWB	P27 SSWC	P28 SSWD	P29 PWNS	P30 PWNC	P31 PWND	P33 SUDN
1										
2	1	1	1	1	1	1				
3							1	1	1	1
4										
5										
6				1	1	1	1	1	1	
7	1	1	1							
9	1			1			1			
10		1			1			1		
11			1			1			1	
12										
13				.13	.13	.13				.39
14	.39	.39	.39	1.11	1.11	1.11	.39	.39	.39	.55
15	.45	.45	.45	.12	.12	.12	.45	.45	.45	
16	.30	.30	.30				.30	.30	.30	
17	-21.00	-18.00	-14.00				-21.00	-18.00	-14.00	
18				-14.56	-11.20	-8.40				
19							-18.00	-18.00	-18.00	
20										
24										-1.80
25	-.60	-.50	-.40				-.60	-.50	-.40	
26										
27				-.20	-.20	-.20				
28	7.31	7.31	7.31	5.09	5.09	5.09	7.31	7.31	7.31	4.85
29	14.91	14.91	14.91	13.99	13.99	13.99	14.91	14.91	14.91	11.54
30										
31										
Returns or Cost (-)	-12.65	-12.45	-12.25	-12.73	-12.13	-11.88	-12.65	-12.45	-12.25	-11.30

APPENDIX A, TABLE II (CONTINUED)

Row Number	P34 WPST	P35 NSGB	P36 NSGC	P37 NSGD	P73 FAL1	P74 FAL2	P75 FAL3	P76 FAL4	P38 NWTB	P39 NWTC
1					1					
2						1				
3	1	1	1	1			1			
4								1	1	1
5										
6										
7										
9		1							1	
10			1							1
11				1						
12										
13		.13	.13	.13						
14	.39	1.11	1.11	1.11					.39	.39
15	.45	.12	.12	.12					.45	.45
16	.30								.30	.30
17									-21.00	-18.00
18		-14.56	-11.20	-8.40						
19										
24										
25	-.20								-.60	-.50
26	-1.8									
27		-.20	-.20	-.20						
28	7.48	5.09	5.09	5.09					7.31	7.31
29	15.08	13.99	13.99	13.99					14.91	14.91
30										
31										
Return or Cost (-)	-9.11	-12.73	-12.13	-11.88	-2.00	-2.00	-2.00	-2.00	-12.65	-12.45

APPENDIX A, TABLE II (CONTINUED)

Row Number	P40 NWTD	P41 SUDN	P42 PSTW	P43 PGSB	P44 PGSC	P45 PGSD	P47 BOCA	P48 ANCA	P49 LVST	P50 LVST
1										
2										
3										
4	1	1	1	1	1	1				
5										
6										
7				1	1	1				
9				1						
10					1					
11	1					1				
12										
13		.39		.13	.13	.13			1.60	1.60
14	.39	.55	.39	1.11	1.11	1.11				.50
15	.45		.45	.12	.12	.12				
16	.30		.30						1.10	1.10
17	14									
18				-14.56	-11.20	-8.40				
19										
20				-11.61	-11.61	-11.61				
24		-1.80							.50	.50
25	-.40		-.20						1.90	1.90
26			-1.80							1.40
27				.20	.20	.20				
28	7.31	4.85	7.48	5.09	5.09	5.09	-1		118.50	123.00
29	14.91	11.54	15.08	13.99	13.99	13.99		-1	40.08	63.17
30										
31										
Return or Cost (-)	-12.25	11.30	9.11	12.73	12.13	11.88	-0	-.06	12.88	31.40

APPENDIX A, TABLE II (CONTINUED)

Row Number	P51 LVST	P52 LVST	P53 COCF	P54 HLAB	P55 HLAB	P56 HLAB	P57 HLAB	P64 WTSL	P65 FGSL	P66 WTCT	P67 FGSP
1											
2											
3											
4											
5											
6											
7											
9											
10											
11											
12											
13	2.8	2.8	4.85	-1							
14	1.5	1.5	1.25		-1						
15	1.0	1.0	.80			-1					
16	2.3	2.3	4.30				-1				
17								1			
18									1		
19										1	
20											1
24	6.70	4.90	11.00								
25			1.40								
26			1.40								
27		1.80									
28	130.00	130.00	217.30	1.00	1.25	1.25	1.00				
29	114.00	114.00	205.00	.50	.62	.62	.50				
30										1	
31											1
Return or Cost (-)	25.24	25.24	59.45	-1.00	-1.25	-1.25	-1.00	1.25	1.75	1.32	.53

