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# Effects Of Policy Programs And Capital Availability On Red River Valley Farms

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# Effects of Policy Programs and Capital Availability on Red River Valley Farms

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The Red River Valley is predominantly a cash grain farming area. Therefore, federal wheat and feed grain policy programs greatly determine profitable resource use on Valley farms. In this study, effects of alternative farm programs, ranging from rigid controls with high diversion payments to no production restrictions, were analyzed.

But the uncertainty of future government farm programs is only part of the problem. Acre size of farm, associated machinery complement, and available capital for a given acre size must also be considered when adjusting farms to improve income.

Moreover, cash grain farming is associated with high and low seasonal demands on labor. Some Valley farmers have a cattle-feeding enterprise to absorb winter slack-season labor and to increase farm income. Others are considering this alternative.

To analyze these facets of organizing farms to improve income, effects of eight different policy programs were examined for two representative situations. Each representative farm had a different acre size and machinery complement. Each was analyzed at four capital levels besides that currently available; capital availabilities ranged from $20 to $200 per acre. So the analyses can be applied to many individual farm situations. A farmer, by following the analysis for the representative farm corresponding to his acre size, machinery set-up, and capital position, can obtain guidelines for planning his organization.

Finally, analyses of these representative farms provide data on the role and profitability of beef feeding in the Valley.

The general objective of this study was to provide information on organizing Red River Valley farms to improve income. Variables tested were effects of:

1. Different government wheat programs in combination with compliance or noncompliance in the 1964 Feed Grain Program.

2. Various capital availabilities per acre.

3. Different acre sizes of farms and various machinery complements.

Profit-maximizing plans were developed from alternative choices in crops and livestock.

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# The Procedures Used

## The Study Sample

This kind of study should be limited to a geographical area of similar soils and climate. Inferences then can be made from the sample to farms within the area because each has about the same crop production potential as related to soils and climate. Accordingly, a random sample of 148 farms on Fargo-Bearden soils of western Clay, Norman, and Polk Counties was selected.[1] Early in 1961, operators of these farms were interviewed concerning their 1960 farm organizations and resource availabilities. This information was used for developing the representative farm situations.

## Representative Farm Situations

Time and resources did not permit analysis of each sample farm. Instead, farm situations were constructed representing many farms with similar land, machinery, labor, and capital resources. Sample farms fell into two distinct groupings:

- **A cash grain farm** characterized by 12-foot seeding and pull-type harvesting equipment. In the study, this farm was identified as the typical cash grain farm because it was the most numerous type. Farms in this group averaged 300 crop acres, 60 acres of wheat allotment, and 90 acres of feed grain base. Profit-maximizing farm plans for typical cash grain farms were reported for a farm of this size.

- **A large cash grain-sugar beet farm** utilizing 14-foot seeding and self-propelled harvesting equipment. Farms in this group averaged 765 crop acres. This amount excluded about 300 acres of which half were in beets and half in summer fallow prior to being planted to beets the following year. Farms averaged 153 acres of wheat allotment and 230 acres of feed grain base. Profit-maximizing plans for large cash grain-beet farms were reported for a farm of this size.

Tables 1-3 describe these two representative farm situations. Sugar beets were assumed to be in all income-improving plans for the large cash grain-beet farm. So sugar beet and summer fallow acreages were subtracted from total crop acreage; labor and cash-operating expenses associated with this beet acreage were subtracted from labor and capital supplies. In short, resources committed to sugar beets were considered unavailable for other alternatives.

Since one study objective was to determine effects of capital availability, representative farms were analyzed with varying capital supplies

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[1] For other studies based on this sample, see: H. R. Jensen and T. H. France, *Costs and Adjustment Opportunities in Sugar Beet Production in the Red River Valley*, Agr. Econ. Series 523, July 1962; and L. C. Rixe and H. R. Jensen, *Cost Advantages to Size of Farm in Red River Valley Farming*, Univ. of Minn. Agr. Exp. Sta. Bull. 469, July 1963.

**Table 1. Power and machinery of representative farms***

| Machine | Typical cash grain farm | Large cash grain-beet farm |
|---|---|---|
| | size and/or type | |
| Tractor | Gas, wheel | Diesel wheel and crawler |
| Plow | 3-14 inch | 5-14 inch |
| Combine | 12-foot auxiliary motor | 14-foot self-propelled |
| Swather | 12-foot pull-type | 14-foot self-propelled |
| Grain drill | 12 foot with fertilizer attachment | 14 foot with fertilizer attachment |
| Field cultivator | 11½ foot | 14 foot |
| Disk | 18 foot | 18 foot |
| Harrow | 32 foot | 40 foot |
| Weed sprayer | 30 foot | 30 foot |
| Haymower | 7 foot | 7 foot |
| Hayrake | 10 foot | 10 foot |

* This is not a complete list of machinery available on these farms. However, these are the primary machines used for the crop alternatives considered. They represent sizes and types typically available on these farms.

**Table 2. Resource availabilities of representative farms**

| Resource | Unit | Typical cash grain farm | Large cash grain-beet farm* |
|---|---|---|---|
| Operator and family labor: | | | |
| January-February-March | Man-hour | 300 | 360 |
| April-May | Man-hour | 576 | 875 |
| June-July | Man-hour | 610 | 648 |
| August | Man-hour | 360 | 549 |
| September-October | Man-hour | 630 | 641 |
| November-December | Man-hour | 320 | 295 |
| Cropland | Acre | 300 | 765 |
| Wheat allotment | Acre | 60 | 153 |
| Feed grain base | Acre | 90 | 230 |
| Cash account† | Dollar | 1,272 | 2,754 |
| Chattel credit† | Dollar | 1,452 | 3,366 |
| Real estate credit† | Dollar | 3,276 | 9,180 |

* These resources are net of those required for beets.

† These amounts are not representative of amounts actually available but reflect cash and credit available at the level of $20 per acre of cropland. In the analysis, capital per acre of cropland was varied at intervals up to $200 per cropland acre. Regardless of capital level, cash, chattel credit, and real estate credit were held in constant proportions. These proportions reflected those existing on farms making up the representative farm. On the typical cash grain farm the proportions were: cash, 21 percent; chattel credit, 24 percent; real estate credit, 55 percent. On the large cash grain-beet farm, they were 18, 22, and 60 percent, respectively.

**Table 3. Cash and credit assumed available to typical farms as capital was increased from $20 per acre to $200**

| Capital per acre of land | Typical cash grain farm | | | Large cash grain-beet farm | | |
|---|---|---|---|---|---|---|
| | Real estate mortgage credit | Chattel credit | Cash | Real estate mortgage credit | Chattel credit | Cash |
| | | | dollars | | | |
| 20 | 3,276 | 1,452 | 1,272 | 9,180 | 3,366 | 2,754 |
| 40 | 6,552 | 2,904 | 2,544 | 18,360 | 6,732 | 5,508 |
| 60 | 9,828 | 4,356 | 3,816 | 27,540 | 10,098 | 8,262 |
| 120 | 19,656 | 8,712 | 7,632 | 55,080 | 20,196 | 16,524 |
| 200 | 32,760 | 14,520 | 12,720 | 91,800 | 33,660 | 27,540 |

(see table 3). For the typical cash grain farm, $20 of capital per acre meant that $6,000 of capital (cash plus credit) were available (300 acres x $20).[2] This amount was distributed among cash, real estate credit, and chattel credit in the same proportion as the average found on sample farms (see † footnote, table 2).

Cash represented cash or near-cash (stocks and bonds), plus the value of crops or other inventories held for sale, minus debt claims against these assets. Real estate credit represented 50 percent of the market value of land and buildings minus any existing real estate debts. Chattel credit represented 50 percent of the value of machinery and equipment minus any debts against these assets.

On farms used to construct the typical cash grain farm, actual capital available per acre varied from $2 to $145. On farms used to develop the large cash grain-beet farm, capital available per acre varied from $4 to $236.

## Crop and Beef-Feeding Alternatives

Wheat, oats, barley, flax, soybeans, and alfalfa were commonly grown in the study area. Wheat, oats, and barley were the major crops—in terms of number of farmers growing them and in percentage of farmland used by them. Flax declined in importance since World War II. But, according to the last U. S. Census of Agriculture, about 20 percent of the farmers in Polk, Norman, and Clay Counties grew flax. During the same period, soybeans increased greatly in importance. In 1959, 40 to 50 percent of the Norman and Clay County farmers reported growing soybeans.

Because of their high relative importance, wheat, oats, barley, flax, and soybeans were all possible choices in planning representative farms for maximum income. Flax was included because one study objective was to determine the farm organization and income effects of alternative federal programs. With restrictions on wheat and feed grain acres, flax became a feasible competitor for resources. Alfalfa was also included as a crop alternative, primarily because alfalfa hay was required in rations for the cattle-feeding systems considered. Furthermore, hay could be raised on some land diverted from other crops due to certain production control programs.

Corn was excluded as a crop alternative although its importance varied greatly between the northern and southern parts of the Valley. In Kittson County, less than 1 percent of the farmland was devoted to

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[2] As long as labor is not limiting or restrictive, any farmer in this area with power and machinery similar to that on the typical cash grain farm and with capital availability per acre ranging from $20 to $200 can calculate his optimal farm organization and income. For example, a farmer with $60 of capital per acre but with 400 acres of cropland would maximize profits with the same crops and/or livestock found on the 300-acre farm. The enterprises would simply be operated at 1.33 times the level at which they entered the optimal plan on the 300-acre farm; net cash income would be 1.33 times higher.

Computations can be made by operators of farms similar to the large cash grain-beet farm by referring to tables 19-26.

corn; in Traverse County, about 18 percent was in corn. However, in central Valley counties where the study sample was drawn, 5 percent or less of the farmland was in corn. Furthermore, barley—not corn—was used in rations for the livestock alternatives.

Although potatoes were commonly grown in the study area, they and other vegetable crops were not considered. These specialty crops, grown by relatively few farmers on a large scale, were of minor importance in terms of percentage of total farmland devoted to them. According to the last U. S. Census of Agriculture, the percentage of farmland used for potatoes was below 1 percent in all Valley counties except Polk and Clay which listed about 2 percent.

Since Valley crops were often grown in rotation with fallow, legume fallow was a study alternative. Participation in certain control and diversion programs required acreage in soil-conserving uses. For example, representative farms had the choice (limited somewhat by farm policy programs) of: (1) growing wheat following legume fallow, (2) growing wheat without legume fallow, or (3) growing some wheat with and some without fallow. Similar choices were provided for oats, barley, and flax. Yield-increasing effects of legume fallow on grain yields were assumed to be dissipated with the 2nd year after legume fallow.

In addition to these crop choices, barley could be harvested either as dry barley by conventional methods (swathing and combining) or as high-moisture barley by direct combining. Harvesting methods were assumed to affect barley yields. On a dry matter basis, Crookston experiments showed that 1.17 bushels of high-moisture barley were harvested for each bushel of dry barley. Therefore, if barley was harvested as high-moisture barley, the barley yields of 47, 45, and 44 bushels, shown in table 4, would be 1.17 times higher or about 55, 53, and 52 bushels, respectively. This difference was due to field losses (shattering) in dry barley harvesting.

Expected yields for crop alternatives in planning representative farms, along with inputs deemed necessary to obtain these yields, are summarized in table 4.[3] Table 5 summarizes out-of-pocket production costs and labor requirements for these crop alternatives.

One study objective was to determine the role and relative profitability of beef feeding. Therefore, representative farms were analyzed with this alternative if it was the most profitable use of resources.[4] Since barley was the main feed grain in this area, all feeding systems considered included barley. These beef-feeding alternatives and the input-output requirements for them were based on University experiments at Crookston (see tables 6-8). In these experiments, four feeding systems or rations were observed; all were considered as study choices.

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[3] These data were developed by soils and agronomy specialists. The authors are especially grateful to Merle V. Halverson, extension soils specialist; Harley J. Otto, extension agronomist; and William F. Hueg, Jr., assistant director, Agricultural Experiment Station, University of Minnesota.

[4] In addition to being used in crop and beef-feeding enterprises, capital could be invested in savings if this alternative was most profitable.

