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# FIELD CROP COSTS AND RETURNS 1948-1954

A study of costs and returns  
in four major types of farming areas  
of Illinois

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Location of areas and years in which study was made in each. (Fig. 1)



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# FIELD CROP COSTS AND RETURNS, 1948-1954

R. H. WILCOX and R. A. HINTON<sup>1</sup>

COST-ACCOUNT STUDIES have been conducted by the Illinois Agricultural Experiment Station in some areas of the state since July, 1912.<sup>2</sup> This report, covering the most recent seven years of these studies, represents one phase of this work.

Beginning in 1948, the plan of the cost project was revised and an additional objective set up—to secure detailed information on total farm costs and returns for some well-defined systems of farming. For 21 years, 1927-1947, cost data had been collected from a sample of farmers in Champaign and Piatt counties. But beginning in 1948, the study was located for two years in each of four major type-of-farming areas of the state. This change permitted cost data to be secured on enterprises either not present on Champaign and Piatt county farms, or more important in farm organizations in other areas. It also allowed differences in soil and climate to be reflected in crop costs and yields.

This change in emphasis resulted not only in the two-year rotation of the study to the major type-of-farming areas in the state, but also in a change in the methods by which the costs were computed. The difference in the method of computing was largely one of regrouping cost items so as to identify the basic source of the cost within the framework of four major factors of production—land, labor, capital, and management. The attempt to allocate all costs—direct, joint, and overhead—to the productive enterprises was continued.

The addition of a management charge to the cost-of-production data was another major change. But aside from this and the regrouping of costs, the method of computing total costs was not changed. (For details of the methods of computation, see the Appendix, pages 32-42.)

## Purpose of the Study

The primary purpose was to record and analyze the crop data for the four major type-of-farming areas of the state for the years 1948-1954. Secondary purposes were to provide information on the profitableness of alternative crops and on physical costs. It is expected that

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<sup>2</sup> For a summary of earlier studies, see R. H. Wilcox and H. C. M. Case, *Twenty-Five Years of Illinois Crop Costs, 1913-1937*. Ill. Agr. Exp. Sta. Bul. 467. 1940.

the information provided by these secondary aims will prove useful in planning and organizing farms and that it will be helpful in interpreting less complete farm records.

Much of the data are not new. Annual mimeographed reports have been summarized and published for use by cooperating farmers, farm advisers, teachers, research workers, and others in the field of agriculture. These data have been used in the classroom and drawn upon frequently for extension and research presentations.

## **Selection of Farms**

The farms from which the cost data were obtained were selected from among farms enrolled in the Illinois Farm-Bureau Farm-Management Service.<sup>1</sup> The criteria for selection were type of farm, size of farm, quality of soil, and level of management. Past records of cooperators provided the means for selecting farms meeting these criteria.

Of course, the willingness of the farm operator to keep the detailed records required of him was a major consideration. However, the fact that these farmers were already keeping detailed records of their farm business under the supervision of a fieldman from the Farm-Bureau Farm-Management Service made it possible to obtain records of the hours of labor used and other information needed to make a complete allocation of costs for an enterprise and get it with a minimum of additional effort on the cooperator's part.

## **Location and Characteristics of Farms**

To get as nearly a normal set of cost and return relationships as possible, the study was made in each area for two years. Four geographical areas were included—the western, northwestern, central, and southern. The counties in each area and the years in which the study was conducted there are shown in Fig. 1. Although each area was part of an association of the Farm-Bureau Farm-Management Service, each also tends to represent a different type-of-farming area.<sup>2</sup> These areas present a wide range of climatic and soil differences.

<sup>1</sup>The Illinois Farm-Bureau Farm-Management Service is a cooperative service available to all farm operators in Illinois. The functions of this service are to provide assistance to farmers through farm records and farm business analyses and to provide farm financial and other data to the Agricultural Experiment Station for farm-management research and extension work.

<sup>2</sup>For a comprehensive description of the types of farming prevailing in the areas, see R. C. Ross and H. C. M. Case, *Types of Farming in Illinois*. Ill. Agr. Exp. Sta. Bul. 601. 1956.

**Table 1. — Location of Areas and Characteristics of Farms Studied, 1948-1954**

| Area and systems of farming  | Number of farms | Total acres per farm | Crop acres per farm | Soil productivity rating per farm | Animal units of livestock per 100 farm acres |
|------------------------------|-----------------|----------------------|---------------------|-----------------------------------|--|
| Western area, 1948-1949      |                 |                      |                     |                                   |  |
| Grain.....                   | 16              | 305                  | 238                 | 75                                | 12   |
| Hog.....                     | 16              | 278                  | 203                 | 78                                | 35   |
| Feeder cattle and hog.....   | 15              | 232                  | 166                 | 79                                | 38   |
| Beef cattle and hog.....     | 11              | 380                  | 174                 | 54                                | 32   |
| Dairy and hog.....           | 15              | 125                  | 80                  | 57                                | 42   |
| Northwestern area, 1949-1950 |                 |                      |                     |                                   |  |
| Dairy and hog.....           | 56              | 197                  | 122                 | 62                                | 34   |
| Feeder cattle and hog.....   | 16              | 217                  | 144                 | 66                                | 46   |
| Central area, 1951-1952      |                 |                      |                     |                                   |  |
| Grain.....                   | 30              | 270                  | 212                 | 79                                | 14   |
| Hog.....                     | 22              | 249                  | 174                 | 67                                | 38   |
| Feeder cattle and hog.....   | 23              | 336                  | 235                 | 70                                | 34   |
| Southern area, 1953-1954     |                 |                      |                     |                                   |  |
| Grain.....                   | 22              | 395                  | 291                 | 30                                | 9  |
| Dairy.....                   | 44              | 218                  | 154                 | 37                                | 18   |
| Mixed livestock.....         | 26              | 326                  | 210                 | 30                                | 22   |

The systems of farming and characteristics of the farms are given as general background for the study (Table 1). These systems represent some of the important types of farms in each area; however, they do not necessarily include all the important types of farms in the areas. Many of the differences in crop costs and returns can be traced to such factors as climate, quality of soil, size of equipment, size of farm, and cropping practices.

## I — CROP COSTS AND RETURNS, 1948-1954

Crop yields and costs for the western, northwestern, and central areas were generally considered near normal. In both years of the study in the southern area, however, drouth and hot weather distorted the normal crop-yield relationships. Corn yields in particular were below normal, while small-grain yields were somewhat above normal. In 1954 a considerable part of the corn acreage was abandoned after it had been planted and cultivated. As a consequence, the 1954 data for corn are of limited usefulness for purposes of comparison.

## Per-Acre Total Costs and Returns, Net Returns, and Costs of Producing Feed Nutrients

Per-acre costs, returns, and net returns over costs are useful in selecting cropping systems, in explaining why certain crops are grown in given areas, and in interpreting less detailed crop records. The two-year summary of costs and returns (Table 2) shows the total land, labor, capital, and management costs, the total returns, and net returns for crops studied in each area. More detailed annual cost data are presented in Tables 11-16 in the Appendix.

### **Total costs**

Costs varied less from crop to crop than did the value of the crops. Of the crops studied, total per-acre costs for corn both as grain and silage were highest. Total per-acre costs of wheat, soybeans, and mixed hay differed little. In all areas, lowest total costs per acre were for oats.

Comparison of the four items of cost—land, labor, capital, and management—shows the capital charge<sup>1</sup> the highest. The annual summaries (Tables 11-16 in the Appendix) show that among the items composing capital charges, the combined cost of tractor, truck, and other machinery was the largest item of cost for all crops. On corn and wheat, manure and other fertilizers were the second largest item, while seed was next on soybeans and oats. Buildings and general farm expense were next in order. Other crop expense included insurance on stored grain, hail insurance, weed and insect sprays, and miscellaneous storage charges and was the smallest item on all crops.

Land charges were generally second to capital charges. On corn silage, however, labor was the second highest charge.

### **Total returns**

The value of the five crops differed greatly. Total returns were highest for corn and lowest for oats in all areas, the value of corn being over twice that of oats. In southern Illinois, returns from wheat were almost as large as those from corn. In those areas of northern Illinois in which both corn and soybeans were grown, total returns per acre from soybeans ranked next to those from corn. Returns from hay totaled slightly more than those from oats.

Returns on a two-year basis may not accurately reflect the long-time relationships within and between areas. For instance, in southern Illinois, drouth in 1953 and both drouth and heat in 1954 reduced corn

<sup>1</sup> In this bulletin, the terms cost and charge are used interchangeably.

**Table 2. — Per-Acre Costs and Returns on Selected Crops**  
(Two-year summary for each of four areas)

| Item                                | Corn            | Soy-beans | Oats    | Winter wheat | Mixed alfalfa hay | Corn silage     |
|-------------------------------------|-----------------|-----------|---------|--------------|-------------------|-----------------|
| <b>Western area, 1948-1949</b>      |                 |           |         |              |                   |                 |
| Number of farms.....                | 70              | 24        | 68      | .....        | 47                | .....           |
| Acres of crop per farm.....         | 87.5            | 41.1      | 50.2    | .....        | 22.9              | .....           |
| Production per acre, bushel..       | 71.8            | 30.2      | 51.2    | .....        | 2.2*              | .....           |
| <b>Costs</b>                        |                 |           |         |              |                   |                 |
| Land.....                           | \$10.14         | \$10.30   | \$10.19 | .....        | \$10.10           | .....           |
| Labor.....                          | 9.44            | 6.08      | 3.63    | .....        | 9.62              | .....           |
| Capital.....                        | 27.88           | 16.96     | 12.79   | .....        | 19.86             | .....           |
| Management.....                     | 2.55            | 2.28      | 1.56    | .....        | 1.63              | .....           |
| Total.....                          | 50.01           | 35.62     | 28.17   | .....        | 41.21             | .....           |
| Total returns.....                  | 92.82           | 70.28     | 37.74   | .....        | 53.25             | .....           |
| Net returns.....                    | 42.81           | 34.66     | 9.57    | .....        | 12.04             | .....           |
| <b>Northwestern area, 1949-1950</b> |                 |           |         |              |                   |                 |
| Number of farms.....                | 75              | .....     | 65      | .....        | 58                | 49              |
| Acres of crop per farm.....         | 52.0            | .....     | 39.1    | .....        | 29.9              | 7.2             |
| Production per acre, bushel..       | 71.5            | .....     | 52.8    | .....        | 2.4*              | 12.0*           |
| <b>Costs</b>                        |                 |           |         |              |                   |                 |
| Land.....                           | \$ 9.19         | .....     | \$ 9.03 | .....        | \$ 9.08           | \$ 9.15         |
| Labor.....                          | 9.95            | .....     | 3.65    | .....        | 6.88              | 14.84           |
| Capital.....                        | 40.56           | .....     | 15.64   | .....        | 23.97             | 55.48           |
| Management.....                     | 2.91            | .....     | 1.35    | .....        | 1.94              | 3.86            |
| Total.....                          | 62.61           | .....     | 29.67   | .....        | 41.87             | 83.33           |
| Total returns.....                  | 103.60          | .....     | 44.15   | .....        | 57.75             | .....           |
| Net returns.....                    | 40.99           | .....     | 14.48   | .....        | 15.88             | .....           |
| <b>Central area, 1951-1952</b>      |                 |           |         |              |                   |                 |
| Number of farms.....                | 75              | 58        | 72      | 50           | 49                | .....           |
| Acres of crop per farm.....         | 94.9            | 46.0      | 36.6    | 34.4         | 27.4              | .....           |
| Production per acre, bushel..       | 69.8            | 31.1      | 44.6    | 27.6         | 1.7*              | .....           |
| <b>Costs</b>                        |                 |           |         |              |                   |                 |
| Land.....                           | \$14.37         | \$14.60   | \$14.14 | \$14.22      | \$13.20           | .....           |
| Labor.....                          | 8.46            | 6.81      | 3.94    | 4.22         | 7.04              | .....           |
| Capital.....                        | 30.31           | 20.52     | 14.37   | 19.55        | 19.77             | .....           |
| Management.....                     | 2.89            | 2.29      | 1.78    | 2.13         | 2.13              | .....           |
| Total.....                          | 56.03           | 44.22     | 34.23   | 40.12        | 42.14             | .....           |
| Total returns.....                  | 113.06          | 87.26     | 38.48   | 61.60        | 42.80             | .....           |
| Net returns.....                    | 57.03           | 43.04     | 4.25    | 21.48        | .66               | .....           |
| <b>Southern area, 1953-1954</b>     |                 |           |         |              |                   |                 |
| Number of farms.....                | 41 <sup>a</sup> | 74        | 48      | 88           | 34 <sup>a</sup>   | 33 <sup>a</sup> |
| Acres of crop per farm.....         | 51.6            | 59.8      | 20.0    | 50.0         | 37.9              | 15.1            |
| Production per acre, bushel..       | 46.5            | 13.8      | 37.9    | 32.4         | 1.7*              | 7.6*            |
| <b>Costs</b>                        |                 |           |         |              |                   |                 |
| Land.....                           | \$ 7.67         | \$ 7.79   | \$ 7.88 | \$ 7.71      | \$ 7.65           | \$ 7.42         |
| Labor.....                          | 7.65            | 4.87      | 3.89    | 4.21         | 5.17              | 11.60           |
| Capital.....                        | 43.84           | 22.51     | 18.12   | 27.46        | 22.35             | 38.17           |
| Management.....                     | 2.45            | 1.38      | 1.13    | 1.48         | 1.68              | 2.30            |
| Total.....                          | 61.60           | 36.55     | 31.02   | 40.86        | 36.85             | 59.49           |
| Total returns.....                  | 67.83           | 37.64     | 28.15   | 62.86        | 45.30             | .....           |
| Net returns.....                    | 6.23            | 1.09      | -2.87   | 22.00        | 8.45              | .....           |

<sup>a</sup> 1953 data only.