APPENDIX A, TABLE III

ACTIVITY IDENTIFICATIONS FOR SOUTHWEST LINEAR PROGRAMMING TABLEAU

Program Participation Alternative	Activities	
	Code Letters	Description
Participation in wheat and feed grain	P1 PWFG	Participation in wheat and feed grain
Participation in wheat only	P2 TPWO	Participation in wheat only
Participation in feed grain only	P3 TFGO	Participation in feed grain only
Nonparticipation in wheat and feed grain	P22 PWFG	Nonparticipation in wheat and feed grain
	P8 SUDN	Sudan
	P4 NPWA	Wheat, L_a land
	P5 NPWB	Wheat, L_b land
	P6 NPWC	Wheat, L_c land
	P7 NPWD	Wheat, L_d land
	P9 WPST	Winter pasture
	P11 NPSA	Feed grain, L_a land
	P12 NPSB	Feed grain, L_b land
	P13 NPSC	Feed grain, L_c land
	P14 NPSD	Feed grain, L_d land
Participation in wheat and feed grain	P15 SUDN	Sudan
	P16 PTWA	Wheat, L_a land
	P17 PTWB	Wheat, L_b land
	P18 PTWC	Wheat, L_c land
	P19 PTWD	Wheat, L_d land
	P23 WP1	Winter pasture
	P25 PFGA	Feed grain, L_a land
	P26 PFGB	Feed grain, L_b land
	P27 PFGC	Feed grain, L_c land
	P28 PFGD	Feed grain, L_d land
	P31 SWGA	Substitute wheat for feed grain, L_a land
	P32 SWGB	Substitute wheat for feed grain, L_b land
	P33 SWGC	Substitute wheat for feed grain, L_c land
	P34 SWGD	Substitute wheat for feed grain, L_d land
	P36 SSWA	Substitute feed grain for wheat, L_a land

APPENDIX A, TABLE III (CONTINUED)

Program Participation Alternative	Activities Code Letters	Description
	P37 SSWB	Substitute feed grain for wheat, L_b land
	P38 SSWC	Substitute feed grain for wheat, L_c land
	P39 SSWD	Substitute feed grain for wheat, L_d land
Participation in wheat, non-participation in feed grain	P41 PWTA	Wheat, L_a land
	P42 PWTB	Wheat, L_b land
	P43 PWTC	Wheat, L_c land
	P44 PWTD	Wheat, L_d land
	P48 PSTW	Winter pasture
	P49 NPSA	Feed grain, L_a land
	P50 NPSB	Feed grain, L_b land
	P51 NPSC	Feed grain, L_c land
	P52 NPSD	Feed grain, L_d land
	P53 SUDN	Sudan
Nonparticipation in wheat, participation in feed grain	P54 NPWA	Wheat, L_a land
	P55 NPWB	Wheat, L_b land
	P56 NPWC	Wheat, L_c land
	P57 NPWD	Wheat, L_d land
	P60 WNTP	Winter pasture
	P61 PSGA	Feed grain, L_a land
	P62 PSGB	Feed grain, L_b land
	P63 PSGC	Feed grain, L_c land
	P64 PSGD	Feed grain, L_d land
	P65 SUDN	Sudan
Activities independent of government programs	P67 BOCA	Borrow operating capital
	P68 BACA	Borrow annual capital
	P69 BSMR	Livestock steers, March sell
	P70 BSMA	Livestock steers, May sell
	P71 BSNT	Livestock steers, October sell (native pasture)
	P72 SBNS	Livestock steers, October sell (feed grain stubble)
	P77 COLF	Cow-calf
	P73 HLB1	Hire labor (January-April)
	P74 HLB2	Hire labor (May-July)
	P75 HLB3	Hire labor (August-Sept.)
	P76 HLB4	Hire labor (October-Dec.)

APPENDIX A, TABLE III (CONTINUED)

Program Participation Alternative	Activities	
	Code Letters	Description
Cotton participation	P84 12PC	Transfer cotton allotment, 12.5% diverted
	P85 12PC	Transfer cotton allotment, 12.5% diverted
	P86 12PC	Transfer cotton allotment, 12.5% diverted
	P87 12PC	Transfer cotton allotment, 12.5% diverted
	P88 25PC	Transfer cotton allotment, 25% diverted
	P89 25PC	Transfer cotton allotment, 25% diverted
	P90 25PC	Transfer cotton allotment, 25% diverted
	P91 25PC	Transfer cotton allotment, 25% diverted
	P92 35PC	Transfer cotton allotment, 35% diverted
	P93 35PC	Transfer cotton allotment, 35% diverted
	P94 35PC	Transfer cotton allotment, 35% diverted
	P95 35PC	Transfer cotton allotment, 35% diverted
	P96 12DC	Diversion (12.5%) payment
	P97 25DC	Diversion (25%) payment
	P98 35DC	Diversion (35%) payment
	P99 12DP	Produce cotton, L_a land, (12.5% diverted)
	P100 12DP	Produce cotton, L_b land, (12.5% diverted)
	P101 12DP	Produce cotton, L_c land, (12.5% diverted)
	P102 12DP	Produce cotton, L_d land, (12.5% diverted)
	P104 2DP	Produce cotton, L_a land, (25% diverted)
	P105 2DP	Produce cotton, L_b land, (25% diverted)
	P106 2DP	Produce cotton, L_c land, (25% diverted)
	P107 2DP	Produce cotton, L_d land, (25% diverted)
	P109 3DP	Produce cotton, L_a land, (35% diverted)
	P110 3DP	Produce cotton, L_b land, (35% diverted)