**Table 4. Yield estimates with assumed production practices on representative farms**

| Crop | Yield per acre | Recommended rate of fertilizer application: N | $P_2O_5$ | $K_2O$ | Weed Control: Chemical | Weed Control: Method | Insect Control: Chemical | Insect Control: Method | Seeding rate |
|---|---|---|---|---|---|---|---|---|---|
| | bushels | pounds nutrients per acre | | | | | | | |
| Wheat* | 36 | 8 | 30 | 0 | 2,4-D and Amine | Sprayer | —— | —— | 90 lb. |
| Wheat† | 35 | 30 | 30 | 0 | Amine | Sprayer | —— | —— | 90 lb. |
| Wheat‡ | 34 | 50 | 30 | 0 | Amine | Sprayer | —— | —— | 90 lb. |
| Oats* | 80 | 8 | 30 | 0 | MCPA | Sprayer | —— | —— | 72 lb. |
| Oats† | 78 | 25 | 30 | 0 | MCPA | Sprayer | —— | —— | 72 lb. |
| Oats‡ | 75 | 45 | 30 | 0 | MCPA | Sprayer | Aldrin | Mixed with seed | 72 lb. |
| Barley* | 47 | 8 | 30 | 0 | 2,4-D and Amine | Sprayer | —— | —— | 84 lb. |
| Barley† | 45 | 25 | 30 | 0 | Amine | Sprayer | —— | —— | 84 lb. |
| Barley‡ | 44 | 45 | 30 | 0 | Amine | Sprayer | —— | —— | 84 lb. |
| Flax* | 16 | 0 | 15 | 0 | MCPA and Dalapon§ | Sprayer | —— | —— | 50 lb. |
| Flax† | 15 | 15 | 15 | 0 | MCPA and Dalapon§ | Sprayer | —— | —— | 50 lb. |
| Flax‡ | 15 | 35 | 15 | 0 | MCPA and Dalapon§ | Sprayer | —— | —— | 50 lb. |
| Soybeans | 16 | 0 | 30 | 0 | Amiben | Planter | —— | —— | 1 bu. |
| Alfalfa: | | | | | | | | | |
| (1st year) | 0 | — | — | — | 2,4-D and Dalapon | Preplant or spray | —— | —— | 9 lb. |
| (each succeeding year) | 3.5 | 0 | 68 | 0 | —— | —— | Methoxychlor | Spray | — |

* First year following legume fallow.

† Second year following legume fallow.

‡ Without fallow.

§ Also DATC (Avadex) for control of wild oats.

**Table 5. Resources used for crop production, per acre, on representative farms**

| Resource | Wheat* | Wheat† | Wheat‡ | Oats* | Oats† | Oats‡ | Barley* | Barley† | Barley‡ |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | dollars | | | | |
| Seed | 4.15 | 4.15 | 4.15 | 4.50 | 4.50 | 4.50 | 4.37 | 4.37 | 4.37 |
| Fertilizer | 3.64 | 6.39 | 8.89 | 3.64 | 5.76 | 8.26 | 3.64 | 5.76 | 8.26 |
| Weed control | 0.55 | 0.55 | 0.55 | 0.85 | 0.85 | 0.85 | 0.55 | 0.55 | 0.55 |
| Seed treatment—insecticides | 0.40 | 0.40 | 0.40 | 0.40 | 0.40 | 0.40 | 0.40 | 0.40 | 0.40 |
| Fuel and repair§ | 2.02-1.97 | 3.24-3.61 | 3.24-3.61 | 2.02-1.97 | 3.24-3.61 | 3.24-3.61 | 2.02-1.97 | 3.24-3.61 | 3.24-3.61 |
| | | | | | hours | | | | |
| Labor required§ | 1.11-.76 | 2.07-1.56 | 2.07-1.56 | 1.11-.76 | 2.07-1.56 | 2.07-1.56 | 1.11-.76 | 2.07-1.56 | 2.07-1.56 |

| Resource | Flax* | Flax† | Flax‡ | Soybeans | High-moisture barley* | High-moisture barley† | High-moisture barley‡ | Alfalfa (1st year) | Alfalfa (subsequent years) | Legume fallow |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | dollars | | | | | |
| Seed | 3.70 | 3.70 | 3.70 | 4.00 | 4.37 | 4.37 | 4.37 | 6.30 | ... | 1.12 |
| Fertilizer | 1.32 | 3.19 | 5.69 | 0.26 | 3.64 | 5.76 | 8.26 | ... | 5.98 | ... |
| Weed control | 5.50 | 5.50 | 5.50 | 5.00 | 0.55 | 0.55 | 0.55 | 3.50 | ... | ... |
| Seed treatment—insecticides | ... | ... | ... | ... | 0.40 | 0.40 | 0.40 | ... | 2.00 | ... |
| Fuel and repair§ | 2.08-2.03 | 3.30-3.65 | 3.30-3.65 | 3.00-2.83 | 2.02-1.97 | 3.24-3.61 | 3.24-3.61 | 2.62-2.67 | 7.67-7.95 | 2.40-2.77 |
| | | | | | hours | | | | | |
| Labor required§ | 1.19-.81 | 2.14-1.59 | 2.14-1.59 | 2.06-1.68 | 1.01-.66 | 1.97-1.44 | 1.97-1.44 | 1.98-1.55 | 4.42 ... | 1.96 ... |

* First year following legume fallow.

† Second year following legume fallow.

‡ Without fallow.

§ The first figure in each row represents the amount of these resources used with the power and machinery of the typical cash grain farm while the second figure represents the amounts used on the large cash grain-beet farm. When only one figure appears, the amount used was the same for both farms.

**Table 6. Weights, grades, and feeding periods for alternative yearling steer-feeding systems on representative farms**

| | Feeding system | | | |
|---|---|---|---|---|
| Characteristics of steer | Rolled dry barley with supplement | Rolled dry barley without supplement | Rolled high-moisture barley with supplement | Rolled high-moisture barley without supplement |
| Initial weight (pounds) | 784 | 784 | 784 | 784 |
| Initial grade | Medium | Medium | Medium | Medium |
| Gain in weight (pounds) | 349 | 377 | 388 | 363 |
| Final weight (pounds) | 1,133 | 1,161 | 1,172 | 1,147 |
| Final grade | Good | Good | Good | Good |
| Feeding period (days) | 155 | 155 | 155 | 155 |
| Dates of feeding period— | | | | |
| beginning | October 26 | October 26 | October 26 | October 26 |
| end | March 30 | March 30 | March 30 | March 30 |

**Table 7. Feed requirements for yearling feeder steers, per head, per feeding period, on representative farms***

| Feed | Feeding system: Rolled dry barley with supplement | Rolled dry barley without supplement | Rolled high-moisture barley with supplement | Rolled high-moisture barley without supplement |
|---|---|---|---|---|
| | pounds | | | |
| Barley† | 2,426 | 2,477 | 2,541 | 2,461 |
| Alfalfa hay | 345 | 724 | 438 | 799 |
| Supplement | 101 | ........ | 101 | . |
| Minerals | 4.9 | 7.0 | 7.0 | 7.0 |
| Salt | 1.4 | 0.7 | 1.9 | 2.2 |

* Data are from feeding trials, Northwest Experiment Station, Crookston, October 1960-March 1962. Figures are on a dry matter basis.

† In this study, beet pulp could replace up to approximately 25 percent of the barley in the ration, if this substitution was profitable.

**Table 8. Labor and other resource requirements for yearling feeder steers, per head, per feeding period, on representative farms**

| Resource requirements | Feeding system: Rolled dry barley with supplement | Rolled dry barley without supplement | Rolled high-moisture barley with supplement | Rolled high-moisture barley without supplement |
|---|---|---|---|---|
| | dollars | | | |
| Barley supplement | 2.05 | ........ | 2.05 | ........ |
| Buildings and equipment* | | | | |
| Depreciation, insurance, taxes | 6.14 | 5.88 | 9.46 | 9.29 |
| Miscellaneous | 5.56 | 5.56 | 5.56 | 5.56 |
| Machinery and equipment for cleaning | 1.59 | 1.59 | 1.59 | 1.59 |
| Bedding | 0.65 | 0.65 | 0.65 | 0.65 |
| Trucking and marketing | 5.80 | 5.65 | 5.85 | 5.70 |
| Stilbestrol, etc. | 0.48 | 0.48 | 0.48 | 0.48 |
| | hours | | | |
| Labor | 5.79 | 5.79 | 5.96 | 5.96 |

* Includes grain storage and beef housing.

Yearling feeder steers, weighing 784 pounds and grading "medium," were bought in October, fed for 155 days, and sold the following March grading "good." The four alternative feeding rations were: (1) rolled dry barley with supplement, (2) rolled dry barley without supplement, (3) rolled high-moisture barley with supplement, and (4) rolled high-moisture barley without supplement. It was assumed that beet pulp could replace up to 25 percent of the barley ration if this substitution was profitable.

Annual building and equipment costs for steers fed high-moisture barley were higher than for steers fed dry barley because of differences in storage costs (see table 8). High-moisture barley was stored in an oxygen-free steel silo; dry barley was stored in a conventional grain bin. Beef housing and equipment and grain storage structures were depreciated out over 15 years. Insurance and taxes on these assets were charged at 1.7 percent of the average investment.

## Prices for Planning

Currently, the general direction of future farm policy is unknown. Therefore, effects of various farm policy programs on farm organization and income had to be tested. Alternative programs considered ranged from rigid acreage and marketing controls with relatively high diversion payments to no production restrictions. Wheat programs considered were similar to the 1963 Wheat Program and the 1964 "Yes" and "No" Vote Wheat Programs in the 1963 wheat referendum. The feed grain program was similar to the 1964 Feed Grain Program. The specific combinations of wheat and feed grain programs used in this analysis were:

| Model[5] | Wheat Program | 1964 Feed Grain Program |
|---|---|---|
| A | Compliance (1963 Program) | Compliance |
| B | Compliance (1963 Program) | Noncompliance |
| C | Compliance (1964 "Yes" Vote) | Compliance |
| D | Compliance (1964 "Yes" Vote) | Noncompliance |
| E | Compliance (1964 "No" Vote) | Compliance |
| F | Compliance (1964 "No" Vote) | Noncompliance |
| G | Noncompliance (1964 "No" Vote) | Compliance |
| H | No wheat program | No feed grain program |

Price projections for each policy program or combination of programs were developed. The objective was to arrive at a set of price relationships that could be expected to exist, for a few years at least, following enactment of farm policy programs considered for the 1964 crop year.

Since support prices for each alternative were known with virtual certainty, the major problem was to estimate prices that were not supported. Future nonsupport and market prices cannot be known for sure. Selling and buying prices used in this study are outlined in tables 9 and 10.

For oats, flax, and soybeans, 1962-63 support prices in the study area were used as their projected prices, irrespective of wheat and feed grain programs. Prices of these crops were expected to be influenced little, if at all, by these federal programs.

Of course, the projected wheat price varied with the wheat program. In each model involving compliance with a wheat program, at least minimum required participation was assumed. Consequently, projected

[5] Each Model letter designates a specific policy for wheat and feed grain production. In the following discussion, a particular policy program often will be identified simply by "Model" and the appropriate letter. For example, compliance with the 1963 Wheat Program and with the 1964 Feed Grain Program will be referred to as Model A.

**Table 9. Selling price projections used in the analysis***

| Farm policy program | Model | Price projections for: Wheat (bushel) | Barley† (bushel) | Oats (bushel) | Flax (bushel) | Soybeans (bushel) | Feeder steer (cwt.) | Fed steer (cwt.) |
|---|---|---|---|---|---|---|---|---|
| | | dollars | | | | | | |
| Compliance: 1963 Wheat and 1964 Feed Grain Programs | A | 1.92 | 0.77 | 0.55 | 2.86 | 2.12 | 22.11 | 23.00 |
| Compliance: 1963 Wheat Program; noncompliance: 1964 Feed Grain Program | B | 1.92 | 0.77 | 0.55 | 2.86 | 2.12 | 22.11 | 23.00 |
| Compliance: 1964 "Yes" Vote Wheat and 1964 Feed Grain Programs | C | 2.10‡<br>1.40 | 0.77 | 0.55 | 2.86 | 2.12 | 22.11 | 23.00 |
| Compliance: 1964 "Yes" Vote Wheat Program; noncompliance: 1964 Feed Grain Program | D | 2.10‡<br>1.40 | 0.77 | 0.55 | 2.86 | 2.12 | 22.11 | 23.00 |
| Compliance: 1964 "No" Vote Wheat and 1964 Feed Grain Programs | E | 1.40 | 0.77 | 0.55 | 2.86 | 2.12 | 21.21 | 22.10 |
| Compliance: 1964 "No" Vote Wheat Program; noncompliance: 1964 Feed Grain Program | F | 1.40 | 0.69 | 0.55 | 2.86 | 2.12 | 21.21 | 22.10 |
| Noncompliance: 1964 "No" Vote Wheat Program; compliance: 1964 Feed Grain Program | G | 1.28 | 0.77 | 0.55 | 2.86 | 2.12 | 21.21 | 22.10 |
| No wheat and feed grain programs | H | 1.28 | 0.69 | 0.55 | 2.86 | 2.12 | 21.21 | 22.10 |

* The buying price projection for feeder steers was included since the price of this input varies with the policy program.