\* Tons.

and hay yields, and to a lesser extent reduced soybean yields, but did not affect small-grain yields. In other years of the study, however, climatic conditions were believed to be more nearly normal.

### **Net returns**

The net return above all costs is the return that remains to all factors of production above the charges made for such factors in the cost analysis.

Of the five crops, corn showed the highest net returns per acre in the northern two-thirds of the state. Soybeans were next, and in the central area, wheat was third. In these areas, oats and mixed hay showed the lowest net returns per acre.

In southern Illinois, wheat showed the highest net return per acre and oats the lowest. Hay, corn, and soybeans in this order were the next most profitable crops.

### **Costs of producing feed nutrients**

Corn both as grain and silage produced the largest quantity of total digestible nutrients per acre and tended to produce these nutrients at the lowest cost per 100 pounds (Table 3). In the northwestern and southern areas, hay produced total digestible nutrients cheaper than corn grain. In all areas, oats produced the least total feed per acre at the highest cost per 100 pounds.

Producing 100 pounds of total digestible nutrients from hay and corn silage usually required more labor than producing 100 pounds from corn grain and oats.

## **Per-Acre Variations in Costs and Returns**

### **Area to area**

Among the four areas, differences in costs and returns from a given crop show the differences in the resources of the areas and the relative adaptability of the crop to the area.

Differences in total costs per acre for various crops were not significant from area to area, even though some of the real differences may be confounded by year-to-year changes. Major differences between areas were in individual items of cost rather than in total cost.

The differences in the average land charges from area to area, for the most part, reflect differences in the quality of soils, even though land prices increased modestly throughout the period. Current land values were assigned each year on the basis of soil-productivity ratings. Soil-productivity ratings and land charges were highest in the central

**Table 3. — Comparative Costs of Producing Feed Nutrients in Alternative Feed Crops, Four Areas**

| Crop                             | Average yield per acre <sup>a</sup> | Total digestible nutrients per acre | Cost per acre <sup>b</sup> | Cost per 100 lb., total digestible nutrients | Direct man hours of labor per 100 lb. total digestible nutrients |
|----------------------------------|-------------------------------------|-------------------------------------|----------------------------|--|--|
|                                  | <i>bu.</i>                          | <i>lb.</i>                          |                            |  |  |
| <b>Western area</b>              |                                     |                                     |                            |  |  |
| Corn.....                        | 67                                  | 3,022                               | \$50.01                    | \$1.65                                       | .25  |
| Oats.....                        | 46                                  | 1,053                               | 28.17                      | 2.68   | .30  |
| Mixed alfalfa hay.....           | 2.2 ( <i>tons</i> )                 | 2,200                               | 41.21                      | 1.89   | .40  |
| <b>Northwestern area</b>         |                                     |                                     |                            |  |  |
| Corn.....                        | 70                                  | 3,157                               | 62.61                      | 1.98   | .27  |
| Oats.....                        | 51                                  | 1,168                               | 29.67                      | 2.54   | .29  |
| Corn silage ( <i>tons</i> )..... | 12                                  | 4,488                               | 83.33                      | 1.86   | .34  |
| Mixed alfalfa hay.....           | 2.4 ( <i>tons</i> )                 | 2,400                               | 41.87                      | 1.74   | .30  |
| <b>Central area</b>              |                                     |                                     |                            |  |  |
| Corn.....                        | 64                                  | 2,886                               | 56.03                      | 1.94   | .23  |
| Oats.....                        | 47                                  | 1,076                               | 34.23                      | 3.18   | .29  |
| Mixed alfalfa hay.....           | 2 ( <i>tons</i> )                   | 2,000                               | 42.14                      | 2.11   | .29  |
| <b>Southern area</b>             |                                     |                                     |                            |  |  |
| Corn.....                        | 45                                  | 2,030                               | 61.61                      | 3.03   | .32  |
| Oats.....                        | 36                                  | 824                                 | 29.69                      | 3.60   | .46  |
| Corn silage ( <i>tons</i> )..... | 8                                   | 2,992                               | 59.49                      | 1.99   | .39  |
| Mixed alfalfa hay.....           | 1.7 ( <i>tons</i> )                 | 1,700                               | 36.85                      | 2.17   | .28  |

<sup>a</sup> Average yields on farms in the Farm-Bureau Farm-Management Service, 1946-1955 for western, northwestern, and central areas, and 1951-1955 for southern area.

<sup>b</sup> Per-acre costs, western area 1948-1949; northwestern, 1949-1950; central, 1951-1952; and southern, 1953-1954.

area, second highest in the western, third highest in the northwestern, and lowest in the southern area.

In the northwestern and southern areas where the land in crops was of lower quality, capital charges per acre for corn tended to be higher than they were in the central and western areas, because expenses for manure and other fertilizers were higher. The manure and other fertilizer charges for corn averaged \$12.21 and \$14.69 in the northwestern area and \$19.76 and \$22.69 per acre in the southern. In contrast, these charges averaged \$6.25 and \$6.72 per acre in the western and \$7.02 and \$8.75 in the central area (Table 11 in the Appendix).

Other costs did not show significant differences between areas, although there is some indication that expenses for tractor, truck, and other machinery were higher in the northwestern than in other areas. If these expenses were higher, the reason is believed to be that on these

farms the acreages cropped were smaller than they were on farms in the other areas, and therefore the fixed costs per acre were slightly higher on them than on the larger farms.

Yields per acre did not differ greatly among farms in the areas in the northern two-thirds of the state. Corn and soybean yields in the southern area were significantly below those in other areas, although the heat and drouth at crucial stages in the growth of these crops during the years of the study tend to overstate the normal differences expected. Oat and hay yields tend to be higher in the northern areas of the state than elsewhere. Climatic and soil differences between the northern and southern areas tend to explain these differences in yields.

### **Year to year**

Year-to-year variations in costs and returns show the effects of variations in yields, commodity prices, and costs of items of expense. Although the areas of the study changed over the seven-year period, total costs per acre were relatively stable from year to year. Prices of important items that enter into the costs of crop production increased slightly during the period. These changes, however, were minor compared to the great changes in crop prices.

Returns tended to fluctuate more widely than costs, because both yields and prices varied widely. Within a given area, year-to-year fluctuations in yields can be primarily attributed to weather. The southern Illinois corn crop in 1954 is an example of the effect of weather on yields. The crop averaged only 16 bushels an acre (Table 11 in the Appendix), whereas in 1953 it had averaged 46.5 bushels. These figures, however, do not clearly show the true variation, since in 1954 a third more of the crop was either harvested as silage or abandoned than was so handled in 1953. In other areas average corn yields from one year to the next varied as follows: western, 78.5 to 65 bushels an acre; northwestern, 76.6 to 66.6; and central, 69.7 to 69.8 bushels. The difference in average yield did not appear to vary with average total costs per acre.

The year-to-year changes in product prices were as great as, if not greater than, the changes in yields. Prices per bushel for various crops during the seven years of the study ranged as follows: corn, \$1.28 to \$1.70; soybeans, \$2.25 to \$2.81; oats, 68 to 85 cents; wheat, \$1.75 to \$2.25; and hay per ton, \$18 to \$24 (Tables 11-16 in the Appendix).

Since total costs were relatively stable, net returns varied as greatly from year to year as total returns.



### Farm to farm

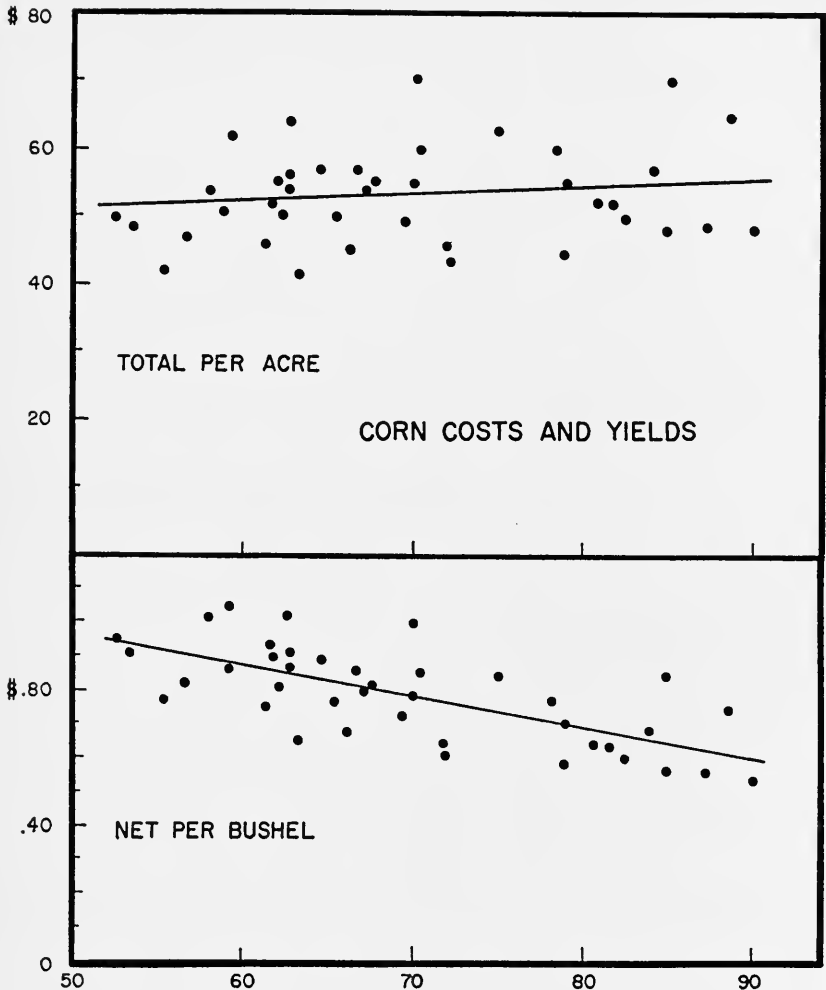
Differences in production costs and returns per acre from farm to farm show the variations due to resources available, cropping practices, and managerial ability of farmers. Farm-to-farm differences in costs and returns per acre were greater than the differences from year to year or from area to area. Total costs and yields per acre for corn grain in each of the four areas by years (Table 4) show the variations in average total costs and yields and their standard deviations. (Standard deviation measures the absolute dispersion of the individual farm data around the average or mean of all farms. For instance, in 1948 the standard deviation of total costs per acre for corn in the western area was \$9.76. This means that about 68 percent of the farms in the study that year had corn-crop costs that were not more than \$9.76 above or below that of the average of all farms in the study, or between \$39.39 and \$58.91.)

**Table 4. — Variations in Total Costs and Yields per Acre of Corn Grain (Four areas)**

| Area and year            | Number of farms | Total costs per acre |         | Yield per acre     |            |
|--------------------------|-----------------|----------------------|---------|--------------------|------------|
|                          |                 | Standard deviation   | Mean    | Standard deviation | Mean       |
| <b>Western area</b>      |                 |                      |         | <i>bu.</i>         | <i>bu.</i> |
| 1948.....                | 38              | \$ 9.76              | \$49.15 | 13.7               | 78.5       |
| 1949.....                | 32              | 10.79                | 50.85   | 10.0               | 65.0       |
| <b>Northwestern area</b> |                 |                      |         |                    |            |
| 1949.....                | 36              | 11.97                | 59.81   | 13.1               | 76.6       |
| 1950.....                | 39              | 15.20                | 65.22   | 12.4               | 66.6       |
| <b>Central area</b>      |                 |                      |         |                    |            |
| 1951.....                | 40              | 7.16                 | 54.26   | 10.3               | 69.7       |
| 1952.....                | 35              | 10.07                | 58.07   | 8.2                | 69.8       |
| <b>Southern area</b>     |                 |                      |         |                    |            |
| 1953.....                | 41              | 12.82                | 61.61   | 12.7               | 46.5       |
| 1954.....                | 45              | 13.40                | 59.83   | 10.5               | 16.0       |