APPENDIX A, TABLE III (CONTINUED)

Program Participation Alternative	Activities Code Letters	Description
	P111 3DP	Produce cotton, L_c land, (35% diverted)
	P112 3DP	Produce cotton, L_d land, (35% diverted)
Activities independent of government program	P114 SPD	Cotton sell
	P115 SSP	Cotton price support payment
	P124 WHS	Wheat sell
	P125 FGP	Feed grain sell
	P126 FGP	Wheat certificate payment
	P127 FSP	Feed grain price support payment
	P130 COT	Cotton cropland transfer
	P131 COT	Cotton cropland transfer
	P132 COT	Cotton cropland transfer
	P133 COT	Cotton cropland transfer
	P134 FAL	Fallow
	P135 FAL	Fallow
	P136 FAL	Fallow
	P137 FAL	Fallow
	P10 WPST	Winter pasture (conserving)
	P24 WPTG	Winter pasture (diverted)
	P20 SUDN	Sudan (conserving)
	P29 FALL	Fallow (conserving)
	P21 FALL	Fallow (diverted)

APPENDIX A, TABLE IV

LINEAR PROGRAMMING TABLEAU FOR SOUTHWEST OKLAHOMA

Restriction	Row Number	PO	Units	P1 PWFG	P2 TPWO	P3 TFGO
Total Cropland		750=	Acre	750	750	750
Total Cropland	1	0=	Acre			
Participating Cropland I	2	0=	Acre	-638		
Participating Cropland II	3	0=	Acre		-670	
Participating Cropland III	4	0=	Acre			-638
Diversion	5	0=	Acre	-32		-32
Wheat Allotment	6	0≥	Acre	-299	-299	
Feed Grain Allotment	7	0≥	Acre	-125		-125
Land L_a	8	100≥	Acre			
Land L_b	9	185≥	Acre			
Land L_c	10	225≥	Acre			
Land L_d	11	150≥	Acre			
Conservation Base	12	0=	Acre	-80	-80	-80
Labor January-April	13	710≥	Hours			
Labor May-July	14	638≥	Hours			
Labor August-September	15	440≥	Hours			
Labor October-December	16	594≥	Hours			
Wheat Production Inventory	17	0=	Bu.			
Feed Grain Production Inventory	18	0=	Cwt.			
Wheat Certificate Inventory	19	0≥	Bu.			
Feed Grain Price Support Inventory	20	0≥	Cwt.			
Native Pasture	24	175≥	AUM			
Sorghum Grazing (October-February)	25	0≥	AUM			

APPENDIX A, TABLE IV (CONTINUED)

Restriction	Row Number	PO	Units	P1 PWFT	P2 TPWO	P3 TFGO
Small Grain Pasture (Mar.-May 15)	26	0≥	AUM			
Grain Sorghum Stubble Grazing (Oct.-Feb.)	27	0≥	AUM			
Operating Capital	28	0≥	Dol.			
Annual Capital	29	0≥	Dol.			
Cotton Allotment	30	149≥	Cwt.			
Cotton 12.5% Diversion	31	0≥	Acre			
Cotton 25% Diversion	32	0≥	Acre			
Cotton 35% Diversion	33	0≥	Acre			
Cotton Production Inventory	34	0≥	Cwt.			
Cotton Price Support Inventory	35	0≥	Cwt.			
Cotton Diversion 1	36	0≥	Acre			
Cotton Diversion 2	37	0≥	Acre			
Cotton Diversion 3	38	0≥	Acre			
Wheat Certificates - Maximum	39	2019.74≥	Bu.			
Feed Grain Price Support - Maximum	40	1358.05≥	Cwt.			
Cotton	41	0=	Acre			
Cotton Price Support - Maximum	42	184≥	Cwt.			
Variable Cost or Return Over Variable Cost						

APPENDIX A, TABLE IV (CONTINUED)

Row Number	P22 PWFG	P8 SUDN	P4 NPWA	P5 NPWB	P6 NPWC	P7 NPWD	P9 WPST	P11 NPSA	P12 NPSB	P13 NPSC	P14 NPSD	P15 SUDN
	750											
1	-670	1	1	1	1	1	1	1	1	1	1	
2												1
3												
4												
5												
6												
7												
8			1					1				
9				1					1			
10					1					1		
11						1					1	
12	-80											
13		1.02						.92	.92	.92	.92	1.02
14		.72	.83	.83	.83	.83	.83	.89	.89	.89	.89	.72
15			.42	.42	.42	.42	.42	.10	.10	.10	.10	
16			.20	.20	.20	.20	.20					
17			-28.10	-22.00	-17.10	-13.40						
18								-21.80	-19.70	-16.30	-12.20	
19												
20												
24		-1.50										-1.50
25			-.60	-.50	-.40	-.30	-.60					

APPENDIX A, TABLE IV (CONTINUED)

