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Optimum FARM ORGANIZATION with Different Livestock Prices, Limestone Valley Areas of ALABAMA

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Optimum Farm Organization with Different Livestock Prices, Limestone Valley Areas of Alabama

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Production of goods and services takes place in a dynamic environment. Producers must adjust to these changes if they are to maintain or improve their incomes. Those who do not change find a dwindling demand for their product or a lack of ability to compete with more efficient producers of the same product.

Farmers can use any or all of three methods in adjusting to meet changing conditions. They can increase volume of existing enterprises by obtaining more resources. They can reorganize each enterprise in order to use existing resources to produce a more desirable product or to produce it more efficiently. They can find the combination of enterprises that will give them the greatest possible returns to the resources they control.

The objective of this study was to provide guides to adjustment in enterprise organization for farmers in the Limestone Valley Areas of Alabama using recommended production practices and a specific set of resources. More specifically, the objective was to find the most profitable combinations of enterprises under different steer and hog prices for a Limestone Valley farm containing 160 acres of open land if recommended production practices were used. Since this analysis was based on consideration of a specific farm resource situation, the data may not exactly fit any one farm, but adaptations or adjustments can easily be made to fit most Limestone Valley farms.

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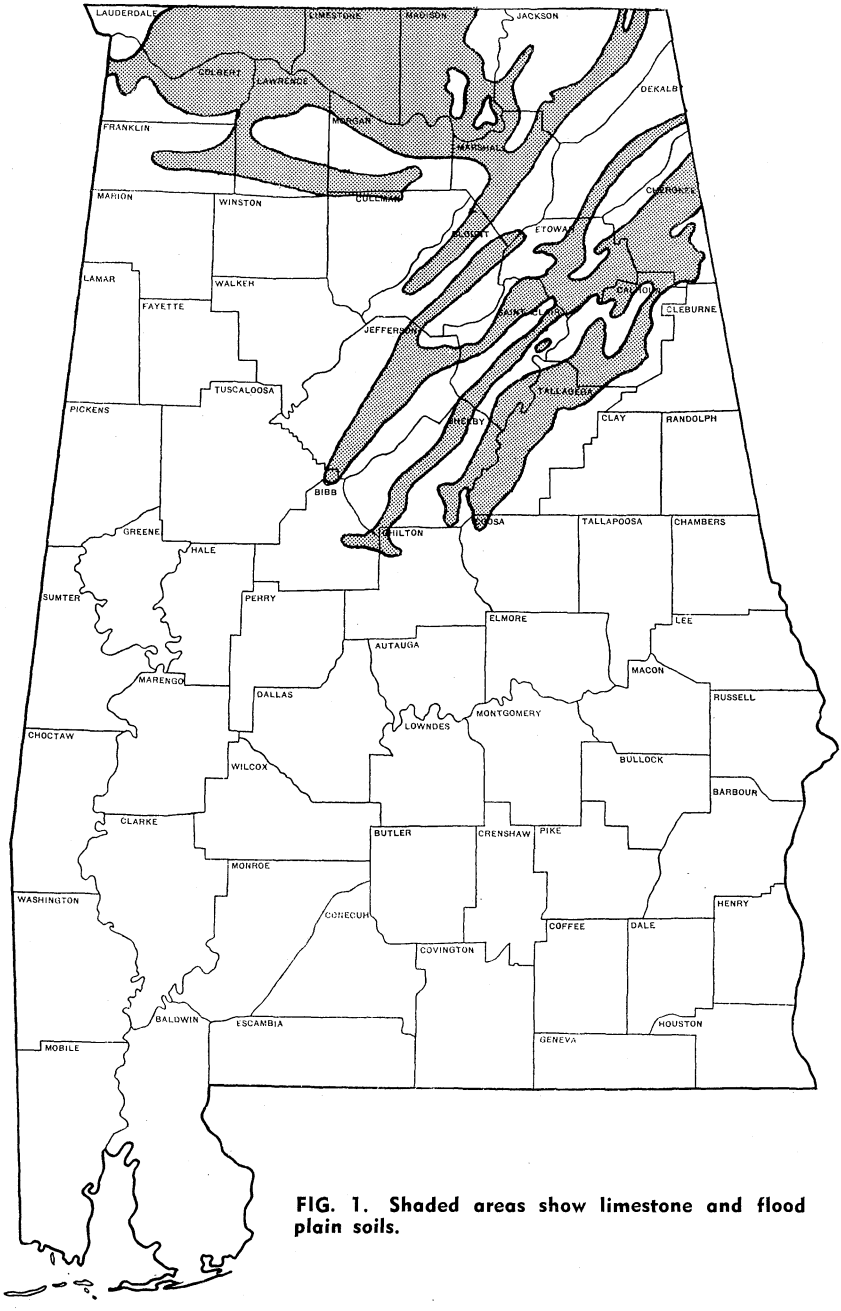

FIG. 1. Shaded areas show limestone and flood plain soils.

This report applies to the Limestone Valley and flood plain soils in northern and northeastern Alabama, Figure 1. Most of these soils are in the Tennessee and Coosa River Valleys, but some are in strips along smaller streams in these areas. Soils in these areas are predominately heavy, and topography is largely level to gently rolling. Most farms are crop farms with supplemental livestock enterprises. The area has almost one-third of the State's cotton acreage, one-sixth of the corn acreage, and one-sixth of the hog and beef cattle numbers.

METHOD OF ANALYSIS

The procedure consisted of (1) selecting a resource situation, (2) selecting enterprise alternatives, (3) constructing enterprise budgets for several crop and livestock alternatives, and (4) making computations to determine the most profitable combinations of enterprises for various hog and steer prices.