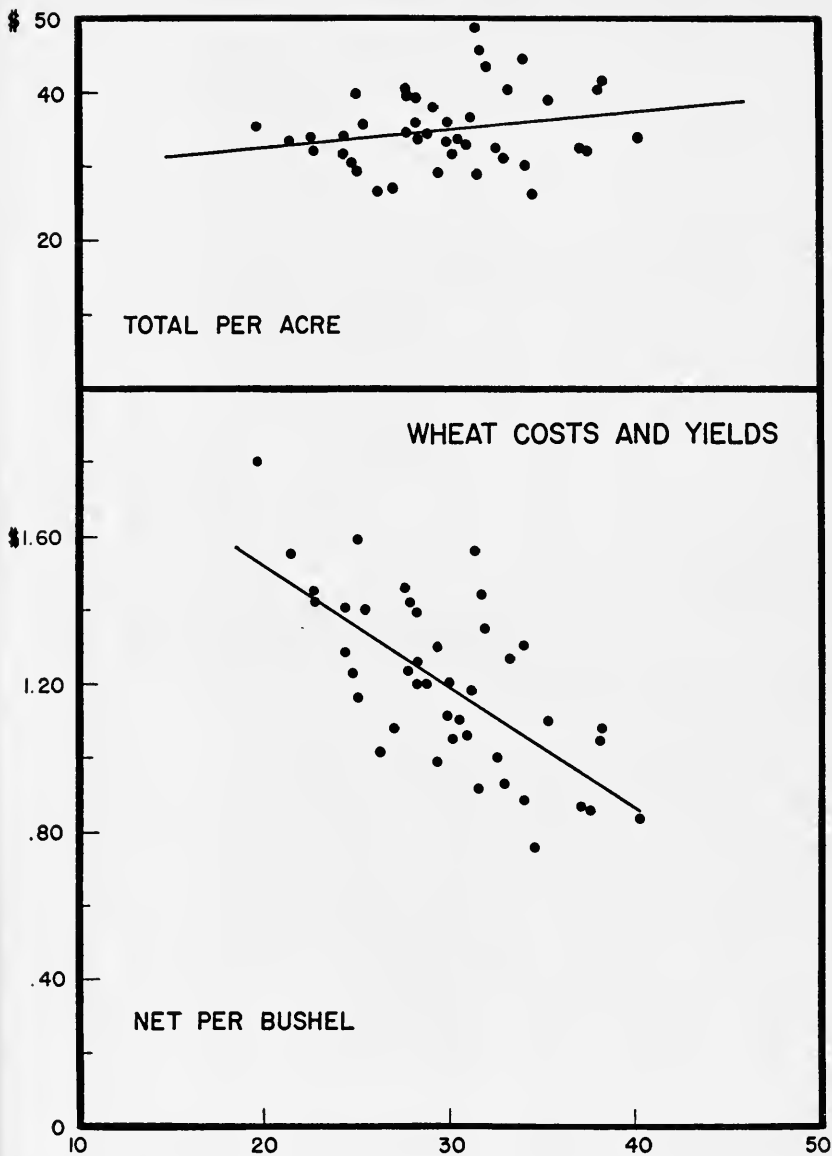
The dispersion of the data for other crops in this and other years was similar to that of corn. The scatter diagrams of relationship of costs and yields of corn and wheat (Figs. 2 and 3) also illustrate the range in the individual farm data. This wide dispersion in the cost and yield data should caution the reader against attaching too much significance to small differences in the averages of data presented in this bulletin.

The wide dispersion and the small number of farms make it diffi-



Although total costs of corn per acre varied from \$41 to \$71 and yields from 52 to 90 bushels an acre on 40 farms in the Central Area in 1951, per-acre costs and yields were not highly correlated. Average per-acre costs increased only 11 cents with each bushel increase in yields, but per-bushel net costs decreased 1 cent with each bushel increase. (Fig. 2)

cult to isolate statistically significant factors affecting costs and returns between farms in any one year. It is reasonable to expect that costs and yields per acre vary with the quantity and quality of resources used in production. Differences between farms, however, cannot all be explained by differences in soil productivity, amount of fertilizers,



Total per-acre costs of wheat varied from \$26 to \$49 and yields from 20 to 40 bushels an acre on 45 farms in the Southern Area in 1953. On the average, per-acre costs increased 25 cents with each bushel increase in yields, but per-bushel net costs decreased 3 cents with each bushel increase. (Fig. 3)

amount and kind of power and machinery, labor, and other resources used. Yields do not always vary directly with the amount of individual cost items or with the total of all cost items.

Some differences can be explained since resources substitute for one another. For instance, fertilizer may substitute for land, and power and machinery for labor. Other differences result from random influences beyond the farmer's control, such as storms, hail, and rainfall which do not occur uniformly. Some differences may be caused by accounting procedures which permitted different cost rates to be applied for similar services between farms.

Many of the unexplained differences in costs and returns, however, must be attributed to differences in the managerial ability of the individual farmer. Costs and returns often vary widely on two farms operated identically on similar soils and having other similar resources. Managerial decisions concerning timing of practices seem to be as important as resources and practices used.

## **Relation of Yields to Per-Acre Costs**

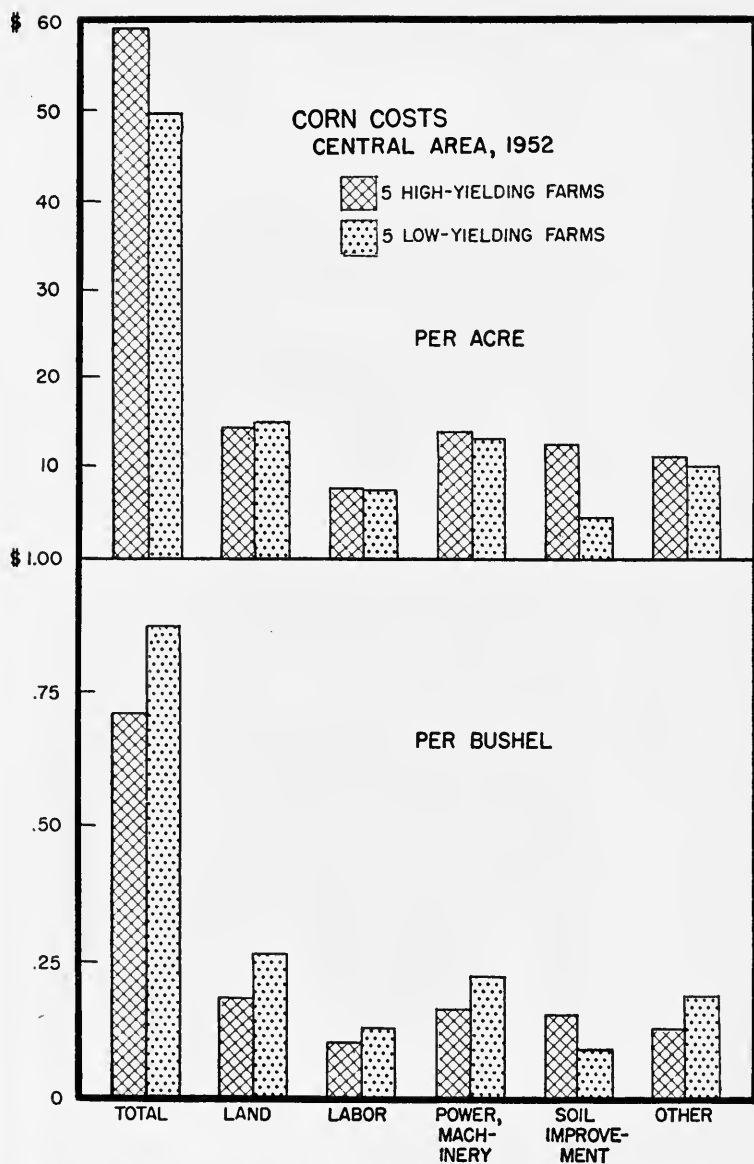
### ***Effects of yields on costs***

Individual items of cost on five central Illinois farms having the highest corn and soybean yields were compared with the same items on five farms having the lowest yields (Figs. 4 and 5). Comparisons of the same items were made on five farms in southern Illinois having the highest and five having the lowest wheat yields (Fig. 6). Though the samples are admittedly small, the findings are believed to be valid.

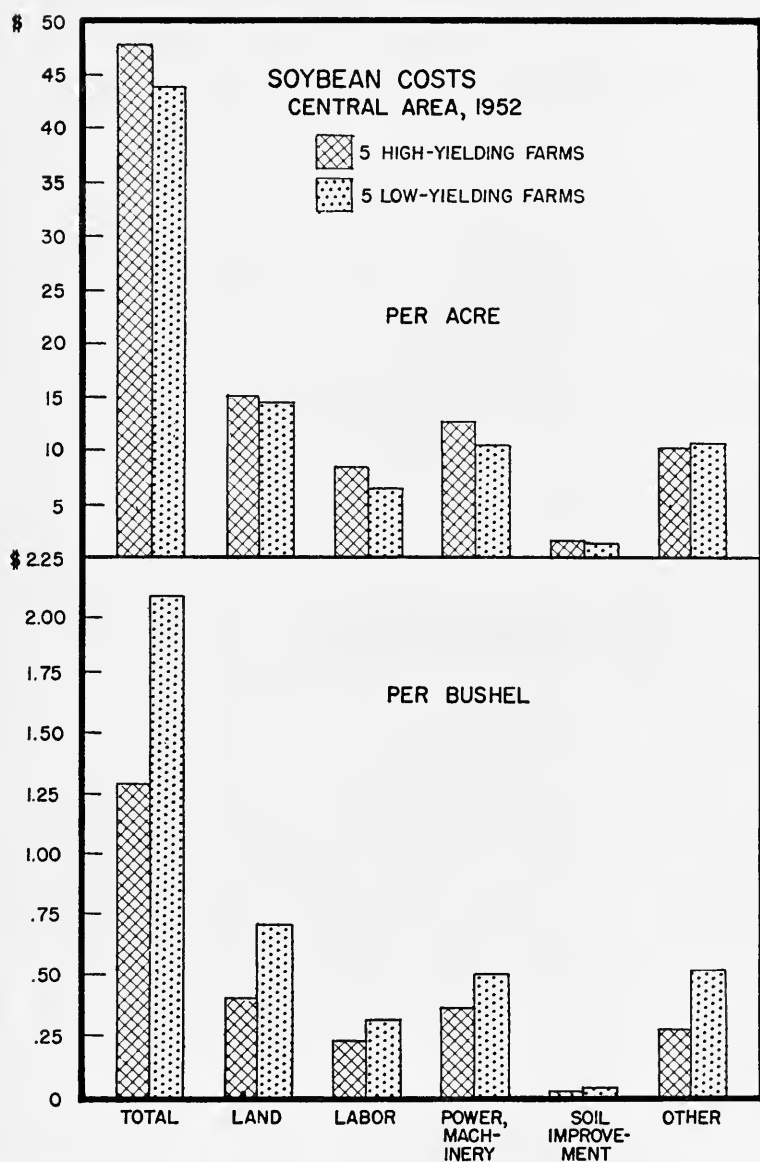
Yield per acre stood out as the most important factor affecting the per-bushel cost of production. In the central area, on farms having the same inherent soil-productivity rating and similar value and tax levy, the range in yields was wide. But the yield per acre had no effect on the land charge. Other costs, including building expenses, general farm expenses, and management charges tended to be the same at both yield levels. Land charges and other costs for soybeans and wheat accounted for over 50 percent of the total per-acre costs.

Power and machinery costs per acre for corn, wheat, and soybeans were slightly higher on farms having high yields than on those having low yields. Man labor also for corn and soybeans was higher on the farms having high yields. And as might be expected, costs of soil improvement (manure and other fertilizers) on corn and wheat were higher on farms having high yields than on those having low.

Since the per-acre costs of many items were of similar amounts,

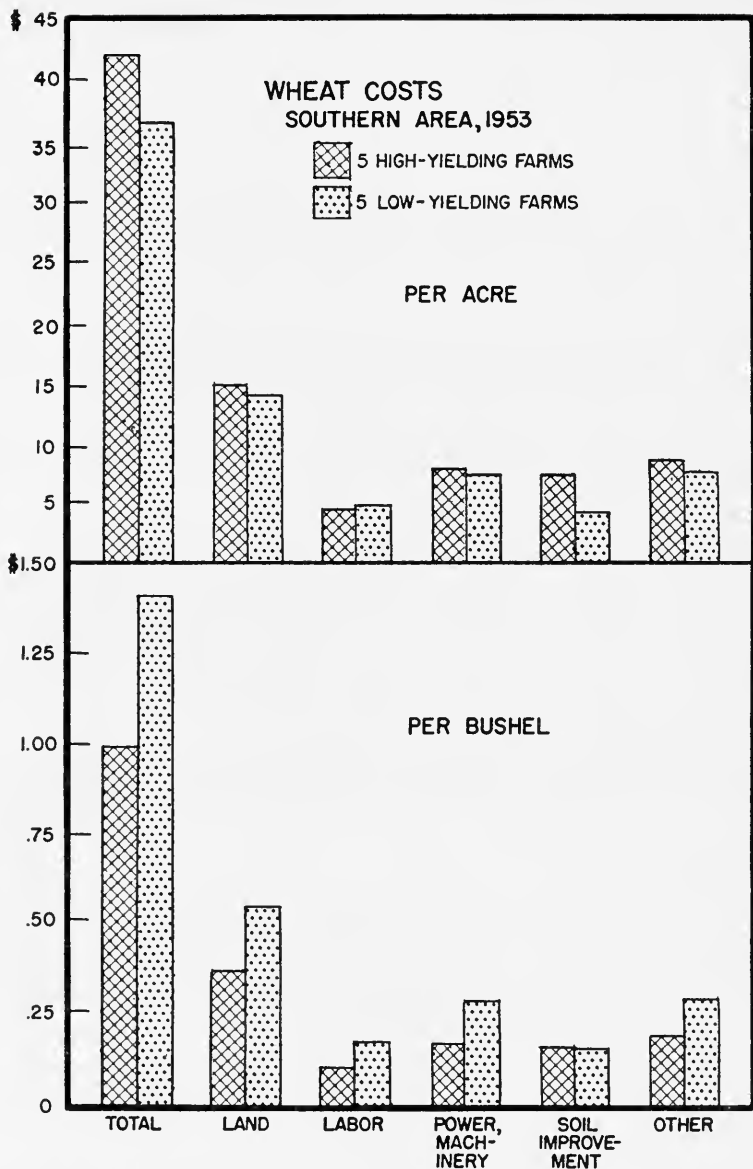


All per-acre costs except soil-improvement costs were similar. Consequently all per-bushel costs except soil-improvement costs were significantly lower on the high-yielding farms. Corn averaged 84 and 57 bushels an acre, respectively, on the two groups. (Fig. 4)



All per-acre costs were similar, and therefore all per-bushel costs were significantly lower on the high-yielding farms. Soybeans averaged 37 and 21 bushels an acre, respectively, on the two groups.