Row Number	P22 PWFG	P8 SUDN	P4 NPWA	P5 NPWB	P6 NPWC	P7 NPWD	P9 WPST	P11 NPSA	P12 NPSB	P13 NPSC	P14 NPSD	P15 SUDN
26							-2.0					
27								-.20	-.16	-.12	-.10	
28		4.69	7.40	7.40	7.40	7.40	7.18	6.48	6.48	6.48	6.48	4.69
29		12.07	12.75	12.75	12.75	12.75	13.87	14.75	14.75	14.75	14.75	12.07
30												
31												
32												
33												
34												
35												
36												
37												
38												
39												
40												
41												
42												
Return or Cost (-)		-4.38	-13.11	-12.73	12.42	-12.19	-7.55	-10.94	-10.81	-10.54	-10.24	-4.38

APPENDIX A, TABLE IV (CONTINUED)

Row Number	P16 PTWA	P17 PTWB	P18 PTWC	P19 PTWD	P10 WPST	P20 SUDN	P23 WP1	P24 WPTG	P21 FALL	P25 PFGA
1										
2	1	1	1	1			1			1
3										
4										
5								1	1	
6	1	1	1	1						
7										1
8	1									1
9		1								
10			1							
11				1						
12					1	1				
13						1.02				.92
14	.83	.83	.83	.83	.83	.72	.83	.83		.89
15	.42	.42	.42	.42	.42		.42	.42		.10
16	.20	.20	.20	.20	.20		.20	.20		
17	-28.10	-22.00	-17.10	-13.40						
18										-21.80
19	-19.30	-19.30	-19.30	-19.30						
20										-17.30
24						-1.50				
25	-.60	-.50	-.40	-.30	-.60		-.60	-.60		

APPENDIX A, TABLE IV (CONTINUED)

Row Number	P16 PTWA	P17 PTWB	P18 PTWC	P19 PTWD	P10 WPST	P20 SUDN	P23 WP1	P24 WPTG	P21 FALL	P25 PFGA
26					-2.0		-2.0	-2.0		
27										-.20
28	7.40	7.40	7.40	7.40	7.18	4.69	7.18	7.18		6.48
29	12.75	12.75	12.75	12.75	13.87	12.07	13.87	13.87		14.75
30										
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
41										
42										
Return or Cost (-)	-13.11	-12.73	-12.42	-12.19	-7.55	-4.38	-7.55	-7.55	-2.00	-10.94

APPENDIX A, TABLE IV (CONTINUED)

Row Number	P26 PFGB	P27 PFGC	P28 PFGD	P29 FALL	P31 SWGA	P32 SWGB	P33 SWGC	P34 SWGD	P36 SSWA	P37 SSWB
1										
2	1	1	1		1	1	1	1	1	1
3										
4										
5										
6									1	1
7	1	1	1		1	1	1	1		
8					1				1	
9	1					1				1
10		1					1			
11			1					1		
12				1						
13	.92	.92	.92						.92	.92
14	.89	.89	.89		.83	.83	.83	.83	.89	.89
15	.10	.10	.10		.42	.42	.42	.42	.10	.10
16					.20	.20	.20	.20		
17					-28.10	-22.00	-17.10	-13.40		
18	-19.70	-16.30	-12.20						-21.80	-19.70
19										
20	-17.30	-17.30	17.30							
24										
25					-.60	-.50	-.40	-.30		

APPENDIX A, TABLE IV (CONTINUED)

Row Number	P26 PFGB	P27 PFGC	P28 PFGD	P29 FALL	P31 SWGA	P32 SWGB	P33 SWGC	P34 SWGD	P36 SSWA	P37 SSWB
26										
27	-.16	-.12	-.10						-.20	-.16
28	6.48	6.48	6.48		7.40	7.40	7.40	7.40	6.48	6.48
29	14.75	14.75	14.75		12.75	12.75	12.75	12.75	14.75	14.75
30										
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
41										
42										
Return or Cost (-)	-10.81	-10.54	-10.24	-2.00	-13.11	-12.73	-12.42	-12.19	-10.94	-10.81

APPENDIX A, TABLE IV (CONTINUED)

Row Number	P38 SSWC	P39 SSWD	P41 PWTA	P42 PWTB	P43 PWTC	P44 PWTD	P48 PSTW	P49 NPSA	P50 NPSB	P51 NPSC
1										
2	1	1								
3			1	1	1	1	1	1	1	1
4										
5										
6	1	1	1	1	1	1				
7										
8			1					1		
9				1					1	
10	1				1					1
11		1				1				
12										
13	.92	.92						.92	.92	.92
14	.89	.89	.83	.83	.83	.83	.83	.89	.89	.89
15	.10	.10	.42	.42	.42	.42	.42	.10	.10	.10
16			.20	.20	.20	.20	.20			
17			-28.10	-22.00	-17.10	-13.40				
18	-16.30	-12.20						-21.80	-19.70	-16.30
19			-19.30	-19.30	-19.30	-19.30				
20										
24										
25			-.60	-.50	-.40	-.30	-.60			

APPENDIX A, TABLE IV (CONTINUED)