Selecting the Resource Situation

Land and Allotments

The size of the farm used as an example, 160 acres of open land, is considerably larger than the average size farm in the Limestone Valleys. This size farm can give reasonably full employment to an efficient operator using some family or seasonal hired labor for jobs requiring more than one man. The example farm is more nearly the average size of farms operated by full-time commercial farmers in the area.

Soil resources were defined in terms of Soil Conservation Service land use classes. *Open land* was defined as SCS classes I through IV cropland and pasture. All cropland and pasture in SCS classes I through III were designated as *plowable land.* All classes I and II, and half of classes IIIe and IIIw, cropland and pasture, were designated as *row cropland.* In these classifications, 90.5 per cent of the open land is plowable and 69.4 per cent can be used for row cropland.[1] Based on these percentages, the 160 acres of open land include 144.8 acres of plowable land, 111.0 acres of which are row cropland. Thus, 111 acres have no agronomic restrictions on its use, 33.8 acres can be used only for small

[1] Determined from county work sheets for the Alabama Soil and Water Conservation Needs Inventory.

grains and sod crops, and 15.2 acres can be used only for sod crops.

The cotton allotment in the Limestone Valley Areas amounts to about 18 per cent of the open land as defined in this study. Therefore the example farm would have a cotton allotment of 28.8 acres.

Labor, Capital, and Equipment

It was assumed that most productive work on the farm would be performed by the operator. Seasonal labor was hired to assist in all operations requiring more than one man.

Adequate investment and operating capital were assumed to be available. Interest was charged at the rate of 6 per cent on the average investment in buildings, fences, equipment, machinery, and breeding herds. Interest was also charged on operating capital at the rate of 6 per cent per annum for the period used.

A tractor and a full complement of two-row land preparation, planting, cultivation, and insect and weed control equipment for row crops were assumed, Table 1. A second fully depreciated tractor was kept for miscellaneous use. All crops were mechanically harvested, but a one-row corn picker was the only harvesting equipment owned. Since the amounts of small grain, hay, and cotton in the farm plans would not justify purchase of harvesting equipment, these crops were custom harvested. Other pieces of

TABLE 1. ITEMS OF MACHINERY AND PURCHASE PRICE, EXAMPLE FARM

Item	Purchase price
	Dollars
Tractor	4,000
Old tractor	200
Plow	375
Disk harrow	275
Spike toothed harrow	200
Planter	720
Pre-emerge equipment	150
Cultivator	675
Post-emerge equipment	100
Fertilizer attachment	165
Low volume sprayer	300
Corn picker	1,200
Wagons (two)	800
Rotary mower	430
Fertilizer spreader	340
Grain elevator	375
Hand seeder	15
Total	10,320

equipment assumed to be on the farm were two wagons, a rotary mower, a fertilizer spreader, a grain elevator, and a cyclone hand seeder. Small grain was planted with the fertilizer spreader.

Selecting Enterprise Alternatives

The enterprises considered in the analysis were "conventionally planted" cotton, "skip-row" cotton, corn, oats, grain sorghum, soybeans, lespedeza hay, steers, and hogs. Although beef cows were considered early in the analysis, they were eliminated because of the small (6 or 7 cows) size of the enterprise in the optimum programs. On farms with larger acreage suited only to sod crops, a supplemental beef cow herd would add a small amount to net income. Alfalfa was eliminated because of some unsolved insect control problems. Poultry and corn purchases were not considered since they do not compete for open land. However, they could be added to any farm organization to expand volume of business and increase income if sufficient labor and capital were available.

Several enterprises were eliminated because of institutional, resource, or market restrictions. Entrance into Grade A milk production is severely restricted by the existing institutional framework. Fruit, nut, and vegetable production was eliminated because other areas appeared to have physical, management, and market resources better adapted to production and sale of these products.

Enterprise Budgets

Budgets were prepared for each of the enterprises used in the programming analysis. The use of improved practices and a high level of managerial ability was assumed for these budgets. They corresponded closely to what was being done by the best farmers in the Limestone Valley Areas.[2] Inputs per unit of each of the enterprises are shown in Appendix Tables 2, 3, and 4.

[2] The production practices are similar to those used in the improved practices budgets found in the following publications:

Partenheimer, Earl J., and Ellis, Theo H., *Costs and Returns from Crop Production in the Limestone Valley Areas of Alabama,* Ala. Agr. Expt. Sta. in cooperation with Farm Econ. Res. Div., Agr. Res. Serv., U.S. Dept. of Agr., Auburn, Alabama, February, 1960.

Ellis, Theo H., and Partenheimer, Earl J., *Costs and Returns from Crop Production in the Limestone Valley Areas of Alabama,* Ala. Agr. Expt. Sta. in cooperation with Farm Econ. Res. Div., Agr. Res. Serv., U.S. Dept. of Agr., Auburn, Alabama, December, 1960.

Production Rates

The expected longtime average crop yields and livestock production rates used in the budgets reflect the high level of management that was assumed. A yield of 700 pounds per acre was used for conventionally planted cotton. A yield of 1,050 pounds of lint per acre of allotment was used for two by two skip-row cotton. These yields were adjusted to 665 and 998 pounds of lint, respectively, to allow for field losses resulting from mechanical harvest. Other crop yields per acre used were 65 bushels for corn, 70 bushels for oats, 25 bushels for soybeans, 45 bushels for grain sorghum, and 1.8 tons for annual lespedeza hay. An average of 16 hogs per sow per year were raised to market weight of 210 pounds. A conversion rate of 3.5 pounds of feed per pound of pork was used. Steers were purchased at 450 pounds and sold at 1,075 pounds less 3.5 per cent shrinkage. Included in the livestock budgets were 0.5 acre of pasture per sow, and 0.8 acre of pasture and hay and 0.178 acre of corn silage per steer. One-half the hog pasture had to be on row crop land and one-half could be on plowable open land. Hay and pasture production for steers could be on any type land.