(Fig. 5)



All per-acre costs except soil-improvement costs were similar. Consequently all per-bushel costs except soil-improvement costs were lower on the high-yielding farms. Wheat averaged 43 and 26 bushels an acre, respectively, on the two groups. (Fig. 6)

the total per-bushel costs were significantly lower on the high-yielding than on the low-yielding farms (Figs. 4, 5, and 6). All the per-bushel cost items were lower on the high-yielding than on the low-yielding farms except the costs of soil improvement on corn and wheat. The soil-improvement costs for corn on the high-yielding farms were about double those on the low-yielding and for wheat were about the same at both yield levels.

Higher per-acre costs for producing corn and wheat tended to be associated with higher yields (Figs. 2 and 3). The increase in costs, however, was associated with a more than proportional increase in yields, and therefore costs per bushel tended to decrease rapidly as yield increased.

The data indicate that a large part of the costs of producing crops do not vary with yield. Some production practices, such as the use of fertilizers, or weed and insect sprays, are associated directly with yields. Most farm operators can usually decide whether to adopt such practices by figuring out whether the value of the additional yield will be greater than the additional costs of the practices.

### ***Large yields needed to meet production costs***

During the years of this study, about 75 percent of the returns from the principal cash-grain crops was required to pay all production costs per acre. The remaining 25 percent of the returns may be considered profit, or may be considered an added return to invested capital and to the operator's and the family's labor and management over and above the charges made to the crop for these factors.

The level of crop yields necessary to pay all production costs depends on the price of the crop and, of course, on the level of costs. An important part of the production cost depends on the value of land, for the land charge varies directly with land value.

In any area, land values per acre are determined largely by long-time net returns per acre to land under typical combinations of crops. If prices of farm products decline, land charges also will go down, since the value of land will drop.

The yields of the principal cash-grain crops that are required to equal total production costs on land at various price levels in central Illinois in 1951-1952 are shown in Table 5. These figures are based on the assumption that costs of production do not vary with changes in product prices and that the only cost of production that does vary with land value is the land charge.



**Table 5. — Yields per Acre Required to Equal Total  
Production Costs per Acre**

(Land at various values and crops at various prices, Central Area, 1951-1952)

| Farm price<br>per bushel | Land value per acre |            |            |            |
|--------------------------|---------------------|------------|------------|------------|
|                          | \$200               | \$300      | \$400      | \$500      |
| <b>Corn</b>              | <i>bu.</i>          | <i>bu.</i> | <i>bu.</i> | <i>bu.</i> |
| \$2.00.....              | 26                  | 28         | 30         | 32         |
| 1.75.....                | 30                  | 32         | 34         | 37         |
| 1.50.....                | 35                  | 37         | 40         | 43         |
| 1.25.....                | 42                  | 45         | 48         | 52         |
| 1.00.....                | 52                  | 56         | 60         | 65         |
| <b>Soybeans</b>          |                     |            |            |            |
| \$3.00.....              | 14                  | 15         | 16         | 18         |
| 2.50.....                | 16                  | 18         | 19         | 21         |
| 2.00.....                | 20                  | 22         | 24         | 26         |
| 1.50.....                | 27                  | 30         | 32         | 35         |
| <b>Winter wheat</b>      |                     |            |            |            |
| \$2.50.....              | 14                  | 15         | 17         | 19         |
| 2.25.....                | 15                  | 17         | 19         | 21         |
| 2.00.....                | 17                  | 19         | 21         | 23         |
| 1.75.....                | 20                  | 22         | 24         | 27         |
| 1.50.....                | 23                  | 26         | 28         | 31         |
| <b>Oats</b>              |                     |            |            |            |
| \$1.25.....              | 23                  | 26         | 30         | 33         |
| 1.00.....                | 29                  | 33         | 37         | 41         |
| .75.....                 | 39                  | 44         | 50         | 55         |
| .50.....                 | 58                  | 66         | 74         | 82         |

## Effect of Size of Field Machinery on Labor, and Power and Machinery Costs per Acre

The average number of hours of labor required per acre for growing, harvesting, storing, and marketing crops depends on several factors. The hours spent on field operations depend on the number of operations performed as well as the time of each field operation. Important factors affecting the hours of labor required per acre for any given field operation are the effective width of the machine, average speed at which it travels, length of the fields, the time for turning at the end of the field, and the time used on over-all service and rest in the field.<sup>1</sup>

A cross tabulation of the size of machine with the total labor, power and machinery hours, and costs per acre on these farms indicated, as

<sup>1</sup>R. T. Burdick, A New Technique for Field Crop Analysis. Colo. Agr. Exp. Sta. Tech. Bul. 36. 1949.

Table 6. — Effect of Size of Power-Drawn Machinery on Hours of Man Labor, Hours of Tractor Use, and Operating Cost of Power and Machinery  
(Machinery operated in corn and soybean fields)

| Item   | Northern two-thirds of state, 1948-1952 |                             | Southern third of state, 1953 |                             |
|--|---|-----------------------------|-------------------------------|-----------------------------|
|  | Large machines <sup>a</sup>             | Small machines <sup>b</sup> | Large machines <sup>a</sup>   | Small machines <sup>b</sup> |
| <b>Cornfields</b>                                    |   |                             |                               |                             |
| Man hours per acre.....                              | 6.6                                     | 8.5                         | 4.5                           | 7.4                         |
| Tractor hours per acre.....                          | 5.2                                     | 7.2                         | 3.6                           | 6.2                         |
| Power and machinery cost per acre <sup>c</sup> ..... | \$13.11                                 | \$14.20                     | \$13.03                       | \$14.90                     |
| Number of farms.....                                 | 30                                      | 41                          | 4                             | 11                          |
| Acres in corn per farm.....                          | 112                                     | 61                          | 158                           | 39                          |
| Acres per field.....                                 | 32                                      | 20                          | 33                            | 17                          |
| Tillable acres per farm.....                         | 248                                     | 143                         | 528                           | 187                         |
| <b>Soybean fields</b>                                |   |                             |                               |                             |
| Man hours per acre.....                              | 4.8                                     | 6.6                         | 3.3                           | 5.4                         |
| Tractor hours per acre.....                          | 3.3                                     | 4.8                         | 2.6                           | 5                           |
| Power and machinery cost per acre <sup>c</sup> ..... | \$ 9.60                                 | \$10.14                     | \$ 8.66                       | \$11.37                     |
| Number of farms.....                                 | 11                                      | 12                          | 7                             | 9                           |
| Acres in soybeans per farm...                        | 52                                      | 31                          | 106                           | 33                          |
| Acres per field.....                                 | 26                                      | 28                          | 21                            | 16                          |
| Tillable acres per farm.....                         | 277                                     | 204                         | 475                           | 168                         |

<sup>a</sup> Large power-drawn machines are three-bottom plows, four-row cultivators, and combines with cutter bars of seven feet or longer.

<sup>b</sup> Small power-drawn machines are two-bottom plows, two-row cultivators, and combines with cutter bars of less than seven feet.

<sup>c</sup> Includes the cost of tractors and power-drawn machinery.

might reasonably be expected, that the direct man hours and tractor hours per acre were less on farms with the larger field machinery (Table 6). On farms in the northern two-thirds of Illinois with three-bottom plows, four-row cultivators, and two-row pickers 6.6 hours of man labor and 5.2 hours of tractor use were required on corn. In the same area on farms with two-bottom plows, two-row cultivators, and one-row pickers 8.5 hours of man labor and 7.2 hours of tractor use were needed on corn. In southern Illinois the differences on corn were similar. In both areas the differences between hours of man labor and tractor use for farms using large and small machines on soybeans were similar to those on corn.

Lower per-acre costs for power and machinery on farms having larger machines are due in part to fewer hours of tractor use per acre and in part to the fact that these power and machine units were used on larger acreages. Although these larger machines represent a larger

total investment and cost, many of these annual costs do not vary with use; therefore, the costs per acre tend to become less as the acres covered increase.

Other factors important in explaining differences in the time required for field operations tended to be associated with the size of machinery. For instance, to illustrate the effect of length of field and turning time, a cross tabulation of labor and power used in fields of different sizes was tried. This tabulation by size of field also tended to sort large machines with large fields and smaller machines with small fields.

## **Results of Study as Guide to Crop Selection**

### ***Total returns most important consideration***

Farmers who do not have detailed cost records of their own may find the figures in Table 2 and Tables 11-16 in the Appendix very helpful when they come to select the crops they want to grow from among those studied during 1948-1954. Comparisons of costs, returns, and net returns for these crops show that returns vary more than costs and that net returns tended to vary directly with total returns (Table 2). These comparisons suggest that total returns are the most important item to consider when crops are to be chosen from among those studied here.

Using the figures in this bulletin, farmers may make their choices by comparing returns of various crops above the direct cost of commercial fertilizers and other variable cost items affecting yield. They can make these comparisons in terms of the cash value of the alternative crops, as was done here, or in terms of the quantity of feed each can be expected to produce.

### ***Cost of producing feed nutrients important to livestock farmers***

The figures on quantities produced and costs of producing feed nutrients (Table 3) suggest that livestock farmers may wish to weigh very carefully considerations other than the cash value of the crops they produce. When the crops are fed on the farm, growing those which produce a large quantity of feed at a low cost per unit may prove more profitable than growing those having a higher cash value.

There is a limit, however, to the use of such a test as a guide to crop selection, especially when the choice is between a roughage and a concentrate feed. Some livestock, such as hogs, can use roughages only to a limited extent. Even forage-consuming livestock, such as

dairy cattle, if the milk production level is maintained, need more than one total digestible nutrient from hay or silage to replace one total digestible nutrient from grain concentrates at the usual feeding levels.

### **Seasonal requirements for labor and power a consideration**

Seasonal requirements for labor and power are an important consideration in crop selection. Little field work on crops is now done without mechanical power, so a seasonal distribution of man labor on crops also gives a picture of power use.

In general, the relative seasonality of labor used on crops is similar in all areas of Illinois (Figs. 7 and 8). Many of the less permeable soils of southern Illinois often cannot be worked as early in the spring as the more permeable soils of northwestern Illinois, and therefore in the years of the study the labor needed for corn and soybeans in southern Illinois came somewhat later than in northern Illinois.

The difference between the areas in the distribution of labor on hay is accounted for by differences in the nurse crop used. When the legume was seeded with the small-grain crop in the same operation, all labor was charged to the small-grain crop. In the southern area where winter wheat was a nurse crop, seeding the legume was a second operation and was charged to the legume crop. Much of the labor on soybeans in late July and August was spent on hand roguing. The fall labor spent on growing a crop was for plowing and disking.

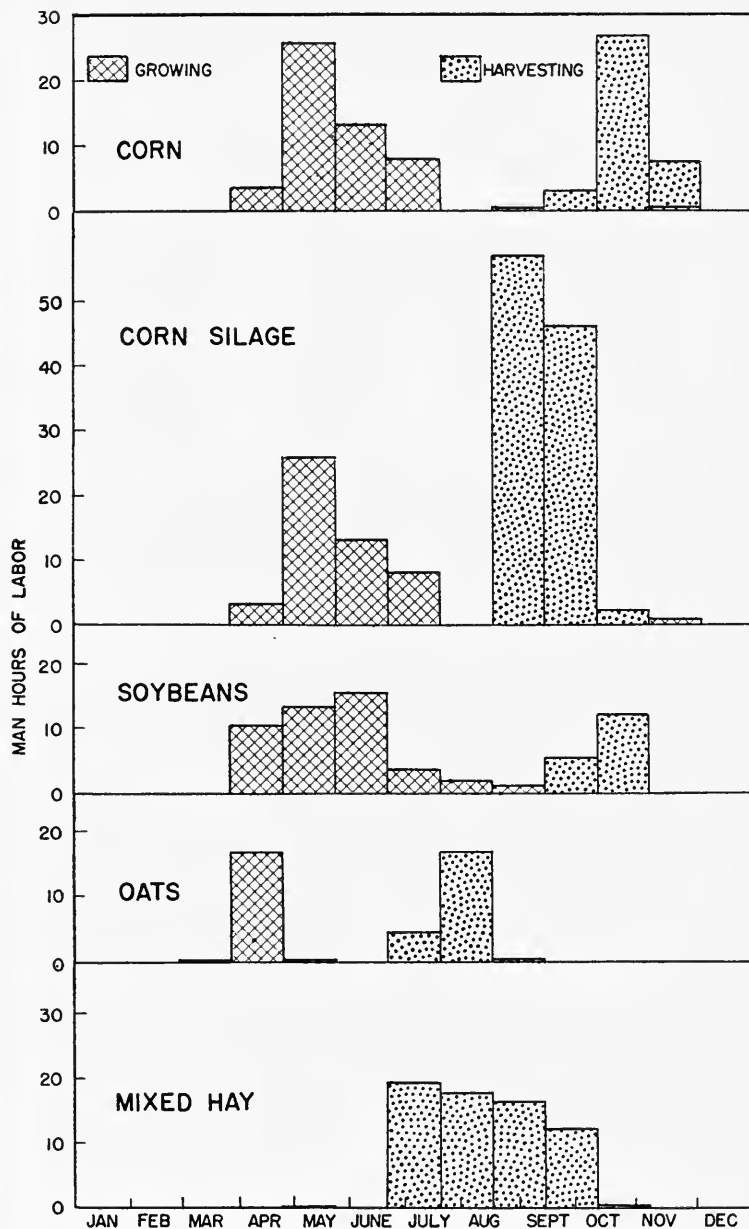
The distribution of labor on these crops indicates not only when the crops compete for labor, but also the extent to which they may compete for land. For instance, fall-seeded winter wheat usually cannot follow corn harvested as grain, because corn harvesting is usually too late for wheat sowing.