Row Number	P38 SSWC	P39 SSWD	P41 PWTA	P42 PWTB	P43 PWTC	P44 PWTD	P48 PSTW	P49 NPSA	P50 NPSB	P51 NPSC
26							-2.0			
27	-.12	-.10						-.20	-.16	-.12
28	6.48	6.48	7.40	7.40	7.40	7.40	7.18	6.48	6.48	6.48
29	14.75	14.75	12.75	12.75	12.75	12.75	13.87	14.75	14.75	14.75
30										
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
41										
42										
Return or Cost (-)	-10.54	-10.24	-12.08	-11.73	-11.45	-11.24	-7.55	-10.94	-10.81	-10.54

APPENDIX A, TABLE IV (CONTINUED)

Row Number	P52 NPSD	P53 SUDN	P54 NPWA	P55 NPWB	P56 NPWC	P57 NPWD	P60 WNTP	P61 PSGA	P62 PSGB	P63 PSGC
1										
2										
3	1	1								
4			1	1	1	1	1	1	1	1
5										
6										
7								1	1	1
8			1					1		
9				1					1	
10					1					1
11	1					1				
12										
13	.92	1.02						.92	.92	.92
14	.89	.72	.83	.83	.83	.83	.83	.89	.89	.89
15	.10		.42	.42	.42	.42	.42	.10	.10	.10
16			.20	.20	.20	.20	.20			
17		-28.10	-22.00	-17.10	-13.40					
18	-12.20							-21.80	-19.70	-16.30
19										
20								-17.30	-17.30	-17.30
24		-1.50								
25			-.60	-.50	-.40	-.30	-.60			

APPENDIX A, TABLE IV (CONTINUED)

Row Number	P52 NPSD	P53 SUDN	P54 NPWA	P55 NPWB	P56 NPWC	P57 NPWD	P60 WNTP	P61 PSGA	P62 PSGB	P63 PSGC
26							-2.0			
27	-.10							-.20	-.16	-,12
28	6.48	4.69	7.40	7.40	7.40	7.40	7.18	6.48	6.48	6.48
29	14.75	12.07	12.75	12.75	12.75	12.75	13.87	14.75	14.75	14.75
30										
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
41										
42										
Return or Cost (-)	-10.24	-4.38	-13.11	-12.73	-12.42	-12.19	-7.55	-10.94	-10.81	-10.54

APPENDIX A, TABLE IV (CONTINUED)

Row Number	P64 PSGD	P65 SUDN	P67 BOCA	P68 BACA	P69 BSMR	P70 BSMA	P71 BSNT	P72 SBNS	P77 CCLF	P73 HLB1
1										
2										
3										
4	1	1								
5										
6										
7	1									
8										
9										
10										
11	1									
12										
13	.92	1.02			1.60	1.60	2.80	2.80	4.85	-1
14	.89	.72				.50	1.50	1.50	1.25	
15	.10						1.00	1.00	.80	
16					1.10	1.10	2.30	2.30	4.30	
17										
18	-12.20									
19										
20	-17.30									
24		-1.50			.50	.50	6.70	4.90	11.00	
25					1.90	1.90			1.40	

APPENDIX A, TABLE IV (CONTINUED)

Row Number	P64 PSGD	P65 SUDN	P67 BOCA	P68 BACA	P69 BSMR	P70 BSMA	P71 BSNT	P72 SBNS	P77 CCLF	P73 HLB1
26						1.40			1.40	
27	-.10							1.80		
28	6.48	4.69	-1		118.50	123.00	130.00	130.00	217.30	1.00
29	14.75	12.07		-1	40.08	63.17	114.00	114.00	205.00	.50
30										
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
41										
42										
Return or Cost (-)	-10.24	-4.38		-.06	12.88	31.40	25.24	25.24	59.45	-1.00

APPENDIX A, TABLE IV (CONTINUED)

Row Number	P74 HLB2	P75 HLB3	P76 HLB4	P84 12PC	P85 12PC	P86 12PC	P87 12PC	P88 25PC	P89 25PC	P90 25PC	P91 25PC
1				19				38			
2					19				38		
3						19				38	
4							19				38
5				-19	-19	-19	-19	-38	-38	-38	-38
6											
7											
8											
9											
10											
11											
12											
13											
14	1										
15		1									
16			1								
17											
18											
19											
20											
24											
25											

APPENDIX A, TABLE IV (CONTINUED)

Row Number	P74 HLB2	P75 HLB3	P76 HLB4	P84 12PC	P85 12PC	P86 12PC	P87 12PC	P88 25PC	P89 25PC	P90 25PC	P91 25PC
26											
27											
28	1.25	1.25	1.00								
29	.62	.62	.50								
30				149	149	149	149	149	149	149	149
31				-130	-130	-130	-130				
32								-111	-111	-111	-111
33											
34											
35											
36				-19	-19	-19	-19				
37								-38	-38	-38	-38
38											
39											
40											
41											
42											
Return or Cost (-)	-1.25	-1.25	-1.00								

APPENDIX A, TABLE IV (CONTINUED)