† Only feeding quality barley was considered in this study so no price premiums for malting barley were included.

‡ The support price for wheat marketed under the National Marketing Allocation was $2.10; $1.40 was the expected price for wheat marketed in excess of this allocation. With the National Marketing Allocation representing 0.8 of the normal production of allotted acres, returns per acre were computed as follows: normal yield (30 bushels x 0.8 = 24 bushels x $2.10 + predicted yield (36 bushels) — 24 bushels x $1.40).

prices used for wheat produced in compliance with the 1963 Wheat Program and with the 1964 "Yes" and "No" Vote Programs were the support prices, including a premium of $0.10 per bushel for Valley wheat.

The $1.40 per bushel projected price for wheat under the 1964 "No" Vote Wheat Program may be high (Models E and F). Under this program, the price support (loan rate) was to have been set at 50 percent of parity for those producing within their allotment—10 percent less than the 1963 wheat allotment. A national loan rate of $1.30 per bushel was used in this study. To this amount, $0.10 per bushel were added as a quality premium for Valley wheat. Later figures suggested that the national loan rate should have been only $1.20.

Under noncompliance with the "No" Vote Wheat Program or without any wheat program (Models G and H), the wheat price was projected at $1.28 per bushel. This projection required great judgment since a no-program level of wheat price had to be estimated together with its effect on feed grain prices. Under no-wheat-program conditions, it was assumed that national wheat production would rise so that the wheat price would approach feed grain prices. Furthermore, it was assumed that corn prices would drop about 10 percent in the Valley—from $1.09 to $0.98. Pricing wheat at its feed value, considering $0.98 per bushel for corn, would make it worth about $1.08 per bushel. However, farmers probably would be reluctant to view wheat on a par with corn. So wheat would continue, at least for some time, to command a premium price of about $0.10. Moreover, since Valley farmers received a quality premium for wheat of about $0.10 per bushel, the projected price was set at $1.28.

The projected barley price was set at the loan rate of $0.77 per bushel in all instances involving participation in the 1964 Feed Grain

**Table 10. Buying price projections used in the analysis***

| Input | Unit | Price |
|---|---|---|
| Seed: | | dollars |
| Wheat | bushel | 2.77 |
| Barley | bushel | 2.50 |
| Oats | bushel | 2.00 |
| Flax | pound | 0.074 |
| Soybeans | bushel | 4.00 |
| Alfalfa | pound | 0.70 |
| Sweetclover | pound | 0.14 |
| Fertilizer: | | |
| N | pound | 0.125 |
| $P_2O_5$ | pound | 0.088 |
| Feed: | | |
| Beet pulp | ton | 30.00 |
| Supplement | ton | 74.00 |
| Gasoline | gallon | 0.193 |
| Diesel fuel | gallon | 0.156 |
| Labor, hired | hour | 1.25 |
| Chattel credit | percent | 7.0 |
| Real estate credit | percent | 4.0 |

* Unit prices of herbicides, seed treatment, and insecticides are not listed; the "cost per acre" appears in table 5.

Program because at least minimum participation was assumed. In addition, the barley price was projected at the same level in Models B and D. In these situations, wheat would not compete with feed grains as feed; noncompliance of Valley farmers with the 1964 Feed Grain Program would not add enough to feed grain supplies to bring the market price for barley below loan rate levels.

In Models F and H, the barley price was projected at $0.69. Under these conditions, no support price would be received for barley. Low wheat prices would bring wheat into competition with barley as feed and depress feed grain prices.

With the grain prices assumed to prevail under Models A through D, moderately favorable price expectations for beef seemed justified—approximating the average price level received during 1961 and 1962. On this basis, a selling price for fed steers of $23 per hundred pounds (cwt.) was used. A corresponding buying price for feeder steers was set at $22.11 per cwt. This latter price was based on an average differential of $0.89 (selling price above buying price) for short-fed yearlings, according to 1950-61 Minnesota farm record accounts.

Beef prices were projected at somewhat lower levels with grain prices assumed under the remaining program alternatives (table 9). In Models E through H, lower wheat and/or feed grain prices were assumed to encourage beef production and lower beef prices to a level existing in spring 1962. So the price of fed steers was projected at $22.10 per cwt.; with the $0.89 differential, feeder steer prices were projected at $21.21.

Projected prices for specified inputs required for the crop and livestock alternatives are listed in table 10. These projections, corresponding closely to current price levels, are reasonable expectations of the immediate future.

Of course, estimated incomes for representative farms under various farm policy programs were influenced not only by prices but also by diversion payments received for program participation. Information on these diversion payments is given in the appendix.

## Linear Programming

Once crop and beef-feeding alternatives, input-output data for these alternatives, prices, and resource and institutional restrictions were specified, the information was organized so that it could be analyzed by an electronic computer. The computer determined the most profitable ways to use available resources by a budgeting procedure called linear programming. "Most profitable" means highest income, net of cash expenses, including the annual cost of insurance, taxes, and depreciation on added investments in buildings and equipment. Depreciation, taxes, and insurance on existing investments are not included. Therefore, income figures given in this report represent the return to the farmer's fixed resources including labor, initial capital, and management.

# The Typical Cash Grain Farm

The main variables tested were effects of different government wheat and feed grain programs and available capital per acre on optimal farm organizations in the Red River Valley. Tables 11-18, presenting optimal plans, show that wheat program situations (including no program) and the farmer's capital availability strongly influenced income and organization. The feed grain program affected organization by controlling the beef enterprise which the farm could support with home-grown feeds. But its effect on income was negligible. Purchasing barley for cattle feeding was not permitted.

Wheat was a profitable crop. Mainly, wheat programs affected farm organization by limiting the amount of wheat grown to the maximum permissible under the program. Higher diversion payments than those offered in any program would have been necessary to make diversion beyond the minimum required profitable (see tables 13 and 14).

The same crops were in all optimal plans except Models G and H where no restrictions were on wheat. The crop and livestock organization can be summarized as follows: wheat following 1st year after legume fallow up to the maximum permitted by the wheat program; beef at least to the limit of real estate credit availability; enough barley to feed the beef; and oats on all remaining land except land in hay. Hay was raised to meet beef needs; fallowing occurred only to the extent required by participation in federal programs. The 1964 Feed Grain Program effec-

**Table 11. Annual incomes from profit-maximizing plans with participation in the 1964 Feed Grain Program and alternative wheat programs, typical cash grain farm**

| Wheat program | Available capital per acre | | | | |
|---|---|---|---|---|---|
| | $20 | $40 | $60 | $120 | $200 |
| | dollars | | | | |
| Model A Compliance: 1963 Wheat Program | 8,060 | 8,370 | 8,580 | 9,150 | 9,350 |
| Model C Compliance: 1964 "Yes" Vote | 7,710 | 8,030 | 8,230 | 8,800 | 9,020 |
| Model E Compliance: 1964 "No" Vote | 6,590 | 6,830 | 7,030 | 7,520 | 7,730 |
| Model G Noncompliance: 1964 "No" Vote | 6,750 | 6,980 | 7,180 | 7,610 | 7,820 |

**Table 12. Annual incomes from profit-maximizing plans with nonparticipation in the 1964 Feed Grain Program and participation in alternative wheat programs, typical cash grain farm**

| Wheat program | Available capital per acre | | | | |
|---|---|---|---|---|---|
| | $20 | $40 | $60 | $120 | $200 |
| | dollars | | | | |
| Model B Compliance: 1963 Wheat Program | 8,120 | 8,290 | 8,463 | 8,970 | 9,520 |
| Model D Compliance: 1964 "Yes" Vote | 7,780 | 7,950 | 8,120 | 8,630 | 9,162 |
| Model F Compliance: 1964 "No" Vote | 6,750 | 6,870 | 6,990 | 7,350 | 7,670 |
| Model H No wheat program | 7,700 | 7,778 | 7,831 | 7,986* | 8,189* |

* All available cash was not used in these instances. Some cash was invested in savings where it earned 4-percent interest.

**Table 13. Land use systems of profit-maximizing plans with participation in the 1964 Feed Grain Program and alternative wheat programs, typical cash grain farm**

| | Model A (compliance: 1963 Wheat Program) | | | | | Model C (compliance: 1964 "Yes" Vote) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Capital per acre: | | | | | Capital per acre: | | | | |
| Land use | $20 | $40 | $60 | $120 | $200 | $20 | $40 | $60 | $120 | $200 |
| | acres | | | | | | | | | |
| Wheat* | 48.0 | 48.0 | 48.0 | 48.0 | 48.0 | 54.0 | 54.0 | 54.0 | 54.0 | 54.0 |
| Wheat† | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... |
| Wheat‡ | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... |
| Total wheat | 48.0 | 48.0 | 48.0 | 48.0 | 48.0 | 54.0 | 54.0 | 54.0 | 54.0 | 54.0 |
| Oats* | ...... | 21.0 | 21.0 | ...... | ...... | 4.6 | 15.0 | 15.0 | ...... | ...... |
| Oats† | 96.0 | 75.0 | 75.0 | 77.6 | 77.6 | 91.4 | 69.0 | 69.0 | 72.0 | 72.0 |
| Oats‡ | ...... | ...... | ...... | 18.4 | 18.4 | ...... | 12.0 | 12.0 | 24.3 | 24.3 |
| Total oats | 96.0 | 96.0 | 96.0 | 96.0 | 96.0 | 96.0 | 96.0 | 96.0 | 96.3 | 96.3 |
| Dry barley* | 49.2 | 5.9 | 5.9 | ...... | ...... | 32.7 | ...... | ...... | ...... | ...... |
| Dry barley† | 1.2 | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... |
| Dry barley‡ | 3.6 | 66.1 | 66.1 | ...... | ...... | 21.3 | 72.0 | 72.0 | ...... | ...... |
| High-moisture barley* | ...... | ...... | ...... | 29.6 | 29.6 | ...... | ...... | ...... | 17.7 | 17.7 |
| High-moisture barley† | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... |
| High-moisture barley‡ | ...... | ...... | ...... | 42.4 | 42.4 | ...... | ...... | ...... | 54.3 | 54.3 |
| Total barley | 54.0 | 72.0 | 72.0 | 72.0 | 72.0 | 54.0 | 72.0 | 72.0 | 72.0 | 72.0 |
| Alfalfa | 4.8 | 9.0 | 9.0 | 6.4 | 6.4 | 4.6 | 9.0 | 9.0 | 6.3 | 6.3 |
| Diverted wheat base | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 |
| Diverted feed grain base | 36.0 | 18.0 | 18.0 | 18.0 | 18.0 | 36.0 | 18.0 | 18.0 | 18.0 | 18.0 |
| Total diversion | 48.0 | 30.0 | 30.0 | 30.0 | 30.0 | 42.0 | 24.0 | 24.0 | 24.0 | 24.0 |
| Legume fallow | 49.2 | 45.0 | 45.0 | 47.6 | 47.6 | 49.4 | 45.0 | 45.0 | 47.7 | 47.7 |

| | Model E (compliance: 1964 "No" Vote) | | | | | Model G (noncompliance: 1964 "No" Vote) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Capital per acre: | | | | | Capital per acre: | | | | |
| Land use | $20 | $40 | $60 | $120 | $200 | $20 | $40 | $60 | $120 | $200 |
| | acres | | | | | | | | | |
| Wheat* | 54.0 | 54.0 | 54.0 | 54.0 | 54.0 | 85.4 | 83.2 | 83.2 | 65.8 | 65.8 |
| Wheat† | ...... | ...... | ...... | ...... | ...... | 70.6 | 72.8 | 72.7 | 65.8 | 65.8 |
| Wheat‡ | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | 24.4 | 24.4 |
| Total wheat | 54.0 | 54.0 | 54.0 | 54.0 | 54.0 | 156.0 | 156.0 | 155.9 | 156.0 | 156.0 |
| Oats* | 4.7 | 7.0 | 7.0 | ...... | ...... | ...... | ...... | ...... | ...... | ...... |
| Oats† | 91.3 | 89.0 | 89.0 | 71.7 | 71.7 | ...... | ...... | ...... | ...... | ...... |
| Oats‡ | ...... | ...... | ...... | 24.3 | 24.3 | ...... | ...... | ...... | ...... | ...... |
| Total oats | 96.0 | 96.0 | 96.0 | 96.0 | 96.0 | ...... | ...... | ...... | ...... | ...... |
| Dry barley* | 32.7 | 28.0 | 28.0 | ...... | ...... | ...... | ...... | ...... | ...... | ...... |
| Dry barley† | ...... | ...... | ...... | ...... | ...... | 14.8 | 10.4 | 10.4 | ...... | ...... |
| Dry barley‡ | 21.3 | 26.0 | 26.0 | ...... | ...... | 39.2 | 43.6 | 43.6 | ...... | ...... |
| High-moisture barley* | ...... | ...... | ...... | 17.7 | 17.7 | ...... | ...... | ...... | ...... | ...... |
| High-moisture barley† | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... |
| High-moisture barley‡ | ...... | ...... | ...... | 54.3 | 54.3 | ...... | ...... | ...... | 72.0 | 72.0 |
| Total barley | 54.0 | 54.0 | 54.0 | 72.0 | 72.0 | 54.0 | 54.0 | 54.0 | 72.0 | 72.0 |
| Alfalfa | 4.7 | 7.0 | 7.0 | 6.3 | 6.3 | 4.6 | 6.8 | 6.8 | 6.2 | 6.2 |
| Diverted wheat base | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | ...... | ...... | ...... | ...... | ...... |
| Diverted feed grain base | 36.0 | 36.0 | 36.0 | 18.0 | 18.0 | 36.0 | 36.0 | 36.0 | 18.0 | 18.0 |
| Total diversion | 42.0 | 42.0 | 42.0 | 24.0 | 24.0 | 36.0 | 36.0 | 36.0 | 18.0 | 18.0 |
| Legume fallow | 49.3 | 47.0 | 47.0 | 47.0 | 47.7 | 49.4 | 47.2 | 47.2 | 47.8 | 47.8 |

* First year following legume fallow. † Second year following legume fallow. ‡ Without fallow.