Prices

Input prices used in the study were based on data obtained in a survey of farm supply and equipment dealers in the Limestone Valley Areas, Appendix Table 1. They represented prices that good managers could obtain with a reasonable amount of "shopping." Product prices were set at levels that might be expected to prevail during the next several years Table 2. Analyses were conducted to ascertain the effect changing hog and steers prices would have on optimum farm organization.

TABLE 2. BASE PRODUCT PRICES, EXAMPLE FARM

Product	Unit	Price
		Dollars
Cotton lint	lb.	0.31
Cotton seed	ton	40.00
Corn, ear	bu.	1.05
Oats	bu.	.80
Grain sorghum	bu.	.95
Soybeans	bu.	2.20
Annual lespedeza hay	ton	28.00
Steers	cwt.	24.00
Market hogs	cwt.	16.00
Sows	cwt.	13.00
Boars	cwt.	6.00

Overhead Costs

A charge for certain overhead costs was made against the gross income of the farm. These costs included machinery overhead, pickup truck operation, real estate taxes, bookkeeping, liability insurance, and telephone, Table 3. However, overhead costs on items used only a specific livestock enterprise were charged to that enterprise. This included depreciation, interest, taxes, and insurance on buildings, fences, specialized equipment, and breeding stock.

No charges were made for land or operator labor and management. Thus, the net returns for the farm are returns to land and operator labor and management.

TABLE 3. ANNUAL OVERHEAD COSTS FOR THE PROBLEM FARM

Item	Amount
	Dollars
Machinery overhead*	
Depreciation	911
Interest, housing, taxes, and insurance	464
Pickup truck	375
Real estate taxes	80
Bookkeeping	50
Liability insurance	40
Telephone	40
Total	1,960

* Depreciation on machinery was figured at 9 per cent of the new cost of all machinery except the second tractor. Interest, housing, taxes, and insurance on machinery were charged as 4.5 per cent of new cost.

Determining the Most Profitable Organizations

Linear programming and price mapping procedures were used to determine the most profitable organizations for different prices of hogs and steers. Results are presented first for the base price situation. Then the results with different steer and hog price combinations are presented.

ORGANIZATION WITH BASE PRICES

With hogs and steers at $16 and $24 per hundredweight, respectively, the computed optimum plan consisted of the full 28.8 acre cotton allotment planted conventionally; 75.1 acres of corn used for hog feed; 26.6 acres of oats sold for grain; 14.3 acres of hog pasture; and 28.6 sows. The 15.2 acres of unplowable open

land were not used. The restricting resources were, in descending order of importance: row cropland, cotton allotment, and plowable land. The estimated net returns to land, operator labor, and management were $9,325.

The computed optimum solution indicated all of the cotton allotment should be planted in the conventional way. Except for the small acreage needed for hog pasture, the remaining row crop land should be for corn. Enough hogs were produced to consume all corn produced. Plowable open land not used for hog pasture was seeded to oats. The only possible use for the unplowable open land was as a source of pasture and hay for steers. This land remained idle since steers were not in the optimum program.

ORGANIZATIONS WITH DIFFERENT HOG AND STEER PRICES

A farm plan that is most profitable under one set of product prices may not be optimum when prices change. The four products most likely to make up the major enterprises are cotton, corn, hogs, and steers. Cotton prices do not fluctuate widely because of government price support levels. Preliminary programming indicated that corn was sold rather than fed only when hog and steer prices were low in relation to corn prices. Hog and steer price changes were more likely to change the optimum farm organization. Thus, the effect of changing hog and steer prices on farm organizations was investigated using price mapping.

Figure 2 shows the effect on the cotton enterprise of changes in hog and steer prices.[3] It is more profitable to reduce corn acreage and use skip-row planting methods for cotton with hog prices at low levels (Area R). Cotton should be planted conventionally if hog prices are expected to average more than 14.70 per hundredweight (Areas S and T).

If the farm were reorganized using any expected hog price above $17.50 per hundredweight, cotton acreage would be reduced below the full allotment in order to grow more corn for hog feed (Area T).

Steer prices, within the range shown, had almost no effect on the cotton enterprise. With hog prices low enough to keep them out of the optimum program, steer prices would have to increase

[3] Cull sow and boar prices were varied proportionately with the price of market hogs.

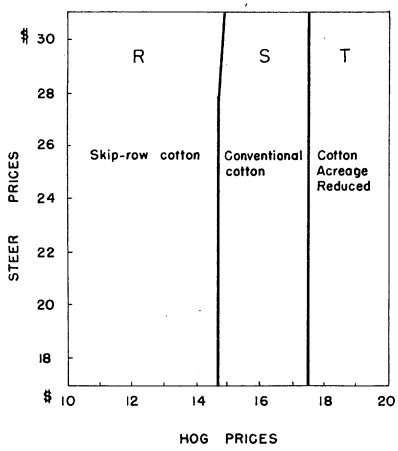

FIG. 2. Cotton enterprises.

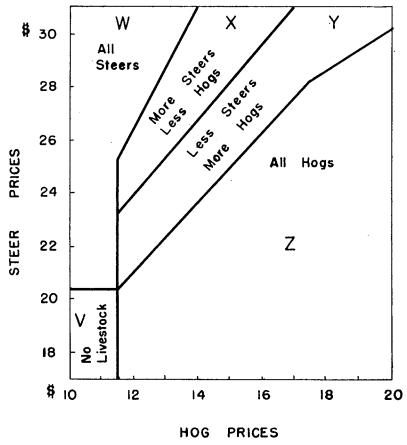

FIG. 3. Livestock enterprises.

to $35 per hundredweight before it would be more profitable to replace skip-row cotton with conventionally planted cotton in order to obtain more corn for feed.