The seasonality of labor needed by all crops often means that livestock may be added to the farm organization to increase returns to labor available on the farm.

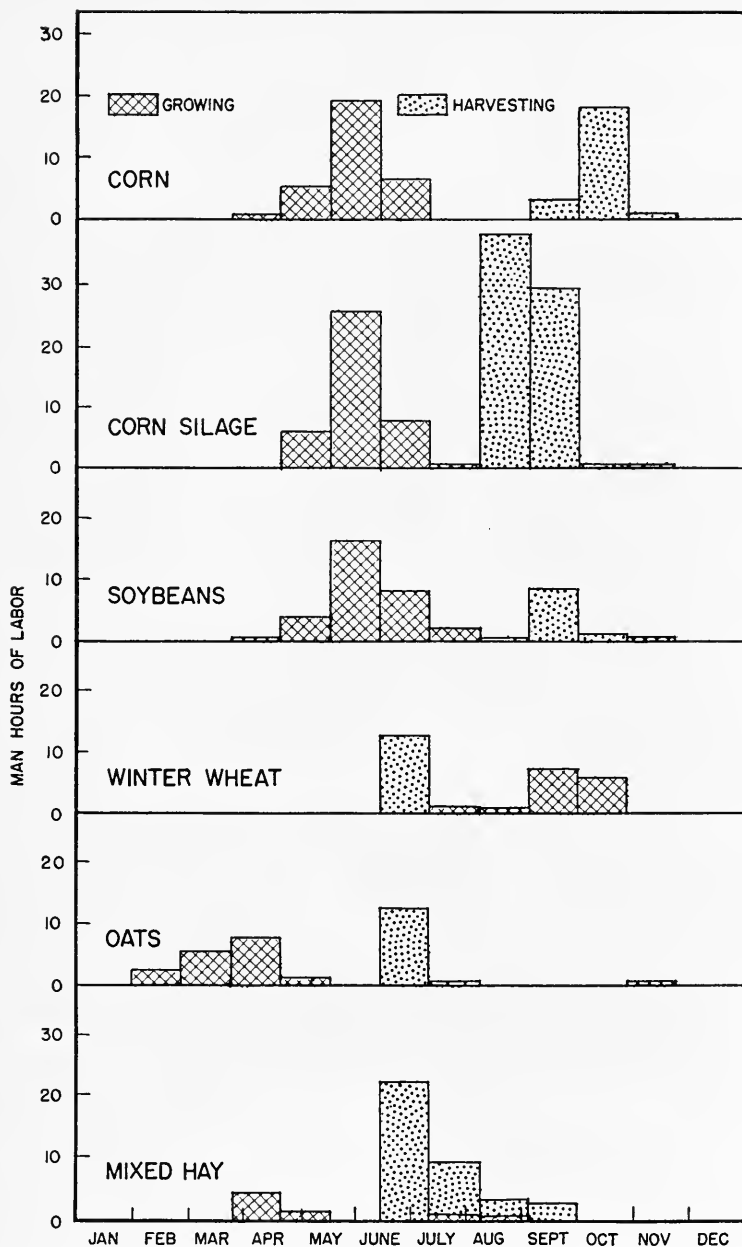
### **Other determining factors**

Crops selected for tillable land must be adapted to the combination of physical, biological, and economic conditions on the farm. In farm planning, the final standard for selecting crops in a rotation depends on their ability to contribute to net farm income from both a short-time and a long-time point of view.

To evaluate the contribution of individual crops to net farm income requires a comparison, not of the average net return over all costs, but



Hours of man labor used to grow and harvest 10 acres of the principal crops, Northwestern Area, 1949. Labor is shown by 28-day periods. (Fig. 7)



Hours of man labor used to grow and harvest 10 acres of the principal crops, Southern Area, 1953. Labor is shown by 28-day periods.

(Fig. 8)

the marginal or added return over the added direct costs. For this purpose, the cost and return figures presented in this bulletin are inadequate for two reasons. First, the cost items in the cost summary (Table 2 or Tables 11-16 in the Appendix) include an allocation of overhead costs which are not relevant to marginal cost comparisons. The uniform cost rates charged for labor and power and machinery may not reflect the added direct costs of these items to the alternative crops. For instance, when the oats crop is planted, there may be no other opportunity for the labor and power and machinery to be used on the farm. Hence the added costs for growing oats would be only the added direct expenses and would not include any of the overhead or fixed costs. Second, the returns may be incomplete in that by-products and contributions to other enterprises have not been credited fully. No way has been found to credit oats for their value as a nurse crop for legume seedings, or to credit hay and pasture for their value in controlling erosion and maintaining fertility.

In Illinois, the choice of crops can be simplified by classifying crops into cultivated crops, small grains or nurse crops, and hay and pasture crops. Within these classes the figures presented here are most useful in selecting high-profit crops either in terms of cash income or feed for livestock. Among cultivated crops, on the basis of the figures given by this study, the choice is between corn grain, corn silage, and soybeans. Among small grains, the choice is between oats and wheat.

When the percentage of each class of crop to be grown on any farm is to be decided, factors other than relative returns need to be considered. On rolling land subject to erosion, the percentage of land in hay and pasture crops may depend on the soil type and the extent to which the soil can be or is conserved by field practices or mechanical structures. On soils less subject to erosion, the percentage of hay and pastures grown rests on the need to maintain fertility, the relative costs of commercial fertilizers, and the forage requirements of the livestock in the farm organization. The percentage of small grains for nurse crops will tend to be limited by the seeding needs of hay and pasture crops.

## II — TRENDS IN COSTS AND RETURNS, 1921-1952

The seven-year period, 1948-1954, covered by this study is not long enough to permit analysis of general trends in costs and returns. To bring out some important conclusions concerning these trends, supplementary data from earlier studies made in Champaign and Piatt counties have been used.

## Labor Required Declined

The man labor used per acre for crop production went down over 50 percent during the last 30 years. The figures indicate that in Champaign and Piatt counties in 1921-1922 it took 14.4 hours of man labor to grow and harvest an acre of corn (Table 7). In central Illinois, the area most comparable to the Champaign-Piatt county area, 6.5 man hours were used in 1951-1952. Man hours for soybeans declined from 13 to 5.9; for winter wheat from 12.3 to 3.4; and oats from 6.7 to 3.1.

**Table 7.—Average Man Hours Required to Produce Some Major Crops in Central Illinois in Recent and in Past Years**

| Item                             | Cass, Logan,<br>Menard,<br>Morgan, and<br>Sangamon<br>counties,<br>1951-1952 | Champaign and Piatt counties |           |                   |
|----------------------------------|--|------------------------------|-----------|-------------------|
|                                  |  | 1941-1942                    | 1931-1932 | 1921-1922         |
| <b>Corn</b>                      |  |                              |           |                   |
| Man hours per acre.....          | 6.5  | 7.7                          | 11.9      | 14.4              |
| Yield per acre, bushels.....     | 69.8   | 71.9                         | 53.5      | 48.8              |
| Minutes of labor per bushel..... | 5.6  | 6.4                          | 13.3      | 17.7              |
| Percent of the corn crop:        |  |                              |           |                   |
| Machine husked.....              | 100  | 93                           | 13        | 0                 |
| Hand husked.....                 | 0  | 7                            | 87        | 100               |
| <b>Soybeans</b>                  |  |                              |           |                   |
| Man hours per acre.....          | 5.9  | 4.2                          | 7.2       | 13.0 <sup>a</sup> |
| Yield per acre, bushels.....     | 31.2   | 27.3                         | 27.3      | 16.4              |
| Minutes of labor per bushel..... | 11.3   | 9.2                          | 15.8      | 47.6              |
| Percent of soybean crop:         |  |                              |           |                   |
| Cultivated.....                  | 100  | 18                           | 0         | 0                 |
| Combined.....                    | 100  | 100                          | 74        | 0                 |
| Threshed.....                    | 0  | 0                            | 26        | 100               |
| <b>Winter wheat</b>              |  |                              |           |                   |
| Man hours per acre.....          | 3.4  | 3.8 <sup>b</sup>             | 6.0       | 12.3              |
| Yield per acre, bushels.....     | 27.7   | 25.2                         | 25.9      | 22.8              |
| Minutes of labor per bushel..... | 7.4  | 9.0                          | 13.9      | 32.4              |
| Percent of wheat crop:           |  |                              |           |                   |
| Combined.....                    | 100  | 100                          | 52        | 0                 |
| Threshed.....                    | 0  | 0                            | 48        | 100               |
| <b>Oats</b>                      |  |                              |           |                   |
| Man hours per acre.....          | 3.1  | 4.0                          | 6.8       | 6.7               |
| Yield per acre, bushels.....     | 44.6   | 43.3                         | 49.2      | 32.2              |
| Minutes of labor per bushel..... | 4.2  | 5.5                          | 8.3       | 12.5              |
| Percent of oat crop:             |  |                              |           |                   |
| Combined.....                    | 100  | 73                           | 9         | 0                 |
| Threshed.....                    | 0  | 27                           | 91        | 100               |

<sup>a</sup> 1922-1923 data used since data for 1921 not available.

<sup>b</sup> 1940-1941 data used since in 1942 only four farms harvested wheat due to severe winter killing that year.



Changes in the methods used in growing and harvesting are responsible for the decreases in the direct labor used per acre. In the early years, the reduction in hours of labor was associated with the change from horse-drawn to mechanical-powered field implements and with the adoption of mechanical harvesting machines. In the later years, the increase in size of power units that can be used to propel larger power-drawn machinery in multiple or individual units has been responsible for an even further reduction in the time spent on crops.

Much of the time-reducing possibilities of mechanical power and field harvesting machines was realized in the early 1940's. Part of the time thus saved is shown by the amount of the crop harvested by the alternative methods of harvest used on each crop (Table 7). The man hours per acre for soybeans have increased slightly since 1941-1942. The change from drilling to rowing and cultivating the crop are believed to be responsible for this increase.

The minutes of labor used per bushel show a proportionately greater decline than the man hours per acre. At the same time that man hours needed per acre were being reduced, yields per acre were increasing. This increase in yields resulted in the larger decline in time spent per bushel.

### **Operating Costs per Acre Increased**

Operating costs for labor, capital items, and taxes per acre increased in actual and adjusted terms during the 30-year period. In 1921-1922 actual operating costs averaged \$16.04 per acre for corn; in 1951-1952 they averaged \$41.70 per acre (Table 8). Actual costs for soybeans, winter wheat, and oats also increased.

Prices of items used in production changed greatly during the period. And the form of the items changed. Tractor power replaced horse labor. Then tractors changed in form—from the four-wheel to the three-wheel row-crop type. They also changed in size and capacity. Mechanical power and machinery substituted for man labor and also increased the timeliness of operations.

To compare operating costs over the 30-year period, adjustments must be made for changes in prices farmers paid for production items. An imperfect way to make this adjustment is to inflate all costs to the 1951-1952 level by the index of prices farmers paid.

The adjusted operating costs per acre for corn declined from \$34.40 an acre in 1921-1922 to \$27.16 in 1941-1942 and then increased to \$41.70 in 1951-1952 (Table 8). Trends in adjusted operating costs for soybeans, winter wheat, and oats were similar.