**Table 14. Land use systems of profit-maximizing plans with nonparticipation in the 1964 Feed Grain Program and participation in alternative wheat programs, typical cash grain farm**

| | Model B (compliance: 1963 Wheat Program) | | | | | Model D (compliance: 1964 "Yes" Vote) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Capital per acre: | | | | | Capital per acre: | | | | |
| Land use | $20 | $40 | $60 | $120 | $200 | $20 | $40 | $60 | $120 | $200 |
| | acres | | | | | | | | | |
| Wheat* | 48.0 | 48.0 | 48.0 | 48.0 | 48.0 | 54.0 | 54.0 | 54.0 | 53.6 | 48.7 |
| Wheat† | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Wheat‡ | ... | ... | ... | ... | ... | ... | ... | ... | ... | 5.3 |
| Total wheat | 48.0 | 48.0 | 48.0 | 48.0 | 48.0 | 54.0 | 54.0 | 54.0 | 53.6 | 54.0 |
| Oats* | 15.2 | 0.5 | ... | ... | ... | 3.5 | ... | ... | 0.4 | ... |
| Oats† | 65.8 | 64.5 | 63.3 | 59.6 | 54.7 | 59.8 | 58.6 | 57.3 | 53.6 | 48.7 |
| Oats‡ | 102.5 | 104.9 | 92.4 | 53.0 | 0.7 | 120.4 | 111.0 | 97.9 | 58.5 | 6.6 |
| Total oats | 183.5 | 169.9 | 155.7 | 112.6 | 55.4 | 183.7 | 169.6 | 155.2 | 112.5 | 55.3 |
| Dry barley* | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Dry barley† | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Dry barley‡ | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| High-moisture barley* | 2.6 | 16.0 | 15.3 | 11.6 | 6.7 | ... | 4.6 | 3.3 | ... | ... |
| High-moisture barley† | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| High-moisture barley‡ | ... | ... | 15.0 | 61.9 | 123.9 | 2.2 | 11.8 | 27.5 | 73.9 | 130.6 |
| Total barley | 2.6 | 16.0 | 30.3 | 73.5 | 130.6 | 2.2 | 16.4 | 30.8 | 73.9 | 130.6 |
| Alfalfa | 0.2 | 1.5 | 2.7 | 6.4 | 11.3 | 0.2 | 1.4 | 2.7 | 6.4 | 11.3 |
| Diverted wheat base | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 |
| Diverted feed grain base | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Total diversion | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 |
| Legume fallow | 53.7 | 52.5 | 51.3 | 47.6 | 42.7 | 53.8 | 52.6 | 51.3 | 47.6 | 42.7 |

| | Model F (compliance: 1964 "No" Vote) | | | | | Model H (no wheat program) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Capital per acre: | | | | | Capital per acre: | | | | |
| Land use | $20 | $40 | $60 | $120 | $200 | $20 | $40 | $60 | $120 | $200 |
| | acres | | | | | | | | | |
| Wheat* | 54.0 | 54.0 | 54.0 | 53.5 | 48.4 | ... | ... | ... | ... | ... |
| Wheat† | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Wheat‡ | ... | ... | ... | 0.5 | 5.6 | 300 | 300 | 300 | 300 | 300 |
| Total wheat | 54.0 | 54.0 | 54.0 | 54.0 | 54.0 | 300 | 300 | 300 | 300 | 300 |
| Oats* | 3.5 | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Oats† | 59.8 | 58.5 | 57.2 | 53.5 | 48.4 | ... | ... | ... | ... | ... |
| Oats‡ | 120.4 | 110.6 | 97.2 | 56.7 | 3.6 | ... | ... | ... | ... | ... |
| Total oats | 183.7 | 169.1 | 154.4 | 110.2 | 52.0 | ... | ... | ... | ... | ... |
| Dry barley* | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Dry barley† | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Dry barley‡ | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| High-moisture barley* | 2.3 | 4.5 | 3.3 | ... | ... | ... | ... | ... | ... | ... |
| High-moisture barley† | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| High-moisture barley‡ | ... | 12.3 | 28.3 | 75.8 | 134.0 | ... | ... | ... | ... | ... |
| Total barley | 2.3 | 16.8 | 31.6 | 75.8 | 134.0 | ... | ... | ... | ... | ... |
| Alfalfa | 0.2 | 1.5 | 2.7 | 6.5 | 11.6 | ... | ... | ... | ... | ... |
| Diverted wheat base | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | ... | ... | ... | ... | ... |
| Diverted feed grain base | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Total diversion | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | ... | ... | ... | ... | ... |
| Legume fallow | 53.8 | 52.5 | 51.2 | 47.5 | 42.4 | ... | ... | ... | ... | ... |

* First year following legume fallow. † Second year following legume fallow. ‡ Without fallow.

tively limited the amount of barley grown and, therefore, the size of the beef operation.

## Participation in the 1964 Feed Grain Program

In Models A, C, and E, with restricted wheat acreage and feed grain program participation, farm organization did not change when capital per acre was increased above $120. At $120 of capital per acre, the beef enterprise was expanded to the maximum amount possible considering barley acreage restrictions (see table 15).

At low levels of capital per acre, beef on dry barley was in the optimal plan to the maximum permitted by capital or by barley acreage. Beef on dry barley had a lower capital requirement than beef on high-moisture barley. In these instances, some chattel credit was used in the beef enterprise. Therefore, the last steer entering optimal plans had to earn at least the chattel mortgage interest rate on the investment it required.

When the beef enterprise became limited by the dry barley acreage, it remained at that level when capital was added. The only change occurring was that real estate credit was substituted for more expensive chattel credit. When capital was sufficient for housing and equipping the entire beef enterprise with real estate credit, a switch to high-moisture barley feeding became profitable. Feed conversion and barley yields were more favorable with high-moisture barley, even though a larger investment per head was required.

This change started at $100 per acre and was completed at $120 per acre. With $120 per acre, the last beef animal entering optimal plans needed only to earn the real estate mortgage interest rate on the investment it required. When this switch was completed, the farm organization remained stable because the feed grain program prevented expansion of barley acreage.

In Models A, C, and E, if capital was available, beef was sufficiently profitable to keep the second 20 percent of the feed grain allotment (which could be put into barley) from being diverted. This situation was true except in two instances—at $40 and $60 levels of capital per acre in Model E. The beef price in Model E was lower than in Models A and C. But as long as steer feeding can be financed with low-cost real estate credit, it is probably more profitable to grow barley and feed beef than to divert the second 20 percent of the feed grain base.

Given restrictions on barley, approximately 80 head was the largest beef operation that could be supported in all cases. The difference in profit levels among Models A, C, and E resulted from differences in the acreage of wheat permitted, the level of wheat and feed grain diversion payments, and prices assumed for grains and beef under different program alternatives. Model A, participation in the 1963 Wheat and 1964 Feed Grain Programs, was the most profitable of the three. Model C, compliance with the 1964 "Yes" Vote Wheat Program and with the 1964 Feed Grain Program, was the next most profitable. But Model E, compliance with the 1964 "No" Vote Wheat Program and with the 1964

**Table 15. Number of feeder cattle fed under different beef-feeding systems in the profit-maximizing plans with participation in the 1964 Feed Grain Program and alternative wheat programs, typical cash grain farm**

| | Model A (compliance: 1963 Wheat Program) | | | | | Model C (compliance: 1964 "Yes" Vote) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Capital per acre: | | | | | Capital per acre: | | | | |
| Beef-feeding system | $20 | $40 | $60 | $120 | $200 | $20 | $40 | $60 | $120 | $200 |
| | number of feeder cattle | | | | | | | | | |
| Dry barley with supplement | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ |
| Dry barley without supplement | 37* | 70 | 70 | ........ | ........ | 36* | 70 | 70 | ........ | ........ |
| High-moisture barley with supplement | ........ | ........ | ........ | 82 | 82 | ........ | ........ | ........ | 81 | 80 |
| High-moisture barley without supplement | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ |
| | tons | | | | | | | | | |
| Beet pulp fed | 11.5 | 21.6 | 21.7 | 25.9 | 25.9 | 11.1 | 21.5 | 21.5 | 25.6 | 25.6 |

| | Model E (compliance: 1964 "No" Vote) | | | | | Model G (noncompliance: 1964 "No" Vote | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Capital per acre: | | | | | Capital per acre: | | | | |
| Beef-feeding system | $20 | $40 | $60 | $120 | $200 | $20 | $40 | $60 | $120 | $200 |
| | number of feeder cattle | | | | | | | | | |
| Dry barley with supplement | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ |
| Dry barley without supplement | 36* | 54 | 54 | ........ | ........ | 36* | 52 | 52 | ........ | ........ |
| High-moisture barley with supplement | ........ | ........ | ........ | 81 | 81 | ........ | ........ | ........ | 79 | 79 |
| High-moisture barley without supplement | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ |
| | tons | | | | | | | | | |
| Beet pulp fed | 11.1 | 16.7 | 16.7 | 25.6 | 25.6 | 11.0 | 16.2 | 16.2 | 25.2 | 25.2 |

* Capital was insufficient to feed all barley produced.

Feed Grain Program, was even less profitable than Model G (see table 11).

Model G required noncompliance with the 1964 "No" Vote Wheat Program and at least minimum compliance in the 1964 Feed Grain Program which meant a 20-percent diversion of the feed grain allotment. As in Model E, diverting the second 20 percent of the feed grain allotment was more profitable at low capital levels than using this acreage for barley to feed steers. At high capital levels, profits were maximized by diverting only the first 20 percent. However, since Model G contained no wheat restrictions, all acreage over that required for beef and feed grain production and diversion was used for wheat. Growing wheat for sale at $1.28 per bushel apparently was more profitable than growing barley and feeding out beef.

## Nonparticipation in the 1964 Feed Grain Program

Models B, D, and F contained government program restrictions on wheat acreage but nonparticipation in the 1964 Feed Grain Program. Therefore, the bonus payment on barley received for staying within allotments and diverting the first 20 percent was not paid. Since participators received this bonus whether barley was fed or sold, participation in the 1964 Feed Grain Program made growing and feeding barley to beef slightly more profitable than otherwise. So without this bonus, beef entered the optimal farm plan only to the extent that real estate credit could provide the investment. The high-moisture barley-fed beef evidently came in because barley yields and feed conversion rates were slightly more favorable than with dry barley (see table 16).

Since barley production was not restricted, the beef enterprise expanded correspondingly as more cash and real estate credit became available. The result was more barley and less oats in the cropping system. This expansion in beef feeding was profitable as long as there was cropland for barley, even when winter-season family labor was exhausted and hired labor had to be used. However, beef feeding was not profitable enough to displace wheat from the cropping system.