Row Number	P92 35PC	P93 35PC	P94 35PC	P95 35PC	P96 12DC	P97 25DC	P98 35DC	P99 12DP	P100 12DP	P101 12DP	P102 12DP
1	52										
2		52									
3			52								
4				52							
5	52	-52	-52	-52							
6											
7											
8								1			
9									1		
10											
11											
12											
13								1.27	1.27	1.27	1.27
14								1.23	1.23	1.23	1.23
15								.15	.15	.15	.15
16								.15	.15	.15	.15
17											
18											
19											
20											
24											
25											

APPENDIX A, TABLE IV (CONTINUED)

Row Number	P92 35PC	P93 35PC	P94 35PC	P95 35PC	P96 12DC	P97 25DC	P98 35DC	P99 12DP	P100 12DP	P101 12DP	P102 12DP
26											
27											
28								9.54	9.54		
29								22.92	22.92		
30	149	149	149	149							
31								1	1	1	1
32											
33	-97	-97	-97	-97							
34								-2.75	-2.25	-1.85	-1.00
35								-1.90	-1.90	-1.90	-1.90
36					1						
37						1					
38	-52	-52	-52	-52			1				
39											
40											
41								1	1	1	1
42											
Return or Cost (-)					24.15	24.15	24.15	-37.39	-37.39	-36.95	-36.02

APPENDIX A, TABLE IV (CONTINUED)

Row Number	P104 2DP	P105 2DP	P106 2DP	P107 2DP	P109 3DP	P110 3DP	P111 3DP	P112 3DP	P114 SPD	P115 SSP	P124 WHS
1											
2											
3											
4											
5											
6											
7											
8	1				1						
9		1				1					
10			1				1				
11				1				1			
12											
13	1.27	1.27	1.27	1.27	1.27	1.27	1.27	1.27			
14	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23			
15	.15	.15	.15	.15	.15	.15	.15	.15			
16	.15	.15	.15	.15	.15	.15	.15	.15			
17											
18											
19											
20											
24											
25											

APPENDIX A, TABLE IV (CONTINUED)

Row Number	P104 2DP	P105 2DP	P106 2DP	P107 2DP	P109 3DP	P110 3DP	P111 3DP	P112 3DP	P114 SPD	P115 SSP	P124 WHS
26											
27											
28	9.54	9.54	9.54	9.54	9.54	9.54	9.54	9.54			
29	22.92	22.92	22.92	22.92	22.92	22.92	22.92	22.92			
30											
31											
32	1	1	1	1							
33					1	1	1	1			
34	-2.75	-2.25	-1.85	-1.00	-2.75	-2.25	-1.85	-1.00	1		
35	-1.90	-1.90	-1.90	-1.90	-1.90	-1.90	-1.90	-1.90		1	
36											
37											
38											
39											
40											
41	1	1	1	1	1	1	1	1			
42										1	
Return or Cost (-)	-37.94	-37.39	-36.95	-36.02	-37.94	-37.39	-36.95	-36.02	21.00	9.42	1.30

APPENDIX A, TABLE IV (CONTINUED)

Row Number	P125 FGP	P126 WCT	P127 FSP	P130 COT	P131 COT	P132 COT	P133 COT	P134 FAL	P135 FAL	P136 FAL	P137 FAL
1				1				1			
2					1				1		
3						1				1	
4							1				1
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18	1										
19		1									
20			1								
24											
25											

APPENDIX A, TABLE IV (CONTINUED)

Row Number	P125 FGP	P126 WCT	P127 FSP	P130 COT	P131 COT	P132 COT	P133 COT	P134 FAL	P135 FAL	P136 FAL	P137 FAL
26											
27											
28											
29											
30											
31											
32											
33											
34											
35											
36											
37											
38											
39		1									
40			1								
41				-1	-1	-1	-1				
42											
Return or Cost (-)	1.75	1.32	.53								

APPENDIX B

DESCRIPTION OF CROP AND LIVESTOCK ENTERPRISES INCLUDED IN THE LINEAR PROGRAMMING TABLEAUS

APPENDIX B, TABLE I

DESCRIPTION OF CROP ACTIVITIES FOR NORTHWEST OKLAHOMA

Item	Activity Number	Unit	Yield on Land Classes			Production Practice
			L_b	L_c	L_d	
Wheat	P4, P5, P6, P12 P13, P14, P23, P24, P25, P29, P30, P31, P38, P39, P40	Bu.	21.0	18.0	14.0	Fall seeded, grazed 30-15-0 fertilizer
Grain Sorghum	P9, P10, P11, P19, P20, P21, P26, P27, P28, P35, P36, P37, P43, P44, P45	Cwt.	14.56	11.20	8.40	Spring planted, stubble pasture, 30-15-0 fertilizer
Small Grain Pasture	P7, P16, P17, P34, P42, P69	AUM[a]	2.0	2.0	2.0	Fall seeded, grazed out by May 15, 30-15-0 fertilizer
Sudan Pasture	P8, P18, P33, P41, P70	AUM	1.8	1.8	1.8	Spring planted, grazed out, 30-15-0 fertilizer
Conservation Fallow	P71, P72, P73, P74, P75, P76	Acre	0	0	0	Minimum practices necessary to meet institutional requirements

[a]An animal unit month is defined as the amount of grazing required by the average cow for a one month period.