The effects of changing hog and steer prices on the most profitable livestock enterprises are shown in Figure 3. When hogs were less than $11.50 per hundredweight and steers were less than $20.30 per hundredweight, the optimum farm organization had no livestock and all corn was sold (Area V). With price combinations in Area W, steers were the only livestock enterprise. As hog prices increased through Areas X and Y, steer numbers decreased and hog numbers increased. For all hog and steer price combinations in Area Z, hogs were the only livestock enterprise. Although it is not shown in Figure 3, the size of the corn and livestock enterprises tended to increase as either hog or steer prices increased.

Combining results shown in Figures 2 and 3, the result is the two-variable price map shown in Figure 4. Under the assumptions used in this report, there is one most profitable farm organization for all combinations of hog and steer prices that fall within any specific block on the price map. The optimum program for each block is shown in Table 4. Suppose planning were done with expected prices of $14 for hogs and $22 for steers. This price combination falls in Area B of the price map. In Table 4 the most profitable enterprise combination for this area was 28.8

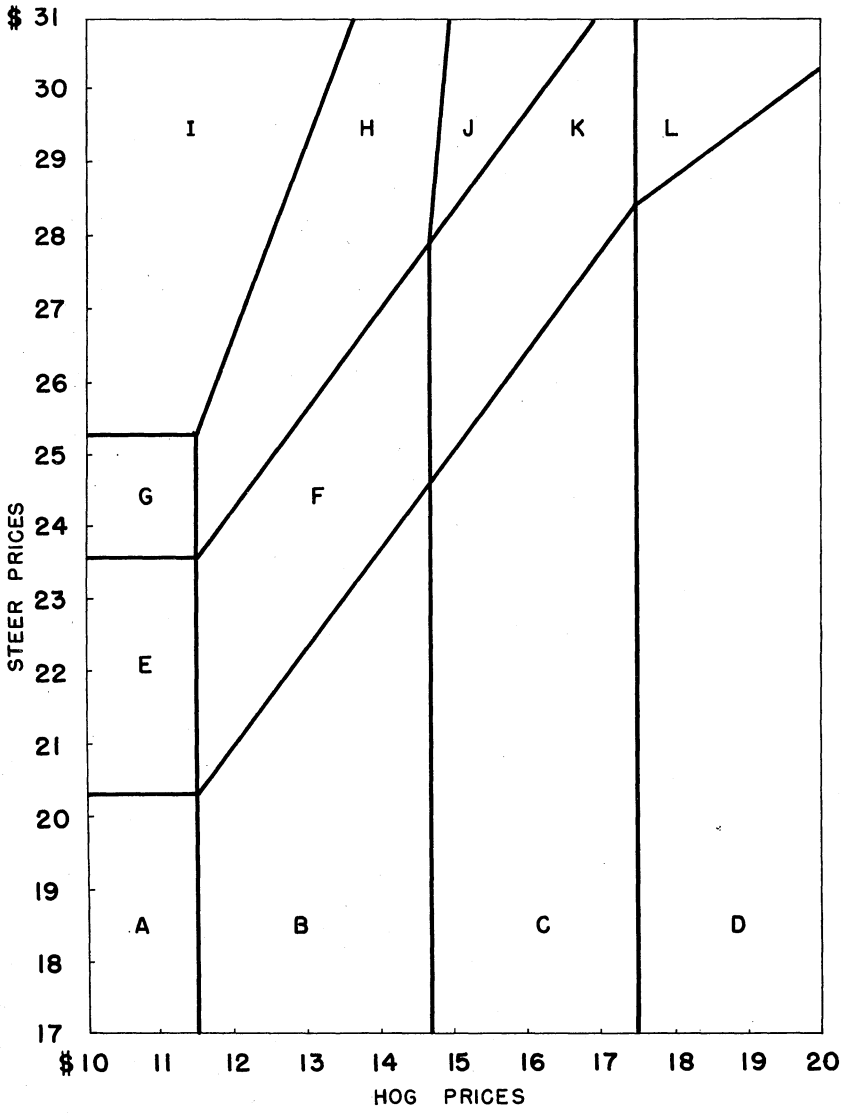

FIG. 4. Price map of hog prices.

acres of skip-row cotton, 48.8 acres of corn for feed, 29.1 acres of oats, 9.3 acres of hog pasture, and 18.6 sows. The 15.2 acres of unplowable open land remained idle.

TABLE 4. MOST PROFITABLE PROGRAMS FOR AREAS IN PRICE MAP IN FIGURE 4

Item	Unit	Area in price map											
		A	B	C	D	E	F	G	H	I	J	K	L
Cotton, skip-row	acre	28.8	28.8	----	----	28.8	28.8	28.8	28.8	28.8	----	----	----
conventional	acre	----	----	28.8	23.2	----	----	----	----	----	28.8	28.8	17.8
Corn for feed	acre	----	48.8	75.1	80.1	9.0	46.4	28.9	41.5	33.3	68.2	72.7	82.7
for sale	acre	53.4	----	----	----	41.0	----	13.6	----	----	----	----	----
Corn silage	acre	----	----	----	----	3.4	3.4	10.9	10.6	12.6	10.0	3.4	3.4
Oats	acre	33.8	29.1	26.6	26.2	33.8	30.2	----	----	----	----	27.7	26.8
Steer pasture & hay	acre	----	----	----	----	15.2	15.2	49.0	47.7	56.5	45.0	15.2	15.2
Hog pasture	acre	----	9.3	14.3	15.3	----	7.2	----	2.6	----	8.0	12.2	14.1
Idle land	acre	15.2	15.2	15.2	15.2	----	----	----	----	----	----	----	----
Steers	head	----	----	----	----	19.0	19.0	61.2	59.7	70.6	56.3	19.0	19.0
Sows	head	----	18.6	28.6	30.6	----	14.3	----	5.1	----	15.9	24.3	28.1