As with Models A, C, and E, differences in profit between Models B, D, and F were due to differences in wheat acreage, diversion payments on wheat, and grain and beef prices assumed for the program combinations. Model B, the 1963 Wheat Program, was most profitable; Model D, the 1964 "Yes" Vote Wheat Program, was next most profitable. But Model F, the 1964 "No" Vote Wheat Program, was even less profitable than Model H (see table 12).

In Model H, with no restrictions on either wheat or feed grain, profits were maximized by using all land for wheat without fallow. Even with a relatively low wheat yield and price, having all land in wheat resulted in higher farm income than growing wheat within 1964 "No" Vote Wheat Program restrictions; producing oats, barley, and alfalfa on the remaining land; and processing the barley and alfalfa through beef.

When comparing Models A, C, and E with B, D, and F, participation in the 1964 Feed Grain Program usually appeared slightly more

**Table 16. Number of feeder cattle fed under different beef-feeding systems in the profit-maximizing plans with nonparticipation in the 1964 Feed Grain Program and participation in alternative wheat programs, typical cash grain farm**

| | Model B (compliance: 1963 Wheat Program) | | | | | Model D (compliance: 1964 "Yes" Vote) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Capital per acre: | | | | | Capital per acre: | | | | |
| Beef-feeding system | $20 | $40 | $60 | $120 | $200 | $20 | $40 | $60 | $120 | $200 |
| | number of feeder cattle | | | | | | | | | |
| Dry barley with supplement | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ |
| Dry barley without supplement | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ |
| High-moisture barley with supplement | 3 | 19 | 35 | 82 | 144 | 3 | 18 | 34 | 81 | 144 |
| High-moisture barley without supplement | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ |
| | tons | | | | | | | | | |
| Beet pulp fed | 1.0 | 6.0 | 11.0 | 26.0 | 45.9 | 0.8 | 5.8 | 10.9 | 25.9 | 45.7 |

| | Model F (compliance: 1964 "No" Vote) | | | | | Model H (no wheat program) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Capital per acre: | | | | | Capital per acre: | | | | |
| Beef-feeding system | $20 | $40 | $60 | $120 | $200 | $20 | $40 | $60 | $120 | $200 |
| | number of feeder cattle | | | | | | | | | |
| Dry barley with supplement | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ |
| Dry barley without supplement | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ |
| High-moisture barley with supplement | 3 | 19 | 35 | 84 | 148 | ........ | ........ | ........ | ........ | ........ |
| High-moisture barley without supplement | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ |
| | tons | | | | | | | | | |
| Beet pulp fed | 0.9 | 6.0 | 11.1 | 26.5 | 46.9 | ........ | ........ | ........ | ........ | ........ |

**Table 17. Borrowed capital and hired labor needed to operate the profit-maximizing plans with participation in the 1964 Feed Grain Program and alternative wheat programs, typical cash grain farm**

| | Model A (compliance: 1963 Wheat Program) | | | | | Model C (compliance: 1964 "Yes" Vote) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Capital per acre: | | | | | Capital per acre: | | | | |
| Resource use | $20 | $40 | $60 | $120 | $200 | $20 | $40 | $60 | $120 | $200 |
| | dollars | | | | | | | | | |
| Real estate credit used | 4,428 | 8,721 | 11,997 | 23,203 | 17,903 | 4,386 | 8,709 | 11,985 | 23,015 | 17,715 |
| Chattel credit used | 8,246 | 12,774 | 8,025 | ... | ... | 7,993 | 12,790 | 8,041 | ... | ... |
| Total credit used | 12,674 | 21,495 | 20,022 | 23,203 | 17,903 | 12,379 | 21,499 | 20,026 | 23,015 | 17,715 |
| Real estate credit not used | ... | ... | ... | 494 | 18,902 | ... | ... | ... | 638 | 19,046 |
| Chattel credit not used | ... | 2,914 | 9,116 | 23,600 | 29,408 | ... | 2,827 | 9,029 | 23,437 | 29,245 |
| | hours | | | | | | | | | |
| Labor hired: | | | | | | | | | | |
| January-March | — | — | — | — | — | — | — | — | — | — |
| April-May | — | — | — | — | — | — | — | — | — | — |
| June-July | — | — | — | — | — | — | — | — | — | — |
| August | — | — | — | — | — | — | — | — | — | — |
| September-October | — | — | — | — | — | — | — | — | — | — |
| November-December | — | — | — | — | — | — | — | — | — | — |

| | Model E (compliance: 1964 "No" Vote) | | | | | Model G (noncompliance: 1964 "No" Vote) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Capital per acre: | | | | | Capital per acre: | | | | |
| Resource use | $20 | $40 | $60 | $120 | $200 | $20 | $40 | $60 | $120 | $200 |
| | dollars | | | | | | | | | |
| Real estate credit used | 4,392 | 8,226 | 11,502 | 22,422 | 17,122 | 4,382 | 8,177 | 11,453 | 22,074 | 16,774 |
| Chattel credit used | 7,779 | 7,760 | 3,011 | ... | ... | 7,720 | 7,373 | 2,623 | ... | ... |
| Total credit used | 12,171 | 15,986 | 14,513 | 22,422 | 17,122 | 12,102 | 15,550 | 14,076 | 22,074 | 16,774 |
| Real estate credit not used | ... | ... | ... | 1,231 | 19,639 | ... | ... | ... | 1,513 | 19,921 |
| Chattel credit not used | ... | 4,635 | 10,836 | 22,868 | 28,676 | ... | 4,739 | 10,550 | 22,635 | 28,443 |
| | hours | | | | | | | | | |
| Labor hired: | | | | | | | | | | |
| January-March | — | — | — | — | — | — | — | — | — | — |
| April-May | — | — | — | — | — | — | — | — | — | — |
| June-July | — | — | — | — | — | — | — | — | — | — |
| August | — | — | — | — | — | — | — | — | — | — |
| September-October | — | — | — | — | — | — | — | — | — | — |
| November-December | — | — | — | — | — | — | — | — | — | — |

**Table 18. Borrowed capital and hired labor needed to operate the profit-maximizing plans with nonparticipation in the 1964 Feed Grain Program and participation in alternative wheat programs, typical cash grain farm**

| Resource use | Model B (compliance: 1963 Wheat Program) | | | | | Model D (compliance: 1964 "Yes" Vote) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Capital per acre: | | | | | Capital per acre: | | | | |
| | $20 | $40 | $60 | $120 | $200 | $20 | $40 | $60 | $120 | $200 |
| | dollars | | | | | | | | | |
| Real estate credit used | 3,428 | 7,485 | 11,543 | 23,711 | 39,923 | 3,408 | 7,465 | 11,523 | 23,691 | 39,901 |
| Chattel credit used | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Total credit used | 3,428 | 7,485 | 11,543 | 23,711 | 39,923 | 3,408 | 7,465 | 11,523 | 23,691 | 39,901 |
| Real estate credit not used | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Chattel credit not used | 2,010 | 6,339 | 10,667 | 23,650 | 40,884 | 1,937 | 6,266 | 10,594 | 23,577 | 40,801 |
| | hours | | | | | | | | | |
| Labor hired: | | | | | | | | | | |
| January-March | — | — | — | — | 102 | — | — | — | — | 100 |
| April-May | — | — | — | — | — | — | — | — | — | — |
| June-July | — | — | — | — | — | — | — | — | — | — |
| August | — | — | — | — | — | — | — | — | — | — |
| September-October | — | — | — | — | — | — | — | — | — | — |
| November-December | — | — | — | — | — | — | — | — | — | — |

| Resource use | Model F (compliance: 1964 "No" Vote) | | | | | Model H (no wheat program) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Capital per acre: | | | | | Capital per acre: | | | | |
| | $20 | $40 | $60 | $120 | $200 | $20 | $40 | $60 | $120 | $200 |
| | dollars | | | | | | | | | |
| Real estate credit used | 3,411 | 7,489 | 11,567 | 23,795 | 40,082 | 3,276 | 2,734 | 1,409 | ... | ... |
| Chattel credit used | ... | ... | ... | ... | ... | 808 | ... | ... | ... | ... |
| Total credit used | 3,411 | 7,489 | 11,567 | 23,795 | 40,082 | 4,084 | 2,734 | 1,409 | ... | ... |
| Real estate credit not used | ... | ... | ... | ... | ... | ... | 3,818 | 8,419 | 19,652 | 32,760 |
| Chattel credit not used | 1,930 | 6,219 | 10,508 | 23,371 | 40,429 | 643 | 2,904 | 4,356 | 8,712 | 14,520 |
| | hours | | | | | | | | | |
| Labor hired: | | | | | | | | | | |
| January-March | — | — | — | — | 111 | — | — | — | — | — |
| April-May | — | — | — | — | — | — | — | — | — | — |
| June-July | — | — | — | — | — | — | — | — | — | — |
| August | — | — | — | — | — | — | — | — | — | — |
| September-October | — | — | — | — | — | — | — | — | — | — |
| November-December | — | — | — | — | — | — | — | — | — | — |

profitable than nonparticipation. However, the difference was undoubtedly insignificant, considering the reliability of the data available. Similarly, the significance of the difference in profit levels among Models A, B, C, and D is questionable. Nevertheless, those four models as a group were clearly more profitable than Models E and F. But profits from the latter two corresponded closely to those under Model D.

In other words, incomes on optimally organized Valley farms would be about the same with either the 1963 Wheat Program or the 1964 "Yes" Vote Program, regardless of participation in the 1964 Feed Grain Program. Furthermore, these farmers could achieve about the same income with no wheat or feed grain programs. Of course, these statements are only valid with regard to yields and prices assumed in the analysis, including $1.28 per bushel for wheat in the absence of any wheat program.

## Profitability of the Beef Enterprise

One major study objective was to evaluate the profitability of beef feeding for utilizing winter labor. Beef fed high-moisture barley figured prominently in most optimal plans. However, use of Model B (compliance: 1963 Wheat Program; noncompliance: 1964 Feed Grain Program) at $100 capital per acre as a test case showed that profits were not extremely sensitive to the beef-feeding method employed. When beef fed high-moisture barley and supplement was eliminated as an alternative, beef fed dry barley without supplement came in at a slightly higher level (74 as compared with 66). Total profits decreased about $25; credit use decreased about $1,000. The cropping pattern was similar in the two plans.

When beef fed dry barley without supplement also was eliminated as an alternative, beef fed high-moisture barley without supplement came in at nearly the same level (66 as compared with 74). This change decreased total profits about another $200 and increased credit requirements about $1,000. When beef fed high-moisture barley without supplement also was eliminated, beef fed dry barley and supplement came into the optimal plan to a level of about 10 head. This alternative was profitable in the optimal plan only when using available cash—not credit. Although this change decreased total profits by another $270, it eliminated the use of credit. Nearly $20,000 of credit were used in all previous instances.

When all beef alternatives were eliminated, total profits decreased another $5. The crop plan consisted of: fallow, wheat to the maximum permissible, and oats on the remaining land. In short, the most profitable beef plan contributed only about $500 to total profits compared with the situation where all beef alternatives were eliminated. This beef enterprise required $20,000 credit. Due to its relatively small profit and economic uncertainty, beef feeding seems to be a marginal enterprise at best.

For a clearer picture of the profitability of beef feeding, beef fed high-moisture barley with supplement was programmed at varying prices; other beef-feeding alternatives were eliminated. Changes in the value of the feeder which probably would accompany changes in the beef price could not be reflected. Net cash returns per steer fed high-moisture barley and supplement varied from $50 to $90 (selling prices from $21.24 cwt. to $24.66 per cwt.). Net cash returns per steer for this alternative in the basic analysis were $70.68 (selling price of $23).

With a return of $62.60 (selling price of $22.32), beef entered the optimal plan, but only to the limit of available cash. When the return reached $63.20 (selling price of $22.37), mortgaging real estate to expand the beef enterprise became profitable. When the return rose to $72.60 (selling price of $23.17), mortgaging chattels to expand beef feeding became profitable up to limits of family labor. At a $76.40 return (selling price of $23.50), hiring labor was profitable in January-March to continue expansion. And at a return of $79.50 (selling price of $23.76), hiring labor was profitable in November-March.

When this last plan was followed, beef could be expanded until all cropland except the wheat acreage was in barley. No further program changes occurred as revenue increased. Even with a beef return of $90 (selling price of $24.66), keeping all possible land in wheat was still more profitable than switching to barley.

In all plans with beef enterprises, substituting beet pulp for barley in the ration was profitable. This substitution permitted growing less barley or keeping more beef when barley was limited. To test its profitability, the alternative of substituting beet pulp for barley was eliminated in Model B at $100 capital per acre. The optimal plan was similar to the optimal plan in the basic analysis where this alternative was considered, except that it contained more barley and less oats. About $75 in income were sacrificed.