APPENDIX B, TABLE II

DESCRIPTION OF CROP ACTIVITIES FOR SOUTHWEST OKLAHOMA

Item	Activity Number	Unit	Yield on Land Classes				Production Practice
			L_a	L_b	L_c	L_d	
Wheat	P4, P5, P6, P7, P16, P17, P18, P19, P31, P32, P33, P34, P41, P42, P43, P44, P54, P55, P56, P67	Bu.	28.1	22.0	17.1	13.4	Fall seeded, grazed, 16-20-0 fertilizer
Grain Sorghum	P11, P12, P13, P14, P25, P26, P27, P28, P36, P37, P38, P39, P49, P50, P51, P52, P61, P62, P63, P64	Cwt.	21.8	19.7	16.3	12.2	Spring planted, stubble pasture, 16-20-0 fertilizer
Small Grain Pasture	P23, P24, P48, P60	AUM[a]	2.6	2.6	2.6	2.6	Fall seeded, grazed out by May 15, 16-20-0 fertilizer
Sudan Pasture	P15, P20, P53, P65, P85	AUM	1.5	1.5	1.5	1.5	Spring planted, handled as native pasture, 16-20-0 fertilizer

[a]An animal unit month is defined as the amount of grazing required by the average cow for a one month period.

APPENDIX B, TABLE II (CONTINUED)

Item	Activity Number	Unit	Yield on Land Classes				Production Practice
			L_a	L_b	L_c	L_d	
Conservation Fallow	P21, P29, P134, P135, P136, P137	Acre	0	0	0	0	Minimum practices necessary to meet institutional requirements
Cotton	P99, P100, P101, P102, P104, P105, P106, P107, P109, P110, P111, P112	Cwt.	2.75	2.25	1.85	1.00	Custom harvest, custom hoeing with three different diversion levels; 12.5, 25 and 35%

APPENDIX B, TABLE III

DESCRIPTION OF LIVESTOCK ACTIVITIES

Cow - Calf

Activity Number	Calving Time	Marketing Date	AUM's Per Cow	Ration
P53	March 1	October 15	13.8	Range, small grain pasture

Stocker Steer, Buy-Sell Activities

Activity Number	Purchase Date	Sell Date	Purchase Weight	Sell Weight	AUM's per Steer	Ration
P49	October 15	March 1	450	600	2.4	Small grain pasture, forage with cottonseed cake
P50	October 15	May 15	450	715	3.8	Small grain pasture, forage with cottonseed cake
P51	October 15	October 15	450	775	6.7	Roughed through winter on range, cottonseed cake
P52	October 15	October 15	450	775	6.7	Grain sorghum stubble native range, cottonseed cake

APPENDIX B, TABLE IV

CROP AND LIVESTOCK ACTIVITIES FOR NORTHWEST OKLAHOMA BENCHMARK FARM

Livestock Activities

Description	Income Per Unit
Stocker Steer, Buy October 15, Sell March 1	12.88
Stocker Steer, Buy October 15, Sell May 15	31.40
Stocker Steer on Range, Buy October 15, Sell October 15	25.24
Stocker Steer on Sorghum Stubble, Buy October 15, Sell October 15	25.24
Cow-Calf March 1 Calving, Marketing October 15	59.45

Crop Activities

Description	Unit	Cost Per Unit Dollars	Yield Per Unit Grain Bu.	Yield Per Unit AUMS
Winter Pasture	Acre	9.11	---	2.0
Wheat Class L_b Land	Acre	12.65	21	.6
Wheat Class L_c Land	Acre	12.45	18	.5
Wheat Class L_d Land	Acre	12.25	14	.4
Sudan Pasture	Acre	11.30	---	1.8
Conservation Fallow	Acre	2.00	---	---
Grain Sorghum Class L_b Land	Acre	12.73	14.56 Cwt.	.2
Grain Sorghum Class L_c Land	Acre	12.13	11.20 Cwt.	.2
Grain Sorghum Class L_d Land	Acre	11.88	8.40 Cwt.	.2

APPENDIX B, TABLE V

CROP AND LIVESTOCK ACTIVITIES FOR SOUTHWEST OKLAHOMA BENCHMARK FARM

Livestock Activities

Description	Income Per Unit
Stocker Steer, Buy October 15, Sell March 1	12.88
Stocker Steer, Buy October 15, Sell May 15	31.40
Stocker Steer on Range, Buy October 15, Sell October 15	25.24
Stocker Steer on Sorghum Stubble, Buy October 15, Sell October 15	25.24
Cow-Calf March 1 Calving, Marketing October 15	59.45