Table 8. — Average Operating Cost of Producing Some Major Crops in Central Illinois in Recent and in Past Years

| Item   | Cass, Logan,<br>Menard,<br>Morgan,<br>Sangamon<br>counties<br>1951-1952 | Champaign and Piatt counties |           |           |
|--|---|------------------------------|-----------|-----------|
|  |   | 1941-1942                    | 1931-1932 | 1921-1922 |
| <b>Corn</b>  |   |                              |           |           |
| Operating cost per acre <sup>a</sup> .....                               | \$41.70   | \$13.80                      | \$11.07   | \$16.04   |
| Operating cost adjusted for<br>changes in price level <sup>b</sup> ..... |   | 27.16                        | 28.44     | 34.40     |
| Yield per acre, bushels.....   | 69.8  | 71.9                         | 53.5      | 48.8      |
| Adjusted operating cost<br>per bushel.....                               | \$ .60  | \$ .38                       | \$ .53    | \$ .70    |
| <b>Soybeans</b>  |   |                              |           |           |
| Operating cost per acre <sup>a</sup> .....                               | \$30.22   | \$11.34                      | \$ 9.92   | \$16.69   |
| Operating cost adjusted for<br>changes in price level <sup>b</sup> ..... |   | 22.30                        | 25.36     | 34.50     |
| Yield per acre, bushels.....   | 31.2  | 27.3                         | 27.3      | 16.4      |
| Adjusted operating cost<br>per bushel.....                               | \$ .97  | \$ .82                       | \$ .93    | \$ 2.10   |
| <b>Winter wheat</b>  |   |                              |           |           |
| Operating cost per acre <sup>a</sup> .....                               | \$26.65   | \$ 8.64 <sup>c</sup>         | \$ 9.20   | \$16.92   |
| Operating cost adjusted for<br>changes in price level <sup>b</sup> ..... |   | 18.69                        | 23.68     | 36.30     |
| Yield per acre.....  | 27.7  | 25.2                         | 25.9      | 22.8      |
| Adjusted operating cost<br>per bushel.....                               | \$ .96  | \$ .74                       | \$ .91    | \$ 1.59   |
| <b>Oats</b>  |   |                              |           |           |
| Operating cost per acre <sup>a</sup> .....                               | \$21.20   | \$ 8.71                      | \$ 8.02   | \$ 8.73   |
| Operating cost adjusted for<br>changes in price level <sup>b</sup> ..... |   | 17.13                        | 20.54     | 18.72     |
| Yield per acre, bushels.....   | 44.6  | 43.3                         | 49.2      | 32.2      |
| Adjusted operating cost<br>per bushel.....                               | \$ .48  | \$ .40                       | \$ .42    | \$ .58    |

<sup>a</sup> Total labor, capital, and tax charges are included; interest on investment in land and management charge are excluded.

<sup>b</sup> Cost adjusted to 1951-1952 level by the index of prices paid by farmers for production items, U. S. Department of Agriculture.

<sup>c</sup> Data for 1940-1941.

The decline in total operating costs per acre through 1941-1942 was caused by a substantial reduction in man and horse labor with a relatively small increase in power and machinery expenses. The increase in costs for 1951-1952 arose primarily from increased expenses for fertilizers and power and machinery. The increase in costs of power and machinery has been accompanied by only a small decrease in hours of labor as compared with the decrease that occurred in the earlier years. It is probable that the costs of mechanization in this later period may reflect expenditures for machines and accessories

which reduce the physical effort required by various operations rather than the hours of labor required.

The adjusted gross operating costs per bushel declined substantially from 1921-1922 through 1941-1942, and then by 1951-1952 increased for all crops (Table 8). This decline and increase in per-bushel costs is more pronounced than the changes in per-acre costs, because yields increased greatly in the first 20 years of the period and changed less in the last 10 years.

In these two areas, crop-yield trends on cost-account farms were similar to those reported by the Crop Reporting Service (Table 9). The two-year average yield on cost-account farms was higher, however. The yields of all major crops have increased. Corn and soybeans showed the greatest relative increase, while oats and wheat showed the

**Table 9.—Trends in Average Yields of Some Major Crops in Recent and in Past Years in Central Illinois**

(Yields on cost-account farms in this series of cost studies compared with yields reported by crop reporters)

| Years               | Yields on cost-account farms | Yields reported by crop reporters <sup>a</sup> |  |
|---------------------|------------------------------|--|--|
|                     |                              | Champaign and Piatt counties                   | Cass, Logan, Menard, Morgan, and Sangamon counties |
|                     | <i>bu.</i>                   | <i>bu.</i>                                     | <i>bu.</i>   |
| <b>Corn</b>         |                              |  |  |
| 1951-1952.....      | 69.8                         | 61.5   | 58.9   |
| 1941-1942.....      | 71.9                         | 61.8   | 57.2   |
| 1931-1932.....      | 53.5                         | 43.0   | 42.1   |
| 1921-1922.....      | 48.8                         | 36.9   | 32.0   |
| <b>Soybeans</b>     |                              |  |  |
| 1951-1952.....      | 31.2                         | 28.5   | 28.4   |
| 1941-1942.....      | 27.3                         | 24.0   | 20.7   |
| 1931-1932.....      | 27.3                         | 21.2   | 19.8   |
| 1922-1925.....      | 16.4                         | ( <sup>b</sup> )                               | ( <sup>b</sup> )                                   |
| <b>Oats</b>         |                              |  |  |
| 1951-1952.....      | 44.6                         | 38.0   | 38.3   |
| 1941-1942.....      | 43.3                         | 42.0   | 38.3   |
| 1931-1932.....      | 49.2                         | 41.0   | 37.0   |
| 1921-1922.....      | 32.2                         | 26.5   | 24.6   |
| <b>Winter wheat</b> |                              |  |  |
| 1951-1952.....      | 27.7                         | 26.0   | 23.6   |
| 1940-1941.....      | 25.2                         | 24.5   | 24.9   |
| 1931-1932.....      | 25.9                         | 21.8   | 20.1   |
| 1921-1922.....      | 22.8                         | 21.2   | 21.9   |

<sup>a</sup> County yields as reported to the Illinois Cooperative Crop Reporting Service.

<sup>b</sup> Yields not reported.

least. The increase in yields was the result of improved varieties of crops, increased use of fertilizers, better control of weeds, insects, and diseases, and better tillage and harvesting operations.

The increase in the adjusted operating costs per acre and per bushel in 1951-1952 without an increase in crop yields over those reported in 1941-1942 is difficult to explain. It suggests that perhaps the additional fertilizer has been for fertility maintenance and build up to offset the declining native fertility of the soil. It also suggests that some of the additional fertilizers, herbicides, insecticides, and larger power and machines may have been uneconomic in that additional costs were greater than additional returns.

### Cash Costs Increased

Cash outlays for producing field crops have increased over the 30-year period. Substituting mechanical power for man and horse labor has increased the direct cash outlays for the original investment in items of power and machinery and for their operating expenses in the forms of gasoline, oil, repair parts, and repair labor. In central Illinois the annual cash operating costs of growing and harvesting

Table 10. — Cash, Depreciation, Interest, and Noncash Costs per Acre of Growing and Harvesting Corn Grain, Central Illinois, 1951-1952

| Item                             | Current cash | Depreciation charges <sup>a</sup> | Interest on investment | Other noncash | Total of all costs |
|----------------------------------|--------------|-----------------------------------|------------------------|---------------|--------------------|
| Land                             |              |                                   |                        |               |                    |
| Taxes.....                       | \$ 2.80      | ....                              | ....                   | ....          | \$ 2.80            |
| Interest.....                    | ....         | ....                              | \$11.57                | ....          | 11.57              |
| Labor                            |              |                                   |                        |               |                    |
| Hired.....                       | 2.24         | ....                              | ....                   | ....          | 2.24               |
| Unpaid operator and family.....  | ....         | ....                              | ....                   | \$ 6.22       | 6.22               |
| Capital                          |              |                                   |                        |               |                    |
| Power.....                       | 3.59         | \$ 2.22                           | .55                    | ....          | 6.36               |
| Machinery.....                   | 1.98         | 4.83                              | 1.19                   | ....          | 8.00               |
| Soil improvements.....           | 2.40         | 2.66                              | ....                   | 2.77          | 7.83               |
| Seed and other crop expense..... | 2.34         | ....                              | ....                   | ....          | 2.34               |
| Buildings.....                   | .64          | 1.20                              | .68                    | ....          | 2.52               |
| General farm expense....         | 1.67         | .85                               | .76                    | ....          | 3.28               |
| Total.....                       | \$17.66      | \$11.76                           | \$14.75                | \$8.99        | \$53.16            |
| Percent of total.....            | 33.2         | 22.1                              | 27.8                   | 16.9          | 100.0              |

<sup>a</sup> This is a prepaid cash cost and it represents that part of the cost allocated to this particular accounting year.

an acre of corn were 33.2 percent of the total costs (Table 10). The prepaid cash or depreciation charges were 22.1 percent of the total costs.

Wilcox and Case<sup>1</sup> estimated that in 1913-1915 the direct cash outlay was 14.1 percent and the cash reserve for depreciation was 4.3 percent of the total costs of producing an acre of corn in central Illinois. They also estimated that in 1935-1937 the direct cash outlay had risen to 28.3 percent and the necessary reserve to meet depreciation had risen to 8 percent of the total.

It should be recognized that if part of investment capital is borrowed, then a part of the interest on investment also becomes a cash cost rather than merely an opportunity cost.

## SUMMARY

This bulletin summarizes and analyzes two years of crop costs and returns for each of four areas of Illinois—western, northwestern, central, and southern—for the period 1948-1954.

Corn gave the greatest net returns per acre in the areas of the northern two-thirds of Illinois. Total returns were found to indicate the relative profitability of the crops studied almost as well as net returns.

Feed nutrients from corn, both as grain and silage, and from hay were produced at the lowest cost per 100 pounds. When livestock farmers select rotations, they may consider feed crops that produce high yields and feed at a low cost per unit.

The crop cost-and-return data varied widely from farm to farm. Farm-to-farm differences arise from differences in the quantity and quality of the resources employed, including the management of the operator. Part of the differences reflected differences in the soil and climate between areas. And part of the variations reflected year-to-year changes in yields, product prices, and cost items.

Yield per acre stood out as the most important factor affecting the cost of producing a bushel or a ton of crops. A large part of the costs per acre do not vary with yield. A large yield was necessary on all crops to meet the cost of production. Yield-increasing practices can be evaluated by determining whether the value of the additional yield is greater than the cost of the practice.

Seasonal labor and power requirements for crops were similar in all areas of the state.

<sup>1</sup>R. H. Wilcox and H. C. M. Case. *Twenty-five Years of Illinois Crop Costs, 1913-1937*. Ill. Agr. Exp. Sta. Bul. 467, pp. 388-9. 1940.

The data provided measures of the relative profitability of alternative crops as a guide to crop selection. However, final consideration in selecting crops to be included in a crop rotation rests upon the contribution of the crop to net farm income. Such selection often requires data and analysis beyond that presented in this bulletin.

The data confirmed the expectation that the use of large power-drawn field machines materially cuts down the number of man hours required per acre.

In the 30-year period, 1921-1952, labor requirements per acre were reduced 50 percent on major grain crops. The total actual and adjusted operating costs per acre were higher in 1951-1952 than in previous years. Yields of all crops have increased materially. Cash outlays for annual operating expenses and depreciation per acre for producing corn have more than doubled during this period.

## APPENDIX

### ***Methods of compiling cost and return data***

All costs in this bulletin are expressed in monetary terms, even though some cost items involve little cash outlay. The reduction of costs to a common basis is necessary because farmers use resources in different forms. Physical costs for man hours, tractor hours, and truck miles are given because they are useful in farm planning. The tables are so arranged that other cost rates for hours of labor, hours of tractor use, seed, fertilizer or manure may be substituted for those used here. It is thus possible on the basis of these data to determine how selected costs of production would vary under different price levels from period to period or year to year.

The method used to charge noncash cost is often called the "alternative price" system. The alternative price refers to the price that could have been obtained for commodities or labor used in production if they had been used in the next best alternative open at the time. For example, in charging unpaid labor of operator or his family on crops, the wage paid for hired labor in the local area was used, for the operator or his family could have received that wage for performing the same type of manual labor in the community at that time.

### ***Items of cost***

The items of cost for production of individual crops are summarized under four heads: land, labor, capital, and management.

The land charge was 4 percent interest on the current value of

bare land plus the real estate taxes. From 1948 to 1952, the current value was assigned to land according to the soil productivity rating by adjusting a regressive relationship between actual land-sale prices and soil-productivity ratings according to the U. S. Department of Agriculture land-value index. After 1952, the adjusted regression between soil productivity and earned value of land for 1950-1951 on Farm-Bureau Farm-Management Service farms was used to assign current land values.

To determine the soil productivity rating of land for each crop, a soil survey was made on each field. The rating was based on the scale established by the soil survey division of the Agronomy Department of the University of Illinois. In this scale, the most productive soils in the state have been given a rating, or index, of 100 and the least productive a rating of 5. These ratings indicate the ability of the soil to grow crops under a low level of management.

The labor charge was based on a daily record kept on each farm, showing in detail the task performed, the time used, and who did the work. The labor charge on crops included the cost of hired labor, the proportional share for labor of the cost of hired custom work, and the charges for the labor of the operator, unpaid family labor, and exchange labor received. The charge for unpaid labor was computed at the average hourly rate for hired men working eight months or more on farms in the study.

The hourly rate for hired workers was computed by dividing cash wages plus social security plus cost of board furnished, or plus market value of feed and farm-raised food furnished, by total of hours worked. The cost of housing and other buildings furnished to labor was included in the building charge.

The labor charge made against any crop enterprise was of two kinds—direct and indirect. Direct labor on crops was the time spent in growing, harvesting, storing, and marketing the crop. Indirect labor on crops was an allocation of the time spent servicing and repairing power units, machinery, equipment, and buildings; hauling manure; and on general farm upkeep. The labor on these various tasks was allocated as indirect labor in exactly the same way as the capital charges on these items. For example, labor on the combine was distributed to oats, wheat, and soybeans on the basis of acres of these crops harvested by the combine.

The **capital charge** was itemized under nine headings: tractor, truck, other machinery, manure, other fertilizers, seed, other crop expense, buildings, and general farm expense.

*The truck, tractor, and other machinery charges* included the cost of fuel and oil, depreciation, insurance, interest at 5 percent on beginning inventory value, and repairs. The proportional share for power and machinery of the cost of custom work hired and machine hire were included. Power and machinery received in exchange were included at the average rates of cost for those items in the area.