Revisions in the Price Map

One of the mathematical assumptions underlying linear programming is that of complete divisibility of the activities (enterprises). An activity may enter the program at any level as long as the restrictions are not violated. However, enterprise budgets

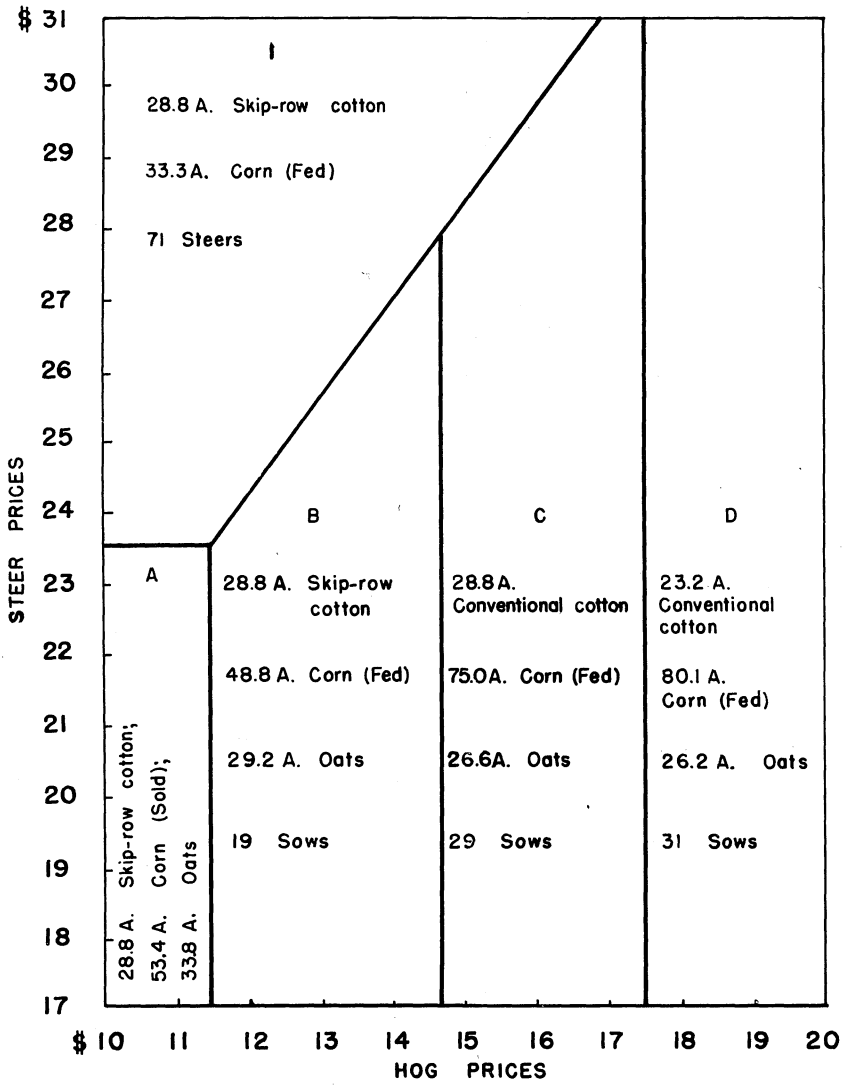

FIG. 5. Revised price map.

containing overhead costs are valid only over restricted ranges. For example, silage storage costs per ton are higher for small silos than for larger ones. Thus, revisions may be needed to make the computed programs fit farm conditions.

Several revisions were necessary to make the previously discussed price map fit farm conditions. Areas E, F, K, and L contained steer feeding enterprises of only 19 head. Budgets were made for 50 steers. Therefore, overhead costs used in the budgets are much less per head than would be true if only 19 steers were fed at a time. Hence the price map Areas E, F, K, and L were eliminated by extending Areas A, B, C, and D, respectively. Similarly Area H was included in Area I in order to eliminate a relatively inefficient hog enterprise. Two further Areas, G and J, were also eliminated. Not only did these areas cover only small price ranges for either product, but they also represented price combinations not likely to be used in farm planning.

The revised price map, along with the optimum programs, is shown in Figure 5. Corn silage, hay, pasture, and idle land acreages can be found by referring to Table 4. In order to make the programs appear more realistic, livestock numbers have been rounded to the nearest whole number.

Opportunity Costs of Different Organizations

An area in the price map shows the price ranges of hogs and steers over which a particular organization is most profitable under the assumptions used. However, other organizations might be found that would almost produce the same returns to the fixed resources at prices within the area. Then the choice of enterprise organization might depend on such things as risk or the skills and preferences of the operator.

To compare the relative profitability of different organizations, the returns to land, operator labor, and management for each of

Table 5. Net Returns to Land, Operator Labor, and Management, and Associated Opportunity Costs, With a Hog Price of $16 and a Steer Price of $24

Organization	Net return	Opportunity cost
	Dollars	*Dollars*
A	6,572	3,328
B	9,435	465
C	9,900	0
D	9,795	105
I	6,977	2,923

the organizations in the revised price map were computed at hog and steer prices of $16 and $24, respectively. The difference between the net returns for the most profitable farm plan at these prices (C) and the net returns for any alternate plan is the opportunity cost of that alternate plan, Table 5. Thus, with hog and steer prices of $16 and $24, respectively, net returns would fall $3,328 below the highest possible return if organization A rather than C were chosen.