## The Crop Program

As noted, the same crops were in all optimal plans involving participation in any of the alternative wheat programs regardless of compliance in the 1964 Feed Grain Program (Models A through F) (see tables 13 and 14). However, the acreage of each crop in each optimal plan varied, especially for oats and barley. The cropping system was determined primarily by the government programs involved and the capital available per acre (acting through the beef enterprise). Oats were raised on all land not permitted for wheat and not used for hay or barley for the beef enterprise.

For Model B (compliance: 1963 Wheat Program; noncompliance: 1964 Feed Grain Program) with $100 capital per acre, tests were run with oats eliminated and then with oats and flax eliminated to determine the effect on income of growing other crops. When oats were eliminated, flax came into the optimal plan at almost the same level formerly held by oats. The livestock enterprise was almost unchanged; a few beef fed dry barley were substituted for a few fed high-moisture barley. Income was reduced $150.

When oats and flax were both eliminated, barley entered the optimal plan on all land which could not be used for wheat. All this barley was

Swathing—the start of harvest

fed to beef cattle, substantially increasing the beef enterprise and the use of credit. So feeding beef was more profitable than selling barley at $0.77 per bushel. Labor in January-March had to be hired for the beef operation. A $538 sacrifice in income resulted.

Soybeans (like flax) did not enter any optimal solution in the basic analysis. But the soybean price was varied under Model B at $100 capital per acre to test its competitive position. This test indicated that a net cash return of $23.66 per acre would bring soybeans into the optimal plan. This amount was $2 over the net cash return for soybeans in the basic analysis. At that value, soybeans displaced oats without fallow. At a net cash reurn of $24.42 per acre, soybeans came in on all land without fallow. The analytical model prevented soybeans from coming in on land following fallow or 2nd year after fallow.

Another interesting feature of the cropping system was that, in all instances, only the amount of fallow land required by government program participation entered the optimal plan. The difference in net cash returns per acre, with and without fallow, did not bring more than the required fallow acreage into the optimal or highest profit plan. When the fallow requirement was relaxed, as under Model H (no wheat or feed grain program), no fallow was in the plan. This result was due partly to the analytical procedure and the assumptions underlying it. It was assumed that after 2 crop years, no further residual effect of fallowing would be left for crops. So in the analysis, fallowing crops, the year following fallow, and the 2nd year following fallow were all interconnected; crops without fallow were separate enterprises. In the absence of any fallow requirement, the optimal rotation tended not to include any fallow or to be one of fallow-crop-crop.

If cost and return assumptions underlying this analysis are correct, and if 3rd year effects of fallow are indeed negligible, then the optimal rotation would be without fallow.

Some tests were made with reduced net cash returns per acre of without-fallow crop alternatives. These tests indicated that a 15- to 20-

percent decrease in these net cash returns was needed to bring fallowing into the optimal solution above amounts required by government programs.

## Effects of Government Programs

All models, except G and H, involved participation in some wheat program that limited wheat acreage. Model G assumed participation in the 1964 Feed Grain Program and noncompliance with the "No" Vote Wheat Program. In this model, beef cattle were raised to the limit of available real estate credit, the barley supply, or total capital—whichever became limiting first. Wheat was grown on all remaining land. As can be seen in Model H (no programs), fallowing was not used. The freed land was put into wheat, increasing incomes above those for Model G.

Model G was more profitable than Model F but less profitable than Models A, B, C, and D.

The second wheat diversion did not enter any optimal plan involving compliance with a wheat program. However, maximum diversion under the 1964 Feed Grain Program maximized profits at low capital-land ratios. The basic analysis did not provide that revenue from diversion alternatives could be used in crop and livestock production. Such a provision might have increased the attractiveness of diversion alternatives.

## Sensitivity to the Interest Rate

In the basic analysis, a 4-percent interest rate was charged on total real estate mortgaged for investment purposes. A 7-percent interest rate was charged on total chattels mortgaged for investment purposes. Furthermore, real estate or chattel cerdit capacity or cash had to sufficiently cover the full new cost of any investment made in permanent facilities (i.e., beef housing and feeding facilities) and 1 year's cash outlay for any crop and/or livestock enterprise in the optimal farm plan. However, investments generated some credit potential of their own.

The interest rate charged on credit affected the optimal program. Tests were run with Model B at $100 capital per acre to check the sensitivity of the farm plan to the interest rate. Test runs were made with interest rates of: (1) 5 percent on total real estate and 7 percent on total chattels, and (2) 6 percent on total real estate and 7.5 percent on total chattels.

The two tests produced organization plans essentially similar to the basic optimal plan. Of course, profits differed somewhat due to the different cost of capital inputs. Test results suggest that the critical point on interest comes somewhere between 6 and 7 percent. At a 6-percent rate, all real estate credit was used. But at a 7-percent rate on chattels in the basic analysis, little or none was used except at low capital-land ratios. Interest rates in the basic programming analysis represent a reasonably conservative restriction on credit use.

# The Large Cash Grain-Sugar Beet Farm

Analytical procedures used for this farm were similar to those used for the typical cash grain farm. Alternative government farm programs and varying amounts of capital per acre generally had the same effects on profit-maximizing organizations for both representative farms (see tables 19-26). Therefore, the following discussion focuses on the few specific differences in farm organization and income between the typical cash grain farm and the large cash grain-beet farm.

- Although income patterns evolving from different policy programs and amounts of capital per acre were similar for both representative farms, income levels for optimal plans on the larger farm were considerably higher. Profit-maximizing incomes ranged from $17,950 to $24,500 for the large cash grain-beet farm and from $6,590 to $9,520 for the typical cash grain farm. This difference reflects the quantities of resources available to each farm.

- In optimal plans for the large cash grain-beet farm, steers were fed out on high-moisture barley at all capital levels. On the typical cash grain farm, high-moisture barley-fed steers entered optimal plans only at high capital levels. This difference again reflects the greater capital supplies available on the large farm.

- In optimal plans with feed grain restrictions, profits on the large cash grain-beet farm were almost always maximized by diverting 40 percent of the feed grain base. In contrast, profits on the typical cash grain farm usually were maximized by diverting only 20 percent. This difference again reflects dissimilarity in available resources. On the larger farm, the feed grain base could provide enough barley for the optimal number of steers even with 40-percent diversion.

- On the large cash grain-beet farm, at capital levels of $40 or more per acre, beef fed high-moisture barley brought barley along with wheat without fallow into the optimal plans of Model H (no wheat and feed grain programs). In this situation, profits were maximized on the typical cash grain farm by completely specializing in wheat without fallow. In the analysis, net cash returns per acre of wheat without fallow were projected at slightly lower levels on the larger farm than on the typical farm.

This difference resulted because costs per acre were estimated somewhat higher—largely due to higher maintenance and repair costs on power and machinery. This small difference in net cash returns per acre placed beef fed high-moisture barley in a strong competitive position on the large cash grain-beet farm. This enterprise could draw some resources away from wheat without fallow as long as low-cost real estate credit was available. In the absence of any wheat or feed grain programs, the large cash grain-beet farm was optimally organized with wheat without fallow in combination with high-moisture barley fed to steers. But the typical cash grain farm was optimally organized with all resources devoted to wheat without fallow.

This difference in organization is not mentioned as a guide for planning. But it points up how sensitive farm organization can be to small variations in net cash returns per unit in crop and livestock production. Another example also illustrates this point. On the large cash grain-beet farm, when planned with any government wheat program but without any feed grain restrictions, soybeans entered optimal plans at the low level of capital availability—$20 per acre. On the typical cash grain farm, soybeans never entered optimal plans in these situations. Because of slightly lower estimated costs per acre (lower fuel and oil costs more than offset higher maintenance and repair costs), net cash returns per acre for soybeans were estimated at slightly higher levels on the large cash grain-beet farm. Consequently, at the low capital level, soybeans entered profit-maximizing plans.

The difference in income between farm plans including any or none of these marginal enterprises would be small. Conditions peculiar to individual farms would probably determine which, if any, enterprise should be included.

**Table 19. Annual incomes from profit-maximizing plans with participation in the 1964 Feed Grain Program and alternative wheat programs, large cash grain-beet farm**

| | Available capital per acre | | | | |
|---|---|---|---|---|---|
| Wheat program | $20 | $40 | $60 | $120 | $200 |
| | | | dollars | | |
| Model A Compliance: 1963 Wheat Program | 21,710 | 22,570 | 23,085 | 24,030 | 24,490 |
| Model C Compliance: 1964 "Yes" Vote | 20,700 | 21,575 | 22,080 | 23,050 | 23,510 |
| Model E Compliance: 1964 "No" Vote | 18,000 | 18,620 | 19,120 | 19,920 | 20,492 |
| Model G Noncompliance: 1964 "No" Vote | 18,540 | 19,130 | 19,630 | 20,395 | 20,855 |

**Table 20. Annual incomes from profit-maximizing plans with nonparticipation in the 1964 Feed Grain Program and participation in alternative wheat programs, large cash grain-beet farm**

| | Available capital per acre | | | | |
|---|---|---|---|---|---|
| Wheat program | $20 | $40 | $60 | $120 | $200 |
| | | | dollars | | |
| Model B Compliance: 1963 Wheat Program | 21,550 | 22,040 | 22,435 | 23,300 | 23,875 |
| Model D Compliance: 1964 "Yes" Vote | 20,620 | 21,120 | 21,515 | 22,390 | 22,945 |
| Model F Compliance: 1964 "No" Vote | 17,950 | 18,435 | 18,690 | 19,250 | 19,710 |
| Model H No wheat program | 19,320 | 19,525 | 19,680 | 20,070 | 20,530 |

**Table 21. Land use systems of profit-maximizing plans with participation in the 1964 Feed Grain Program and alternative wheat programs, large cash grain-beet farm**

| Land use | Model A (compliance: 1963 Wheat Program) | | | | | Model C (compliance: 1964 "Yes" Vote) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Capital per acre: | | | | | Capital per acre: | | | | |
| | $20 | $40 | $60 | $120 | $200 | $20 | $40 | $60 | $120 | $200 |
| | acres | | | | | | | | | |
| Wheat* | 122.0 | 119.0 | 122.0 | 122.0 | 122.0 | 122.5 | 107.3 | 107.3 | 63.7 | 61.3 |
| Wheat† | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Wheat‡ | ... | 3.0 | ... | ... | ... | ... | 30.4 | 30.4 | 74.0 | 76.0 |
| Total wheat | 122.0 | 122.0 | 122.0 | 122.0 | 122.0 | 122.5 | 137.7 | 137.7 | 137.7 | 137.7 |
| Oats* | 1.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Oats† | 123.0 | 119.0 | 122.0 | 118.0 | 118.0 | 122.5 | 107.3 | 107.3 | 63.7 | 61.3 |
| Oats‡ | 225.0 | 273.0 | 254.5 | 247.7 | 247.7 | 257.0 | 264.2 | 264.2 | 302.6 | 204.8 |
| Total oats | 379.0 | 392.0 | 376.5 | 365.7 | 365.7 | 379.5 | 371.5 | 371.5 | 366.3 | 366.1 |
| Dry barley* | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Dry barley† | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Dry barley‡ | 99.0 | ... | ... | ... | ... | 99.4 | ... | ... | ... | ... |
| High-moisture barley* | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| High-moisture barley† | ... | ... | ... | 4.0 | 4.0 | ... | ... | ... | ... | ... |
| High-moisture barley‡ | 39.0 | 122.0 | 134.0 | 139.0 | 139.0 | 38.6 | 138.0 | 138.0 | 181.5 | 184.0 |
| Total barley | 138.0 | 122.0 | 134.0 | 143.0 | 143.0 | 138.0 | 138.0 | 138.0 | 181.5 | 184.0 |
| Soybeans | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Alfalfa | 3.0 | 10.0 | 10.5 | 12.3 | 12.3 | 2.5 | 10.5 | 10.5 | 15.8 | 15.9 |
| Diverted wheat base | 31.0 | 31.0 | 31.0 | 31.0 | 31.0 | 31.0 | 15.3 | 15.3 | 15.3 | 15.3 |
| Diverted feed grain base | 92.0 | 88.0 | 91.0 | 91.0 | 91.0 | 92.0 | 92.0 | 92.0 | 48.4 | 46.0 |
| Total diversion | 123.0 | 119.0 | 122.0 | 122.0 | 122.0 | 122.5 | 107.3 | 107.3 | 63.7 | 61.3 |
| Legume fallow | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |

**Table 21 (continued)**

| Land use | Model E (compliance: 1964 "No" Vote) Capital per acre: $20 | $40 | $60 | $120 | $200 | Model G (noncompliance: 1964 "No" Vote) Capital per acre: $20 | $40 | $60 | $120 | $200 |
|---|---|---|---|---|---|---|---|---|---|---|
| | acres | | | | | | | | | |
| Wheat* | 107.3 | 107.3 | 107.3 | 107.3 | 107.3 | 92.0 | 92.0 | 92.0 | 92.0 | 92.0 |
| Wheat† | ... | ... | ... | ... | ... | 92.0 | 92.0 | 92.0 | 92.0 | 92.0 |
| Wheat‡ | 30.4 | 30.4 | 30.4 | 30.4 | 30.4 | 348.1 | 342.1 | 342.1 | 339.1 | 339.1 |
| Total wheat | 137.7 | 137.7 | 137.7 | 137.7 | 137.7 | 532.1 | 526.1 | 526.1 | 523.1 | 523.1 |
| Oats* | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Oats† | 107.3 | 107.3 | 107.3 | 107.3 | 107.3 | ... | ... | ... | ... | ... |
| Oats‡ | 272.6 | 265.7 | 265.7 | 262.8 | 262.8 | ... | ... | ... | ... | ... |
| Total oats | 379.9 | 373.0 | 373.0 | 370.1 | 370.1 | ... | ... | ... | ... | ... |
| Dry barley* | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Dry barley† | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Dry barley‡ | 105.0 | ... | ... | ... | ... | 93.0 | ... | ... | ... | ... |
| High-moisture barley* | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| High-moisture barley† | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| High-moisture barley‡ | 33.0 | 138.0 | 138.0 | 138.0 | 138.0 | 45.0 | 138.0 | 138.0 | 138.0 | 138.0 |
| Total barley | 138.0 | 138.0 | 138.0 | 138.0 | 138.0 | 138.0 | 138.0 | 138.0 | 138.0 | 138.0 |
| Soybeans | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Alfalfa | 2.1 | 9.0 | 9.0 | 11.9 | 11.9 | 2.9 | 8.9 | 8.9 | 11.9 | 11.9 |
| Diverted wheat base | 15.3 | 15.3 | 15.3 | 15.3 | 15.3 | ... | ... | ... | ... | ... |
| Diverted feed grain base | 92.0 | 92.0 | 92.0 | 92.0 | 92.0 | 92.0 | 92.0 | 92.0 | 92.0 | 92.0 |
| Total diversion | 107.3 | 107.3 | 107.3 | 107.3 | 107.3 | 92.0 | 92.0 | 92.0 | 92.0 | 92.0 |
| Legume fallow | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |

* First year following legume fallow.
† Second year following legume fallow.
‡ Without fallow.

**Table 22. Land use systems of profit-maximizing plans with nonparticipation in the 1964 Feed Grain Program and participation in alternative wheat programs, large cash grain-beet farm**

| Land use | Model B (compliance: 1963 Wheat Program) | | | | | Model D (compliance: 1964 "Yes" Vote) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Capital per acre: | | | | | Capital per acre: | | | | |
| | $20 | $40 | $60 | $120 | $200 | $20 | $40 | $60 | $120 | $200 |
| | acres | | | | | | | | | |
| Wheat* | 31.0 | 31.0 | 31.0 | 31.0 | 31.0 | 42.8 | 15.3 | 15.3 | 15.3 | 30.5 |
| Wheat† | ........ | ........ | ........ | 31.0 | 31.0 | ........ | ........ | ........ | ........ | ........ |
| Wheat‡ | 91.0 | 91.0 | 91.0 | 60.0 | 60.0 | 67.4 | 122.4 | 122.4 | 122.4 | 92.1 |
| Total wheat | 122.0 | 122.0 | 122.0 | 122.0 | 122.0 | 110.2 | 137.7 | 137.7 | 137.7 | 122.6 |
| Oats* | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ |
| Oats† | 31.0 | 31.0 | 31.0 | ........ | ........ | 42.8 | 15.3 | 15.3 | 15.3 | 30.5 |
| Oats‡ | 521.0 | 552.9 | 511.2 | 418.9 | 255.6 | 519.4 | 571.2 | 529.6 | 405.6 | 225.5 |
| Total oats | 552.0 | 583.9 | 542.2 | 418.9 | 255.6 | 562.2 | 586.5 | 544.9 | 420.9 | 256.0 |
| Dry barley* | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ |
| Dry barley† | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ |
| Dry barley‡ | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ |
| High-moisture barley* | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ |
| High-moisture barley† | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ |
| High-moisture barley‡ | ........ | 25.9 | 64.2 | 177.8 | 328.1 | ........ | 23.4 | 61.8 | 175.9 | 327.8 |
| Total barley | ........ | 25.9 | 64.2 | 177.8 | 328.1 | ........ | 23.4 | 61.8 | 175.9 | 327.8 |
| Soybeans | 60.0 | ........ | ........ | ........ | ........ | 49.8 | ........ | ........ | ........ | ........ |
| Alfalfa | ........ | 2.2 | 5.6 | 15.3 | 28.3 | ........ | 2.1 | 5.3 | 15.2 | 28.1 |
| Diverted wheat base | 31.6 | 31.0 | 31.0 | 31.0 | 31.0 | 42.8 | 15.3 | 15.3 | 15.3 | 30.5 |
| Diverted feed grain base | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ |
| Total diversion | 31.0 | 31.0 | 31.0 | 31.0 | 31.0 | 42.8 | 15.3 | 15.3 | 15.3 | 30.5 |
| Legume fallow | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ |

**Table 22 (continued)**

| Land use | Model F (compliance: 1964 "No" Vote) Capital per acre: $20 | $40 | $60 | $120 | $200 | Model H (no wheat program) Capital per acre: $20 | $40 | $60 | $120 | $200 |
|---|---|---|---|---|---|---|---|---|---|---|
| | acres | | | | | | | | | |
| Wheat* | 15.3 | 15.3 | 15.3 | 15.3 | 15.3 | ... | ... | ... | ... | ... |
| Wheat† | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Wheat‡ | 122.4 | 122.4 | 122.4 | 122.4 | 122.4 | 765.0 | 729.9 | 687.9 | 632.6 | 632.6 |
| Total wheat | 137.7 | 137.7 | 137.7 | 137.7 | 137.7 | 765.0 | 729.9 | 687.9 | 632.6 | 632.6 |
| Oats* | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Oats† | 15.3 | 15.3 | 15.3 | 15.3 | 15.3 | ... | ... | ... | ... | ... |
| Oats‡ | 466.7 | 570.6 | 527.8 | 464.3 | 464.3 | ... | ... | ... | ... | ... |
| Total oats | 482.0 | 585.9 | 543.1 | 479.6 | 479.6 | ... | ... | ... | ... | ... |
| Dry barley* | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Dry barley† | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Dry barley‡ | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| High-moisture barley* | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| High-moisture barley† | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| High-moisture barley‡ | ... | 24.1 | 63.4 | 121.9 | 121.9 | ... | 32.3 | 71.0 | 121.9 | 121.9 |
| Total barley | ... | 24.1 | 63.4 | 121.9 | 121.9 | ... | 32.3 | 71.0 | 121.9 | 121.9 |
| Soybeans | 130.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Alfalfa | ... | 2.0 | 5.5 | 10.5 | 10.5 | ... | 2.8 | 6.1 | 10.5 | 10.5 |
| Diverted wheat base | 15.3 | 15.3 | 15.3 | 15.3 | 15.3 | ... | ... | ... | ... | ... |
| Diverted feed grain base | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Total diversion | 15.3 | 15.3 | 15.3 | 15.3 | 15.3 | ... | ... | ... | ... | ... |
| Legume fallow | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |

* First year following legume fallow.

† Second year following legume fallow.

‡ Without fallow.

**Table 23. Number of feeder cattle fed under different beef-feeding systems in the profit-maximizing plans with participation in the 1964 Feed Grain Program and alternative wheat programs, large cash grain-beet farm**

| | Model A (compliance: 1963 Wheat Program) | | | | | Model C (compliance: 1964 "Yes" Vote) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Capital per acre: | | | | | Capital per acre: | | | | |
| Beef-feeding system | $20 | $40 | $60 | $120 | $200 | $20 | $40 | $60 | $120 | $200 |
| | number of feeder cattle | | | | | | | | | |
| Dry barley with supplement | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Dry barley without supplement | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| High-moisture barley with supplement | 32.0* | 134.0 | 134.0 | 158.0 | 158.0 | 32.0* | 134.0 | 134.0 | 200.0 | 203.0 |
| High-moisture barley without supplement | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| | tons | | | | | | | | | |
| Beet pulp fed | ... | 42.6 | 29.9 | 50.1 | 50.1 | ... | 25.7 | 25.7 | 63.5 | 64.4 |

| | Model E (compliance: 1964 "No" Vote) | | | | | Model G (noncompliance: 1964 "No" Vote) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Capital per acre: | | | | | Capital per acre: | | | | |
| Beef-feeding system | $20 | $40 | $60 | $120 | $200 | $20 | $40 | $60 | $120 | $200 |
| | number of feeder cattle | | | | | | | | | |
| Dry barley with supplement | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Dry barley without supplement | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| High-moisture barley with supplement | 27.0* | 114.0 | 114.0 | 152.0 | 152.0 | 37.0* | 114.0 | 114.0 | 152.0 | 152.0 |
| High-moisture barley without supplement | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| | tons | | | | | | | | | |
| Beet pulp fed | ... | ... | ... | 48.3 | 48.3 | ... | ... | ... | 48.3 | 48.3 |

* Capital was insufficient to feed all barley produced.

**Table 24. Number of feeder cattle fed under different beef-feeding systems in the profit-maximizing plans with nonparticipation in the 1964 Feed Grain Program and participation in alternative wheat programs, large cash grain-beet farm**

| | Model B (compliance: 1963 Wheat Program) | | | | | Model D (compliance: 1964 "Yes" Vote) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Capital per acre: | | | | | Capital per acre: | | | | |
| Beef-feeding system | $20 | $40 | $60 | $120 | $200 | $20 | $40 | $60 | $120 | $200 |
| | number of feeder cattle | | | | | | | | | |
| Dry barley with supplement | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Dry barley without supplement | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| High-moisture barley with supplement | ... | 29.0 | 71.0 | 196.0 | 362.0 | ... | 26.0 | 68.0 | 194.0 | 361.0 |
| High-moisture barley without supplement | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| | tons | | | | | | | | | |
| Beet pulp fed | ... | 9.1 | 22.5 | 62.2 | 114.8 | ... | 8.2 | 21.6 | 61.6 | 114.7 |

| | Model F (compliance: 1964 "No" Vote) | | | | | Model H (no wheat program) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Capital per acre: | | | | | Capital per acre: | | | | |
| Beef-feeding system | $20 | $40 | $60 | $120 | $200 | $20 | $40 | $60 | $120 | $200 |
| | number of feeder cattle | | | | | | | | | |
| Dry barley with supplement | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Dry barley without supplement | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| High-moisture barley with supplement | ... | 26.0 | 70.0 | 134.0 | 134.0 | ... | 36.0 | 78.0 | 134.0 | 134.0 |
| High-moisture barley without supplement | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| | tons | | | | | | | | | |
| Beet pulp fed | ... | 8.4 | 22.2 | 42.6 | 42.6 | ... | 11.3 | 24.8 | 42.6 | 42.6 |