Daily records on each farm (similar to the labor records) provided information on tractor hours and truck miles used on each crop. Each crop was charged at the average rate times the amount of use of each power unit.

Separate accounts were kept for each kind of crop machinery, such as general crop machinery, corn machinery and hay machinery, and for certain individual machines such as combines, corn pickers, forage harvesters, and balers. The expenses of the specialized crop machinery were distributed to the crops by a simple division of the expense of each machine or group of machines by the number of acres on which the machine or machines were used. The expense of general crop machinery — plows, disks, harrows, and similar implements used on several crops — was distributed among the crops on a weighted-acre basis that represented the average comparative use of the machinery on each crop. The unit weight used for the important crops was: corn, 10; soybeans, 10; oats, 3; wheat, 10; and fall plowing, 6. In all cases where a machine was used in custom or exchange work off the farm, the acres covered were included in the acreage basis for expense distribution.

The costs of operating power and machinery were allocated to the crop as direct and indirect costs. The direct costs were those incurred by putting in, harvesting, and marketing a crop. Indirect costs were mainly for the use of power and machinery for general farm upkeep, including tractor, truck, and machine hours used in hauling manure, applying permanent land improvements, grading roads, mowing fence rows, and performing other like tasks. The allocation of the costs of these indirect uses of power and machinery was made on the same basis as the allocation of the costs of the items on which the power and machines were used; that is, tractor hours spent on hauling manure were allocated to the crops on the same basis as were the manure charges.



*The manure charge* included the value of barnyard manure applied to the land. Manure was valued at \$2.00 a load for 1948 to 1950; \$3.00 a load in 1951; and \$4.00 a load for 1952-1954. Manure applied during the year was charged off in that year to all crop acres regardless of where it was applied, and the charge distributed on a weighted-acre basis. Each crop acre was given a weight in units intended to represent the proportion of plant nutrients removed by each crop. These weights were: corn, 65; oats, 5; wheat, 20; soybeans, 20; and rotated pasture and hay, 20.

*The other fertilizer charge* included the cost of purchased commercial fertilizers; depreciation on limestone and rock phosphate; depreciation on land improvements such as tiling, terraces and waterways; and costs of soil testing. Depreciation on limestone and rock phosphate was distributed to the crop acres on the same weighted-acre basis as the manure charge. Depreciation on land improvements was distributed uniformly for all crop acres. Commercial fertilizers were charged to the crop where they were applied. Fall applications of fertilizer were charged to the crop harvested the next season.

*The seed charge* includes the cost of purchased seeds, or the current price of home-grown seed plus the costs of seed treatment. The cost of seed for a mixed legume-hay crop was charged equally over a 2- or 3-year period since the seeding usually remained for those times.

*Other-crop-expense charge* included charges for insurance on stored grain, insurance against hail, weed and insect sprays, and miscellaneous storage charges.

*The buildings charge* for crops included repairs, depreciation, fire and windstorm insurance, and interest at 4 percent on the beginning inventory value of buildings used for storing crops and housing power units, machinery, and equipment used in producing the crop. Building costs were allocated on the basis of space used by crop, machine, or item housed. The cost of buildings used to store the crops was a direct cost.

The building expense chargeable for storing machinery and equipment was distributed in two ways. First, the building expenses for all specialized crop machinery were summed and distributed to each crop on the basis of direct tractor hours performed on the crops. Second, the building expenses on other machines, such as tractors, trucks, farm share of auto, and small tools used on all productive enterprises were distributed to productive crops and livestock on the basis of amount of

direct man hours. The hired man's house and other nonassignable building expenses were distributed to all enterprises also on the basis of direct man hours spent on productive enterprises.

*The general-farm-expense charge* included miscellaneous expenditures, such as farm share of auto expense, taxes and interest charges on land in the farmstead, roads and lanes, farm organization dues, telephone, electricity, accounting fees, farm magazine subscriptions, and other expenditures which could not be allocated directly to any of the other accounts. The costs of these general overhead items were added and distributed to all crop and livestock enterprises on the basis of the amounts of direct labor used by the enterprises.

**A management charge** for the operator was included as a cost item. The management charge for the total farm was computed at 7 percent of the adjusted farm returns — gross farm returns less purchases of feed and feeder stock. This 7 percent charge was the one commonly made by Illinois commercial farm managers. The management charge for each farm was adjusted for quality of management by an index of the three-year average (two years prior to the year of the study plus the year of the study) of rate earned on investment of all farms in the study. This adjusted management charge was allocated to productive enterprises on the basis of total costs other than management.

## **Returns**

The prices of grains and hay used to determine the value produced represent the average crop-year prices received in the area studied. The pastures and straw utilized were included as part of returns and valued at 12 to 13 cents per pasture day and \$2.00 to \$4.00 per ton of loose straw in the field, since cost of labor and machinery for harvesting was not charged against the small-grain crop.

Table 11.—CORN: Annual Costs<sup>a</sup> and Returns per Acre  
(Four areas, 1948-1954)

|                                 | Western       |               | Northwestern  |               | Central       |               | Southern       |                    |
|---------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|--------------------|
|                                 | 1948          | 1949          | 1949          | 1950          | 1951          | 1952          | 1953           | 1954 <sup>b</sup>  |
| Number of farms.....            | 38            | 32            | 36            | 39            | 40            | 35            | 41             | 45                 |
| Acres in crops per farm...      | 85.3          | 90.2          | 54.0          | 50.2          | 96.5          | 93.0          | 51.6           | 61.4               |
| Yield per acre, bushels...      | 78.5          | 65.0          | 76.6          | 66.6          | 69.7          | 69.8          | 46.5           | 16.0               |
| <b>Labor and power per acre</b> |               |               |               |               |               |               |                |                    |
| Man hours, direct.....          | 8.0           | 7.2           | 9.2           | 8.0           | 6.6           | 6.5           | 6.4            | 6.9                |
| Man hours, indirect...          | 5.1           | 5.1           | 7.5           | 7.4           | 3.9           | 4.1           | 4.1            | 4.1                |
| Tractor hours, direct...        | 6.6           | 6.0           | 7.3           | 6.8           | 5.6           | 5.5           | 5.2            | 5.0                |
| Tractor hours, indirect         | 1.4           | 1.2           | 1.8           | 2.1           | .7            | .7            | 1.1            | 1.0                |
| Truck miles, direct....         | .2            | .1            | .3            | .1            | .9            | .6            | .7             | 1.3                |
| Truck miles, indirect..         | .4            | 1.7           | 2.2           | .9            | 5.3           | 4.8           | 3.9            | 4.6                |
| <b>Costs per acre</b>           |               |               |               |               |               |               |                |                    |
| <b>Land</b>                     |               |               |               |               |               |               |                |                    |
| Taxes.....                      | \$ 1.96       | \$ 2.39       | \$ 2.19       | \$ 2.49       | \$ 2.76       | \$ 2.85       | \$ 1.73        | \$ 1.81            |
| Interest, 4 percent...          | 7.74          | 8.19          | 6.63          | 7.05          | 11.22         | 11.97         | 5.94           | 6.12               |
| Total.....                      | 9.70          | 10.58         | 8.82          | 9.54          | 13.98         | 14.82         | 7.67           | 7.93               |
| Labor.....                      | 10.05         | 8.82          | 10.26         | 9.66          | 8.24          | 8.72          | 7.65           | 8.21               |
| <b>Capital</b>                  |               |               |               |               |               |               |                |                    |
| Tractor.....                    | 6.40          | 7.02          | 8.38          | 8.28          | 6.23          | 6.50          | 6.73           | 7.16               |
| Truck.....                      | .15           | .32           | .39           | .19           | .74           | .71           | .44            | .60                |
| Other machinery.....            | 5.58          | 6.86          | 8.42          | 9.70          | 7.17          | 7.38          | 7.66           | 8.44               |
| Manure.....                     | 3.61          | 3.43          | 7.69          | 9.30          | 2.44          | 3.15          | 6.78           | 6.46               |
| Other fertilizers.....          | 2.64          | 3.29          | 4.52          | 5.39          | 4.58          | 5.60          | 15.91          | 13.30              |
| Seed.....                       | 1.83          | 1.68          | 1.78          | 1.79          | 1.57          | 1.72          | 1.65           | 1.62               |
| Other crop expense....          | 1.14          | 1.27          | 1.25          | 1.80          | .75           | .64           | .25            | .33                |
| Buildings.....                  | 2.95          | 2.78          | 2.84          | 3.53          | 2.38          | 2.68          | 2.19           | 1.27               |
| General farm expense..          | 2.38          | 2.42          | 2.77          | 2.92          | 3.06          | 3.53          | 2.23           | 2.46               |
| Total capital costs..           | 26.68         | 29.07         | 38.04         | 42.90         | 28.92         | 31.91         | 43.84          | 41.64              |
| Management.....                 | 2.72          | 2.38          | 2.69          | 3.12          | 3.12          | 2.62          | 2.45           | 2.05               |
| <b>Total costs.....</b>         | <b>49.15</b>  | <b>50.85</b>  | <b>59.81</b>  | <b>65.22</b>  | <b>54.26</b>  | <b>58.07</b>  | <b>61.61</b>   | <b>59.83</b>       |
| <b>Net cost per bushel....</b>  | <b>\$ .62</b> | <b>\$ .78</b> | <b>\$ .78</b> | <b>\$ .98</b> | <b>\$ .77</b> | <b>\$ .81</b> | <b>\$ 1.31</b> | <b>\$ 2.94</b>     |
| <b>Price per bushel.....</b>    | <b>1.30</b>   | <b>1.28</b>   | <b>1.28</b>   | <b>1.63</b>   | <b>1.70</b>   | <b>1.50</b>   | <b>1.45</b>    | <b>1.46</b>        |
| <b>Returns per acre</b>         |               |               |               |               |               |               |                |                    |
| <b>Gross</b>                    |               |               |               |               |               |               |                |                    |
| Grain.....                      | \$102.05      | \$83.13       | \$98.44       | \$108.28      | \$118.58      | \$104.69      | \$67.24        | \$16.22            |
| Pasture.....                    | .42           | .04           | .14           | .....         | .70           | 1.32          | .59            | 12.83 <sup>c</sup> |
| Total.....                      | 102.47        | 83.17         | 98.58         | 108.28        | 119.28        | 106.01        | 67.83          | 29.05              |
| Net.....                        | 53.32         | 32.32         | 38.77         | 43.06         | 65.02         | 47.94         | 6.22           | -30.78             |

<sup>a</sup> Costs include growing, harvesting, storing, and marketing charges.

<sup>b</sup> In 1954 only, costs and returns per acre are for acres planted rather than acres harvested as corn grain. The yields, however, are on acres harvested.

<sup>c</sup> Returns from pasture include the value of silage harvested at \$8.00 per ton.

**Table 12. — CORN SILAGE: Annual Costs<sup>a</sup> and Returns per Acre**  
(Northwestern and southern Illinois, 1949, 1950, and 1953)

|                                 | Northwestern |              | Southern     |
|---------------------------------|--------------|--------------|--------------|
|                                 | 1949         | 1950         | 1953         |
| Number of farms.....            | 23           | 26           | 33           |
| Acres in crops per farm.....    | 6.8          | 7.5          | 15.1         |
| Yield per acre, tons.....       | 12.0         | 11.9         | 7.6          |
| <b>Labor and power per acre</b> |              |              |              |
| Man hours, direct.....          | 15.9         | 14.4         | 11.7         |
| Man hours, indirect.....        | 7.7          | 8.7          | 4.0          |
| Tractor hours, direct.....      | 10.9         | 10.4         | 7.6          |
| Tractor hours, indirect.....    | 2.0          | 2.3          | 1.0          |
| Truck miles, direct.....        | .6           | 0            | .8           |
| Truck miles, indirect.....      | 1.9          | .6           | 3.2          |
| <b>Costs per acre</b>           |              |              |              |
| <b>Land</b>                     |              |              |              |
| Taxes.....                      | \$ 2.11      | \$ 2.57      | \$ 1.62      |
| Interest, 4 percent.....        | 6.50         | 7.06         | 5.80         |
| Total.....                      | 8.61         | 9.63         | 7.42         |
| Labor.....                      | 14.89        | 14.79        | 11.60        |
| <b>Capital</b>                  |              |              |              |
| Tractor.....                    | 11.86        | 12.08        | 9.96         |
| Truck.....                      | .51          | .10          | .41          |
| Other machinery.....            | 13.19        | 13.87        | 8.36         |
| Manure.....                     | 8.01         | 9.36         | 7.35         |
| Other fertilizers.....          | 3.64         | 3.88         | 4.16         |
| Seed.....                       | 1.78         | 1.68         | 1.69         |
| Other crop expense.....         | .31          | 1.27         | .21          |
| Buildings.....                  | 9.26         | 11.36        | 2.39         |
| General farm expense.....       | 4.19         | 4.30         | 3.64         |
| Total capital costs.....        | 52.75        | 57.90        | 38.17        |
| Management.....                 | 3.64         | 4.05         | 2.30         |
| <b>Total costs.....</b>         | <b>79.89</b> | <b>86.37</b> | <b>59.49</b> |
| <b>Net cost per ton.....</b>    | <b>6.66</b>  | <b>7.26</b>  | <b>7.83</b>  |

<sup>a</sup> Costs include growing, harvesting, and storing charges.