Both organizations A and I would cause significant income reductions as compared with C. However, the opportunity cost would be rather small using organizations B or D. Since weather risk is less on cotton than on corn, and price fluctuations are smaller for cotton than for hogs, some farmer might prefer organization B to C. Thus, skip-row cotton would replace conventionally planted cotton and the corn-hog operation would be reduced accordingly. A farmer who preferred corn and hogs because of either likes or skills might use organization D rather than C. Since organizations D and C are very nearly the same, it would take large changes in hog prices to cause a significant difference in the net income of these organizations.[4]

Effect of Errors in Price Expectations

Another criterion for analyzing a prospective farm organization is to find the losses that would occur if there were important errors in price expectations. When farm organization is based on the expectation that hog and steer prices would average $16 and $24, respectively, during the planning span, then C is the most profitable organization. Table 6 shows the average annual income foregone if the actual price combinations are such that another organization would have been more profitable. For example, the first line of Table 6 shows what would happen if hog and steer prices are $13 and $20, respectively. Since hog and steer price predictions had been $16 and $24, organization C was used. However, net returns obtained were $6,941 when prices instead were $13 and $20. Organization B would have been used if prices had been predicted correctly, and net returns would have been $7,512. Thus the cost of incorrect price forecasts was $7,512 − $6,941 = $571.

[4] Restrictions on feed grain production prevent taking advantage of the domestic allotment provisions of the 1964 revisions of the cotton program.

TABLE 6. OPPORTUNITY COSTS ASSOCIATED WITH SELECTED HOG AND STEER PRICES THAT OCCUR WHEN FARM ORGANIZATION IS BASED ON HOG AND STEER PRICES OF $16 AND $24 PER HUNDREDWEIGHT, RESPECTIVELY

Hog price	Steer price	Actual organization		Optimum organization		Opportunity cost of price forecast errors
		Organization	Net return	Organization	Net return	
$13	$20	C	$ 6,941	B	$ 7,512	$ 571
13	24	C	6,941	B	7,512	571
13	28	C	6,941	I	8,605	1,664
16	20	C	9,900	C	9,900	0
16	24	C	9,900	C	9,900	0
16	28	C	9,900	C	9,900	0
19	20	C	12,858	D	12,953	95
19	24	C	12,858	D	12,953	95
19	28	C	12,858	D	12,953	95

The largest loss of those shown occurred when hogs were low in price ($13) and steers were high ($28). With these prices, the most profitable program is I, the only program including steers. No significant loss of income occurred at either the $16 or $19 hog price, regardless of the steer price.

The opportunity costs would be even less with smaller errors in price expectations. For example, if a $14 hog price and a $20 (or $24) steer price were used, the opportunity cost of using organization C rather than B would be only $226. Similarly if $14 hog and $28 steer prices were used, the opportunity cost of using area C rather than area I would be only $678. Figure 6 shows the net returns to land, operator labor, and management for organizations B, C, and I at various hog prices. The net returns for I are shown for both $24 and $28 steer prices. The net returns for organization D are not shown but they closely parallel the net returns for C above a hog price of $17.50. By way of comparison, the net returns for organization A, which had no livestock, was $6,001.

From Figure 6 it is apparent that serious losses would occur if organization I were adopted and hog and steer prices were near their base levels of $16 and $24, respectively. Organizations B, C, and D are competitive over a fairly wide range of hog prices. These three organizations are made up primarily of corn, hogs, and cotton.

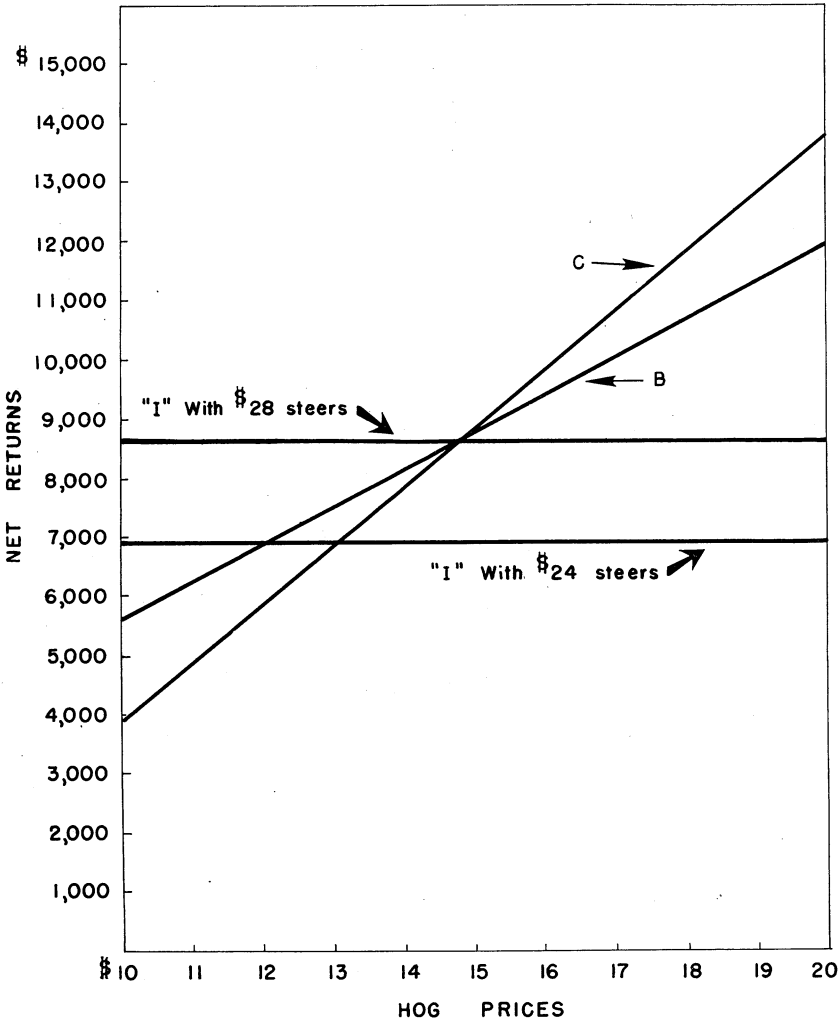

FIG. 6. Net returns to land, operator, labor, and management for three organizations at different hog prices.