**Table 25. Borrowed capital and hired labor needed to operate the profit-maximizing plans with participation in the 1964 Feed Grain Program and alternative wheat programs, large cash grain-beet farm**

| Resource use | Model A (compliance: 1963 Wheat Program) | | | | | Model C (compliance: 1963 "Yes" Vote) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Capital per acre: | | | | | Capital per acre: | | | | |
| | $20 | $40 | $60 | $120 | $200 | $20 | $40 | $60 | $120 | $200 |
| | dollars | | | | | | | | | |
| Real estate credit used | 10,770 | 25,020 | 34,200 | 48,506 | 37,032 | 10,761 | 25,020 | 34,200 | 65,003 | 54,531 |
| Chattel credit used | 9,218 | 28,011 | 14,934 | ... | ... | 9,186 | 27,769 | 15,241 | ... | ... |
| Total credit used | 19,988 | 53,031 | 49,134 | 48,506 | 37,032 | 19,947 | 52,789 | 49,441 | 65,003 | 54,531 |
| Real estate credit not used | ... | ... | ... | 14,395 | 62,590 | ... | ... | ... | ... | 47,325 |
| Chattel credit not used | ... | 3,233 | 19,677 | 48,983 | 62,477 | ... | 3,566 | 19,369 | 56,718 | 70,671 |
| | hours | | | | | | | | | |
| Labor hired: | | | | | | | | | | |
| January-March | — | — | — | 63 | 63 | — | — | — | 176 | 184 |
| April-May | — | — | — | — | — | — | — | — | — | — |
| June-July | — | — | — | — | — | — | — | — | — | — |
| August | — | — | — | — | — | — | — | — | — | — |
| September-October | — | — | — | — | — | — | — | — | — | — |
| November-December | — | — | — | — | — | — | — | — | 79 | 84 |

| Resource use | Model E (Compliance: 1964 "No" Vote) | | | | | Model G (noncompliance: 1964 "No" Vote) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Capital per acre: | | | | | Capital per acre: | | | | |
| | $20 | $40 | $60 | $120 | $200 | $20 | $40 | $60 | $120 | $200 |
| | dollars | | | | | | | | | |
| Real estate credit used | 10,533 | 24,017 | 33,197 | 45,929 | 31,446 | 11,026 | 24,017 | 33,197 | 44,962 | 33,487 |
| Chattel credit used | 8,152 | 20,074 | 7,637 | ... | ... | 9,898 | 19,060 | 6,623 | ... | ... |
| Total credit used | 18,685 | 44,081 | 40,834 | 45,929 | 31,446 | 20,924 | 43,077 | 39,820 | 44,962 | 33,487 |
| Real estate credit not used | ... | ... | ... | 16,693 | 60,354 | ... | ... | ... | 17,660 | 65,855 |
| Chattel credit not used | ... | 6,675 | 22,479 | 46,882 | 60,325 | ... | 7,689 | 23,493 | 46,882 | 60,346 |
| | hours | | | | | | | | | |
| Labor hired: | | | | | | | | | | |
| January-March | — | — | — | 48 | 48 | — | — | — | 48 | 48 |
| April-May | — | — | — | — | — | — | — | — | — | — |
| June-July | — | — | — | — | — | — | — | — | — | — |
| August | — | — | — | — | — | — | — | — | — | — |
| September-October | — | — | — | — | — | — | — | — | — | — |
| November-December | — | — | — | — | — | — | — | — | — | — |

**Table 26. Borrowed capital and hired labor needed to operate the profit-maximizing plans with nonparticipation in the 1964 Feed Grain Program and participation in alternative wheat programs, large cash grain-beet farm**

| Resource use | Model B (compliance: 1963 Wheat Program) | | | | | Model D (compliance: 1963 "Yes" Vote) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Capital per acre: | | | | | Capital per acre: | | | | |
| | $20 | $40 | $60 | $120 | $200 | $20 | $40 | $60 | $120 | $200 |
| | dollars | | | | | | | | | |
| Real estate credit used | 9,180 | 19,774 | 31,051 | 64,799 | 109,734 | 9,180 | 19,641 | 30,918 | 64,696 | 109,714 |
| Chattel credit used | 3,366 | ... | ... | ... | ... | 3,366 | ... | ... | ... | ... |
| Total credit used | 12,546 | 19,779 | 31,051 | 64,799 | 109,734 | 12,546 | 19,641 | 30,918 | 64,696 | 109,714 |
| Real estate credit not used | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Chattel credit not used | ... | 11,936 | 23,019 | 55,965 | 99,667 | ... | 11,447 | 22,529 | 55,587 | 99,594 |
| | hours | | | | | | | | | |
| Labor hired: | | | | | | | | | | |
| January-March | — | — | — | 165 | 609 | — | — | — | 160 | 608 |
| April-May | — | — | — | — | — | — | — | — | — | — |
| June-July | — | — | — | — | — | — | — | — | — | — |
| August | — | — | — | — | — | — | — | — | — | — |
| September-October | — | — | — | — | — | — | — | — | — | — |
| November-December | — | — | — | 72 | 381 | — | — | — | 68 | 381 |

| Resource use | Model F (compliance: 1964 "No" Vote) | | | | | Model H (no wheat program) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Capital per acre: | | | | | Capital per acre: | | | | |
| | $20 | $40 | $60 | $120 | $200 | $20 | $40 | $60 | $120 | $200 |
| | dollars | | | | | | | | | |
| Real estate credit used | 9,180 | 19,675 | 31,007 | 43,471 | 31,996 | 9,180 | 20,126 | 31,419 | 41,452 | 29,977 |
| Chattel credit used | 3,366 | ... | ... | ... | ... | 2,040 | ... | ... | ... | ... |
| Total credit used | 12,546 | 19,675 | 31,007 | 43,471 | 31,996 | 11,220 | 20,126 | 31,419 | 41,452 | 29,977 |
| Real estate credit not used | ... | ... | ... | 18,269 | 66,464 | ... | ... | ... | 20,288 | 68,483 |
| Chattel credit not used | ... | 11,385 | 22,365 | 43,761 | 57,225 | 1,326 | 12,982 | 23,824 | 43,761 | 57,225 |
| | hours | | | | | | | | | |
| Labor hired: | | | | | | | | | | |
| January-March | — | — | — | — | — | — | — | — | — | — |
| April-May | — | — | — | — | — | — | — | — | — | — |
| June-July | — | — | — | — | — | — | — | — | — | — |
| August | — | — | — | — | — | — | — | — | — | — |
| September-October | — | — | — | — | — | — | — | — | — | — |
| November-December | — | — | — | — | — | — | — | — | — | — |

# In Summary

This study's main objective was to determine the effects of different government wheat and feed grain programs and of varying amounts of capital per acre on optimal farm organizations in the Red River Valley.

Analysis of representative farm resource situations showed that the wheat program and available capital per acre substantially influenced farm income and organization. The feed grain program influenced farm organization by regulating the size of the beef-feeding enterprise that could be supported. However, its effect on income appeared insignificant.

Plans calling for participation in the 1963 Wheat Program produced the highest incomes. Next highest were plans involving participation in the 1964 "Yes" Vote Wheat Program. Plans involving compliance with the 1964 "No" Vote Wheat Program produced the lowest incomes, even lower than plans without wheat restrictions.

Regardless of wheat and feed grain programs, farm incomes increased as available capital per acre increased. This relationship between quantity of capital available and level of income was expected. Therefore, the analysis was performed so that farmers with different amounts of capital per acre can observe the associated expected incomes and farm organizations.

With feed grain program restrictions, increased capital per acre increased incomes primarily via expansion of the beef-feeding enterprise. This expansion involved substitution of: (1) high-moisture barley for dry barley, (2) beet pulp for barley, and (3) lower for higher cost borrowed capital. With no feed grain program, increased capital per acre of land increased incomes. This increase resulted largely from expansion in the beef-feeding enterprise, not only through substitutions mentioned above but through substitution of barley for oats in the cropping system.

Beef feeding appears to be a marginal enterprise for farm income improvement in view of:

- The price uncertainty usually associated with beef feeding, especially where credit capital is involved.

- The relatively small increase in farm profits from beef feeding as shown by this analysis.

Of course, some farmers might add significantly to their profits by feeding beef. Other feeding systems, not analyzed here, may fit in well on some farms. And, of course, returns from feeding at any given time depend on buying and selling prices, the manager's buying and selling decisions, and the manager's efficiency in transforming feed into beef.

Wheat and feed grain programs and varying amounts of capital per acre influenced farm income and organization in essentially the same ways on both representative farms. Income patterns for optimal plans were identical. But, because of the larger quantities of resources available, income levels on the large cash grain-beet farm were considerably higher ($11,360 to $14,980 higher) than for the typical cash grain farm.

Differences in resource availabilities between the two farms gave rise to other variations in optimal plans. Two of these differences were:

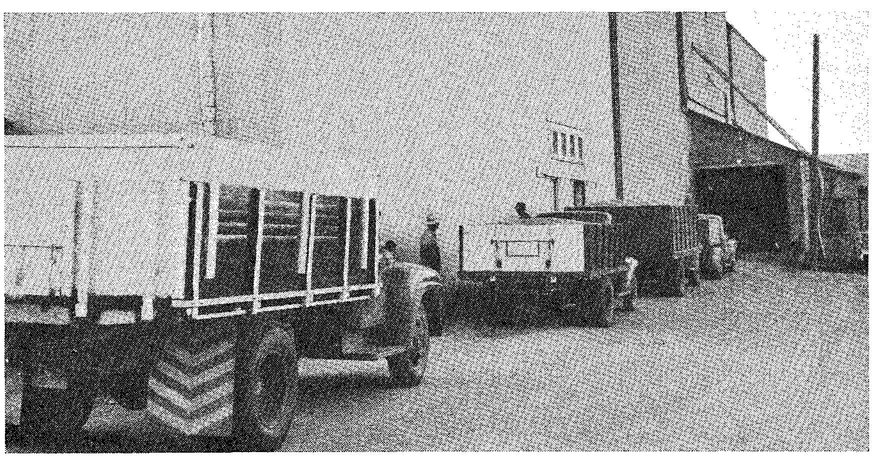
1. Steers were fed out on high-moisture barley at all capital levels on the large farm but only at high capital levels on the typical farm.

2. The large farm almost always maximized profits by diverting 40 percent of its feed grain base in models with feed grain restrictions. However, the typical cash grain farm usually maximized profits by diverting only the first 20 percent. The size of the feed grain base on the two farms made the difference.

# Appendix

Compliance with the **1963 Voluntary Wheat Program** resulted in the following diversion payments: Payment for diverting the first 20 percent of the wheat allotment was computed by taking the normal yield times 50 percent of it times the county support rate. In this study, the computation produced a payment of $28.80 per acre (30 bushels x 0.50 x $1.92). To farmers reducing their wheat acreage by at least 20 percent of their allotment, an $0.18 per bushel bonus was paid on normal production of the remaining acreage actually planted. In other words, for each acre diverted, this bonus was received on normal production from 4 acres. In this analysis, this payment amounted to $21.60 (30 bushels x $0.18 x 4). So the total payment on the first 20-percent diversion was $50.40 per acre.

A producer could also divert a second 30 percent of his wheat allotment. Payment was figured by taking the normal yield times 50 percent of it times the county support rate minus the bonus times the normal



Trucking—the end of harvest

yield. In this study, payment was \$23.40 per acre (30 bushels x 0.50 x \$1.92) — (\$0.18 x 30 bushels).

Compliance with the **1964 "Yes" Vote Wheat Program** meant that the producer diverted 10 percent of his 1964 acreage allotment. Payment was computed as follows: normal yield times 30 percent times basic support rate. In this study the payment was \$18.90 (30 bushels x 0.30 x \$2.10). In addition, the producer could divert another 20 percent of his acreage allotment for which he received a payment of \$31.50 per acre. This payment was computed as follows: normal yield times 50 percent times county support rate or 30 bushels times 0.50 times \$2.10.

No diversion payments were received by compliance with the **1964 "No" Vote Wheat Program.** However, wheat prices were supported at 50 percent of parity for growers complying with their acreage allotment. In this study the suport price was estimated at \$1.40 per bushel. The 1964 allotment was 10 percent less than the 1963 allotment.

Diversion payments under the **1964 Feed Grain Program** were computed as follows: payment for the first 20-percent diversion equals normal yield times 20 percent times county support rate. Since barley was the only feed grain considered in this study, diversion payments apply only to it. The normal barley yield in the study area was 32 bushels and the county support rate was \$0.91 (loan rate of \$0.77 + \$0.14 bonus). Per acre payment for the first 20-percent diversion in this study amounted to \$5.82 (32 bushels x 0.20 x \$0.91). In addition, a bonus of \$0.14 per bushel could be received on normal production on the remaining acreage actually planted. So for each acre diverted, a bonus could be received on 4 acres. In this analysis, the bonus payment was \$17.92 (32 bushels x \$0.14 x 4). Therefore, the first 20-percent diversion yielded a total of \$23.74 per acre.

A second 20 percent of the feed grain allotment also could be diverted. Payment was computed by taking the normal yield times 50 percent times county support rate minus the bonus. In this analysis, the payment was \$10.08 per acre (32 bushels x 0.50 x \$0.91) — (\$0.14 x 32 bushels).

In any wheat or feed grain program involving diversion of cropland, diversion had to be a net addition to the farm's "normal conserving acres." Therefore, the land could be diverted only into fallow or hay. On the typical cash grain farm, the normal conserving acreage base was 54 acres; on the large cash grain-beet farm, it was about 150 acres.