Crop Activities

Description	Unit	Cost Per Unit Dollars	Yield Per Unit Grain Bu.	Yield Per Unit AUMS
Winter Pasture	Acre	7.55	---	2.6
Wheat L_a Land	Acre	13.11	28.1	.6
Wheat L_b Land	Acre	12.73	22.0	.5
Wheat L_c Land	Acre	12.42	17.1	.4
Wheat L_d Land	Acre	12.19	13.4	.3
Sudan Pasture	Acre	4.38	---	1.5
Conservation Fallow	Acre	2.00	---	---
Grain Sorghum L_a	Acre	10.94	21.8 Cwt.	.2
Grain Sorghum L_b	Acre	10.81	19.7 Cwt.	.16
Grain Sorghum L_c	Acre	10.54	16.3 Cwt.	.12
Grain Sorghum L_d	Acre	10.24	12.2 Cwt.	.10
Cotton L_a	Acre	37.94	2.25 Cwt.	---
Cotton L_b	Acre	37.39	2.25 Cwt.	---
Cotton L_c	Acre	36.95	1.85 Cwt.	---
Cotton L_d	Acre	36.02	1.00 Cwt.	---

APPENDIX C

SAMPLE BUDGETS FOR CROP AND LIVESTOCK ENTERPRISES

APPENDIX C, TABLE I

ESTIMATED PER UNIT PRODUCTION REQUIREMENTS AND INCOME FOR PRODUCING GOOD FEEDER CATTLE, FALL BUY - OCTOBER 15; WINTER RATION OF SMALL GRAIN PASTURE WITH FORAGE SORGHUM AND COTTONSEED CAKE WHILE OFF SMALL GRAIN; SOLD-OFF SMALL GRAIN MARCH 1.[1]

Item	Unit	Amount	Price	Total Value
Capital Requirements				
Investment Capital	dol.	105.39	--	105.39
Operating Capital	dol.	4.03	--	4.03
Total Capital	dol.	109.42	--	109.42
Annual Capital	dol.	40.08	--	40.08
Production				
Feeder	cwt.	6.00	22.12	132.72
Less one percent death loss				
Inputs				
Calf	cwt.	4.50	23.42	105.39
Native range	AUM	.50	--	--
Small grain grazing	AUM	2.40	--	--
Forage sorghum	ton	.33	7.60	2.51
C.S.C. (1.5# day)	cwt.	.24	3.80	.91
Vet and Medicine	dol.	1.25	--	1.25
Salt	lbs.	6.50	.01	.07
Hauling and marketing cost	cwt.	10.50	.40	4.20
Property tax	dol.	48.00	.037	1.78
Interest on Annual Capital	dol.	40.08	.06	2.40

[1]Harry H. Hall, et. al., Resource Requirements, Costs, and Expected Returns; Alternative Crop and Livestock Enterprises; Oklahoma Panhandle, Oklahoma Agricultural Experiment Station Processed Series P-459, (Stillwater, 1963), Table 21, p. 30.

APPENDIX C, TABLE I (CONTINUED)

Item	Unit	Amount	Price	Total Value
Total Specified Costs				118.51
Returns to Land, Fixed Capital, Labor Management and Risk				12.88
Labor	hr.	2.76	1.25	3.45
Returns to Land Fixed Capital, Management and Risk				9.43

Labor Requirements

(Man Hr./Animal)

Jan.	Feb.	Mar.	Apr.	May	June	July
.45	.45	.72	.00	.00	.00	.00

Aug.	Sept.	Oct.	Nov.	Dec.	Total
.00	.00	.54	.30	.30	2.76

APPENDIX C, TABLE II

ESTIMATED ANNUAL COSTS AND RETURNS PER ACRE FOR PRODUCING WHEAT ON LOAM SOILS, NORTHWEST OKLAHOMA[1]

Item	Unit	Price or Unit/Cost (dol.)	L_b Land Quantity	L_b Land Value or Cost (dol.)
Production:				
Wheat	bu.	1.39	21	29.19
Grazing	AUM	--	.60	--
Inputs:				
Seed	bu.	2.25	.75	1.69
Fertilizer	lb.	.100-.083-.046	30-15-0	4.24
Machinery operating cost	acre	1.68	1	1.68
Machinery ownership cost	acre	.94	1	.94
Total preharvest cost	dol.	4		8.55
Combining	acre	3.00	1	3.05
Hauling	bu.	.05	21	1.05
Total harvest cost	dol.			4.10
Annual Interest on Capital	dol.	.07	14.91	1.04
Total Specified Costs	dol.			13.69
Total Specified Cost Less Interest on Capital				12.65
Returns to Land, Labor, Risk and Management	dol.			15.50
Labor	hr.	1.25	1.14	1.42
Returns to Land, Risk, and Management (including an assumed value grazing)	dol.			20.08

Total Labor Requirements by Periods (hrs.)

Jan-Apr	May-July	Aug-Sept	Oct-Dec	Total
.00	.39	.45	.30	1.14

Annual Capital Requirements (dol.)

Operating Capital	7.31
Machinery Capital	7.60

[1]Larry J. Connor, Roy E. Hatch and Odell L. Walker, Alternative Crop Enterprises on Loam and Sandy Soils of Northwest Oklahoma: Resource Requirements, Costs and Returns, Oklahoma Agricultural Experiment Station Processed Series P-552 (Stillwater, 1966), Table 1.

VITA

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