SUMMARY AND CONCLUSIONS

Adjustment opportunities were studied on an owner-operated Limestone Valley farm with 160 acres of open land. Labor was hired only for activities that required more than one man. A 6 per cent per annum charge was made on all operating and investment capital. Input and product prices were assumed to be at about the current levels with appropriate trend and cyclical adjustments.

Enterprise alternatives were land based. They included both conventionally planted and skip-row cotton (28.8 acre allotment), corn, oats, grain sorghum, soybeans, lespedeza hay, steers and hogs. A high level of managerial ability and the use of improved production practices were assumed in all the enterprise budgets.

Optimum farm organizations were computed for various combinations of steer and hog prices using linear programming and price mapping procedures. The most profitable farm plans included cotton, corn, hog, steer, and oats enterprises.

Results of the study indicate that Limestone Valley farmers would have higher returns if they plant all of the cotton allotment they can obtain, provided they use improved production practices and expect hog prices to average less than $17.50 per hundredweight. When hog prices are expected to average more than $17.50, it is more profitable to reduce cotton acreage and increase corn and hog production to the extent allowed by labor restrictions. However, few people would be so optimistic concerning average hog prices for the next several years. Also, the production rates for corn and hogs used in this study would necessitate more management improvements on the part of most Limestone Valley farmers than would be true in the case of cotton.

Price-mapping results showed that skip-row cotton would be planted if hog prices were expected to average below $14.40 per hundredweight. This would reduce the size of the corn and hog enterprises. If the analysis had been based on the management practices currently used by most Limestone Valley farmers, skip-row cotton would have been planted at even higher hog prices. Again this is because of the better job currently being done by farmers in cotton production than in corn and hog production.

Steers entered the most profitable farm plans only when steer prices were relatively high as compared to hog prices. Steers appear to be a logical alternative only where a farmer has far greater

skills in steer production than in hog production, or where a man strongly prefers to work with steers rather than hogs.

Land that can be used only for close growing crops was used for oats when it was not needed for hay and pasture. Wheat or other small grains could be substituted for oats with little change in returns. Since one-half of the hog pasture could be on this type of land, a portion of it was usually used for hog pasture. When steers were in the optimum farm organization, this land, along with the unplowable open land, furnished hay and pasture for steers.

When no steers were in the optimum program, unplowable open land remained idle. For farms with adequate capital and larger amounts of this type of land, a supplementary herd of beef cows would furnish some additional income. However, cows could not successfully compete for land with either small grain or row crops. Therefore, the herd should be limited to land that must remain in permanent sod because of agronomic restrictions such as erosion hazards, excess water, or adverse soil conditions.

APPENDIX

APPENDIX TABLE 1. SELECTED INPUT PRICES, EXAMPLE FARM, LIMESTONE VALLEY AREAS

Input	Unit	Price
Seed:		
Cotton, acid delinted	pound	$ 0.18
Corn	pound	0.18
Grain sorghum	pound	0.16
Oats	bushel	1.50
Soybeans	bushel	4.00
Lespedeza, Kobe	pound	0.22
Orchard grass	pound	0.32
White clover	pound	0.70
Hairy vetch	pound	0.18
Crimson clover, common	pound	0.30
Millet	pound	0.15
Coastal bermuda sprigs	bushel	0.50
Fertilizer:		
4-12-12	ton	$ 41.00
0-20-20	ton	47.00
0-16-8	ton	32.00
33.5-0-0	ton	72.00
Pesticides:		
Insecticide, cotton	pound	$ 0.10
grain sorghum	pound	0.08
Pre-emergence chemical	gallon	20.00
Herbicidal oil	gallon	0.35
Phenothiazine	pound	0.70
2,4-D	pound	0.85
Feed and minerals:		
Cottonseed meal	hundredweight	$ 4.00
Meat and bone scraps (50%)	hundredweight	3.60
Soybean oil meal (44%)	hundredweight	2.90
Alfalfa leaf meal	hundredweight	4.10
Salt, loose	hundredweight	1.45
swine formula	hundredweight	1.65
block	hundredweight	2.00
Livestock:		
Feeder calves	hundredweight	$ 24.00*
Boar	head	100.00
Bull	head	600.00
Custom work:		
Picking cotton, machine	pound of lint	$ 0.06
Combining, oats	acre	6.00
soybeans	acre	7.00
grain sorghum	acre	6.00
Mowing, raking, bailing hay	ton	9.00
Ginning	bale	14.00
Shelling corn	bushel	0.10
Grinding and mixing concentrate	hundredweight	0.25
Mixing supplement	hundredweight	0.10
Hauling livestock	hundredweight	0.25
Liming (includes lime)	ton	9.40
Miscellaneous:		
Seasonal labor	hour	$ 0.60
Capital	dollar	0.06
Defoliant	pound	0.07
Stillbestrol (in feed)	head	0.75

* In price mapping, the price of feeders and the price of fat steers were always identical.

APPENDIX TABLE 2. AMOUNTS OF RESTRICTING RESOURCES AVAILABLE AND THE AMOUNTS OF THESE RESOURCES USED ANNUALLY PER UNIT OF EACH ENTERPRISE, EXAMPLE FARM, LIMESTONE VALLEY AREAS, 4-ROW EQUIPMENT

Restricting resource	Unit	Amount available	Enterprise									
			Conventional cotton	Skip-row cotton	Corn	Oats	Soybeans	Grain sorghum	Lespedeza hay	Beef calves (100 cows)	Steers* (50 head)	Hogs* (10 sows)
Open land	acre	160.0	1.00	2.00	1.00	1.00	1.00	1.00	1.00	228.50	48.90	5.00
Plowable land	acre	144.8	1.00	2.00	1.00	1.00	1.00	1.00	1.00	----	8.90	5.00
Row crop land	acre	111.0	1.00	2.00	1.00	----	1.00	1.00	----	----	8.90	2.50
Cotton allotment	acre	28.8	1.00	1.00	----	----	----	----	----	----	----	----
Operator labor:												
Dec., Jan., Feb.	hour	606.0	1.20	2.24	1.28	.40	.72	----	2.29	127.00	104.40	152.20
March	hour	239.0	.61	1.21	.40	----	.38	----	.91	30.00	36.90	46.80
April	hour	231.0	1.35	1.96	.64	----	.40	----	----	66.70	37.30	33.10
May	hour	266.0	1.15	2.13	.84	----	.93	.46	----	78.70	11.70	39.10
June	hour	257.0	.63	1.17	.12	1.00	.38	1.89	----	103.80	5.00	33.60
July	hour	257.0	1.40	2.24	----	----	.19	.83	----	90.00	54.30	72.30
August	hour	266.0	1.06	1.60	----	1.31	----	.15	1.20	138.00	110.10	55.60
September	hour	257.0	.67	1.00	.34	.61	.14	.07	----	52.30	51.70	52.60
October	hour	239.0	.76	1.14	.71	.28	.86	.51	----	47.90	53.00	34.20
November	hour	199.0	.77	1.21	.67	----	----	.49	----	67.70	20.20	33.10
Total	hour	2,817.0	9.60	15.90	5.00	3.60	4.00	4.40	4.40	802.10	484.60	552.60

* Does not include resources used for corn production.

APPENDIX TABLE 3. VARIABLE INPUTS PER ACRE FOR CROP ENTERPRISES, EXAMPLE FARM, 4-ROW EQUIPMENT, LIMESTONE VALLEY AREAS

Variable input	Unit	Enterprise						
		Conventional cotton	Skip-row cotton*	Corn	Oats	Soybeans	Grain sorghum	Lespedeza hay
Seed	lb.	16.0**	16.0**	7.0	80.0	60.0	5.0	35.0
Fertilizer: 4-12-12	cwt.	5.5	5.5	2.5	4.0	----	2.5	----
33.5-0-0	cwt.	1.4	1.4	2.5	1.5	----	1.5	----
0-20-20	cwt.	----	----	----	----	2.8	----	2.5
Lime	ton	.2	.2	.2	.2	.2	.2	.2
Pre-emergence chemical	gal.	.11	.11	----	----	----	----	----
Herbicidal oil	gal.	10.0	10.0	----	----	----	----	----
Insecticide	lb.	135.0	135.0	----	----	----	20.0	----
Defoliant	lb.	30.0	30.0	----	----	----	----	----
Seasonal labor	hour	3.0	3.0	2.3	.9	.4	.9	2.7
Tractor use	hour	9.6	15.9	6.4	2.6	3.0	3.4	2.1
Equipment operating expense	dol.	.91	1.51	1.60	.51	.49	.58	.25
Hauling	dol.	----	----	----	1.40	.62	1.12	1.20
Custom work (Including grinding)	dol.	58.52	87.78	----	6.00	7.00	6.00	18.00
Operating capital***	dol.	20.11	22.41	13.32	15.46	9.62	9.63	11.86

* Inputs listed are those required per acre of allotment. Two acres of row crop land are required per acre of allotment.

** Acid delinted.

*** Cost of each input item times fraction of year from time of purchase to harvest. Harvesting costs were not included in computing operating capital.

APPENDIX TABLE 4. VARIABLE INPUTS FOR LIVESTOCK ENTERPRISE, EXAMPLE FARM, 4-ROW EQUIPMENT, LIMESTONE VALLEY AREAS

Variable input	Unit	Enterprise		
		Beef calves (100 cows)	Steers (50 head)	Hogs (10 sows)
Pasture and hay	acre	228.5	40.0	5.0
Hay production	ton	160.0	20.0	----
Corn silage	acre	----	8.9	----
Corn fed	bu.	----	1,535.0	1,704.1
Protein supplement	cwt.	----	233.0	248.6
Salt	cwt.	22.8	25.5	5.2
Feed preparation	dol.	----	215.00	193.95
Veterinary expense	dol.	92.49	25.00	80.00
Hauling and marketing costs	dol.	428.38	56.25*	231.38
Livestock purchases	dol.	300.00	5,400.00	100.00
Operating capital	dol.	3,379.00	8,100.00	661.00
Investment capital	dol.	28,500.00	2,585.00	2,219.00
Investment costs other than interest**	dol.	492.59	316.08	278.01
Miscellaneous costs	dol.	255.78	212.44	19.92

* Includes only hauling feeders to farm. Fat steers are sold directly to packer buyer at the farm.

** Includes taxes, insurance, depreciation, and repair on livestock, livestock facilities, feed storage facilities, and fences.

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