**Table 13. — SOYBEANS: Annual Costs<sup>a</sup> and Returns per Acre**  
(Three areas, 1948-1954)

|                                 | Western        |                | Central        |                | Southern       |                |
|---------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|
|                                 | 1948           | 1949           | 1951           | 1952           | 1953           | 1954           |
| Number of farms.....            | 17             | 7              | 30             | 28             | 37             | 37             |
| Acres in crop per farm.....     | 38.5           | 47.4           | 49.2           | 42.6           | 57.0           | 62.6           |
| Yield per acre, bushels.....    | 28.8           | 31.6           | 32.5           | 29.8           | 15.9           | 11.7           |
| <b>Labor and power per acre</b> |                |                |                |                |                |                |
| Man hours, direct.....          | 4.7            | 5.7            | 5.6            | 6.2            | 4.6            | 4.5            |
| Man hours, indirect.....        | 2.6            | 3.1            | 2.3            | 2.7            | 2.1            | 1.9            |
| Tractor hours, direct.....      | 3.7            | 3.9            | 4.1            | 4.4            | 3.9            | 3.8            |
| Tractor hours, indirect.....    | .4             | .4             | .3             | .3             | .3             | .3             |
| Truck miles, direct.....        | .6             | .9             | 3.3            | 3.1            | 1.4            | 1.6            |
| Truck miles, indirect.....      | 2.2            | 3.8            | 4.7            | 4.7            | 2.2            | 2.2            |
| <b>Costs per acre</b>           |                |                |                |                |                |                |
| <b>Land</b>                     |                |                |                |                |                |                |
| Taxes.....                      | \$1.74         | \$ 2.23        | \$ 2.80        | \$ 2.90        | \$ 1.67        | \$ 1.90        |
| Interest, 4 percent.....        | 7.97           | 8.65           | 11.42          | 12.11          | 5.87           | 6.15           |
| Total.....                      | 9.71           | 10.88          | 14.22          | 15.01          | 7.54           | 8.05           |
| Labor.....                      | 5.76           | 6.41           | 6.33           | 7.33           | 4.91           | 4.84           |
| <b>Capital</b>                  |                |                |                |                |                |                |
| Tractor.....                    | 3.46           | 3.93           | 4.25           | 4.77           | 4.64           | 5.11           |
| Truck.....                      | .27            | 1.07           | .95            | 1.06           | .34            | .40            |
| Other machinery.....            | 4.44           | 3.89           | 5.11           | 5.84           | 5.50           | 5.53           |
| Manure.....                     | .60            | .45            | .64            | .86            | 1.80           | 1.68           |
| Other fertilizers.....          | .56            | .59            | 1.02           | 1.13           | 3.22           | 3.76           |
| Seed.....                       | 4.59           | 3.19           | 3.56           | 3.45           | 3.61           | 4.16           |
| Other crop expense.....         | .62            | .71            | .54            | .48            | .14            | .26            |
| Buildings.....                  | 1.03           | 1.13           | .86            | 1.12           | .65            | .84            |
| General farm expense.....       | 1.73           | 1.79           | 2.52           | 2.95           | 1.65           | 1.73           |
| Total capital costs.....        | 17.30          | 16.75          | 19.45          | 21.66          | 21.55          | 23.47          |
| Management.....                 | 2.35           | 2.20           | 2.46           | 2.12           | 1.46           | 1.30           |
| <b>Total costs.....</b>         | <b>35.12</b>   | <b>36.24</b>   | <b>42.46</b>   | <b>46.12</b>   | <b>35.46</b>   | <b>37.66</b>   |
| <b>Net cost per bushel.....</b> | <b>\$ 1.22</b> | <b>\$ 1.15</b> | <b>\$ 1.31</b> | <b>\$ 1.55</b> | <b>\$ 2.23</b> | <b>\$ 3.22</b> |
| <b>Price per bushel.....</b>    | <b>2.25</b>    | <b>2.40</b>    | <b>2.81</b>    | <b>2.80</b>    | <b>2.80</b>    | <b>2.64</b>    |
| <b>Returns per acre</b>         |                |                |                |                |                |                |
| Gross.....                      | \$64.71        | \$75.84        | \$90.87        | \$83.40        | \$44.45        | \$30.85        |
| Net.....                        | 29.59          | 39.60          | 48.41          | 37.28          | 8.99           | -6.81          |

<sup>a</sup> Costs include growing, harvesting, storing, and marketing charges.

**Table 14. — OATS: Annual Costs\* and Returns per Acre**  
(Four areas, 1948-1954)

|                                      | Western       |               | Northwestern  |               | Central       |               | Southern       |               |
|--------------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|---------------|
|                                      | 1948          | 1949          | 1949          | 1950          | 1951          | 1952          | 1953           | 1954          |
| Number of farms . . . . .            | 35            | 29            | 30            | 35            | 39            | 33            | 19             | 29            |
| Acres in crops per farm . .          | 53.5          | 53.1          | 37.2          | 40.8          | 37.9          | 35.2          | 19.8           | 20.1          |
| Yield per acre, bushels . .          | 49.9          | 52.5          | 49.6          | 55.9          | 41.5          | 48.1          | 28.3           | 44.5          |
| <b>Labor and power per acre</b>      |               |               |               |               |               |               |                |               |
| Man hours, direct . . . . .          | 3.2           | 3.0           | 4.2           | 3.9           | 3.0           | 3.2           | 3.6            | 3.9           |
| Man hours, indirect . . . .          | 1.8           | 1.7           | 1.8           | 1.8           | 1.7           | 1.9           | 1.4            | 1.5           |
| Tractor hours, direct . . . .        | 2.2           | 2.3           | 3.1           | 3.0           | 2.2           | 2.2           | 2.9            | 3.1           |
| Tractor hours, indirect . . .        | .4            | .2            | .3            | .2            | .1            | .2            | .1             | .2            |
| Truck miles, direct . . . . .        | .5            | .7            | .5            | .3            | 1.3           | 1.7           | .5             | 1.0           |
| Truck miles, indirect . . . .        | .5            | 1.0           | .9            | .5            | 3.0           | 3.2           | 2.1            | 1.9           |
| <b>Costs per acre</b>                |               |               |               |               |               |               |                |               |
| <b>Land</b>                          |               |               |               |               |               |               |                |               |
| Taxes . . . . .                      | \$ 1.93       | \$ 2.30       | \$ 2.28       | \$ 2.48       | \$ 2.75       | \$ 2.89       | \$ 1.76        | \$ 1.83       |
| Interest, 4 percent . . . . .        | 7.75          | 8.41          | 6.29          | 6.96          | 10.98         | 11.72         | 5.83           | 6.23          |
| Total . . . . .                      | 9.68          | 10.71         | 8.57          | 9.44          | 13.73         | 14.61         | 7.59           | 8.06          |
| Labor . . . . .                      | 3.86          | 3.41          | 3.67          | 3.63          | 3.70          | 4.21          | 3.70           | 4.01          |
| <b>Capital</b>                       |               |               |               |               |               |               |                |               |
| Tractor . . . . .                    | 2.55          | 2.54          | 2.64          | 2.93          | 2.13          | 2.50          | 3.34           | 3.62          |
| Truck . . . . .                      | .24           | .27           | .18           | .12           | .50           | .69           | .34            | .28           |
| Other machinery . . . . .            | 3.46          | 3.18          | 5.62          | 5.14          | 4.28          | 3.99          | 5.08           | 5.37          |
| Manure . . . . .                     | .29           | .24           | .57           | .69           | .19           | .23           | .54            | .61           |
| Other fertilizers . . . . .          | .51           | 1.46          | 1.38          | 1.22          | 2.29          | 2.34          | 2.43           | 3.31          |
| Seed . . . . .                       | 3.40          | 2.60          | 2.30          | 2.24          | 1.99          | 2.70          | 2.71           | 2.89          |
| Other crop expense . . . . .         | .40           | .29           | .49           | .49           | .13           | .18           | .01            | .05           |
| Buildings . . . . .                  | 1.00          | 1.00          | 1.22          | 1.39          | .81           | .94           | 1.72           | 1.24          |
| General farm expense . . . .         | 1.20          | .95           | 1.20          | 1.45          | 1.39          | 1.58          | 1.10           | 1.30          |
| Total capital costs . . . . .        | 13.05         | 12.53         | 15.60         | 15.67         | 13.71         | 15.15         | 17.27          | 18.67         |
| Management . . . . .                 | 1.70          | 1.42          | 1.23          | 1.45          | 1.93          | 1.62          | 1.13           | 1.13          |
| <b>Total costs . . . . .</b>         | <b>28.29</b>  | <b>28.07</b>  | <b>29.07</b>  | <b>30.19</b>  | <b>33.07</b>  | <b>35.59</b>  | <b>29.69</b>   | <b>31.87</b>  |
| <b>Net cost per bushel . . . . .</b> | <b>\$ .53</b> | <b>\$ .50</b> | <b>\$ .51</b> | <b>\$ .48</b> | <b>\$ .75</b> | <b>\$ .71</b> | <b>\$ 1.03</b> | <b>\$ .68</b> |
| <b>Price per bushel . . . . .</b>    | <b>.73</b>    | <b>.68</b>    | <b>.68</b>    | <b>.84</b>    | <b>.85</b>    | <b>.80</b>    | <b>.70</b>     | <b>.72</b>    |
| <b>Returns per acre</b>              |               |               |               |               |               |               |                |               |
| <b>Gross</b>                         |               |               |               |               |               |               |                |               |
| Grain . . . . .                      | \$36.43       | \$35.66       | \$33.60       | \$46.85       | \$35.35       | \$38.46       | \$19.58        | \$32.02       |
| Straw . . . . .                      | 1.60          | 1.49          | 3.27          | 3.18          | .79           | .32           | .57            | 1.38          |
| Pasture . . . . .                    | .02           | .29           | .32           | .11           | 1.13          | 1.13          | ....           | ....          |
| Total . . . . .                      | 38.05         | 37.44         | 37.19         | 50.14         | 37.27         | 39.91         | 20.15          | 33.40         |
| Net . . . . .                        | 9.76          | 9.37          | 8.12          | 19.95         | 4.20          | 4.32          | -9.54          | 1.53          |

\* Costs include growing, harvesting, storing, and marketing charges.

**Table 15. — WINTER WHEAT: Annual Costs<sup>a</sup> and Returns per Acre**  
(Two areas, 1951-1954)

|                                 | Central        |                | Southern       |                |
|---------------------------------|----------------|----------------|----------------|----------------|
|                                 | 1951           | 1952           | 1953           | 1954           |
| Number of farms.....            | 25             | 25             | 43             | 45             |
| Acres in crops per farm.....    | 34.9           | 34.2           | 58.6           | 41.8           |
| Yield per acre, bushels.....    | 20.5           | 34.9           | 29.8           | 35.0           |
| <b>Labor and power per acre</b> |                |                |                |                |
| Man hours, direct.....          | 3.1            | 3.7            | 3.2            | 3.4            |
| Man hours, indirect.....        | 1.7            | 1.3            | 2.0            | 2.7            |
| Tractor hours, direct.....      | 2.3            | 2.6            | 2.5            | 2.7            |
| Tractor hours, indirect.....    | .3             | .3             | .5             | .5             |
| Truck miles, direct.....        | 2.2            | 5.0            | 2.3            | 3.9            |
| Truck miles, indirect.....      | 1.5            | 1.8            | 1.0            | 4.1            |
| <b>Costs per acre</b>           |                |                |                |                |
| <b>Land</b>                     |                |                |                |                |
| Taxes.....                      | \$ 2.78        | \$ 2.98        | \$ 1.69        | \$ 1.82        |
| Interest, 4 percent.....        | 11.21          | 11.47          | 5.89           | 6.02           |
| Total.....                      | 13.99          | 14.45          | 7.58           | 7.84           |
| Labor.....                      | 3.88           | 4.62           | 3.76           | 4.65           |
| <b>Capital</b>                  |                |                |                |                |
| Tractor.....                    | 2.48           | 2.94           | 3.49           | 3.98           |
| Truck.....                      | .44            | .91            | .31            | .84            |
| Other machinery.....            | 3.63           | 5.01           | 5.72           | 6.77           |
| Manure.....                     | .69            | .86            | 1.99           | 2.12           |
| Other fertilizers.....          | 6.21           | 5.23           | 8.77           | 8.94           |
| Seed.....                       | 3.92           | 3.89           | 3.34           | 3.35           |
| Other crop expense.....         | .22            | .36            | .99            | 1.36           |
| Buildings.....                  | .22            | .41            | .48            | 1.19           |
| General farm expense.....       | .63            | 1.06           | .54            | .68            |
| Total capital costs.....        | 18.44          | 20.67          | 25.63          | 29.23          |
| Management.....                 | 2.28           | 1.98           | 1.49           | 1.47           |
| <b>Total costs.....</b>         | <b>38.59</b>   | <b>41.72</b>   | <b>38.46</b>   | <b>43.19</b>   |
| <b>Net cost per bushel.....</b> | <b>\$ 1.79</b> | <b>\$ 1.13</b> | <b>\$ 1.20</b> | <b>\$ 1.20</b> |
| <b>Price per bushel.....</b>    | <b>2.25</b>    | <b>2.10</b>    | <b>1.75</b>    | <b>1.98</b>    |
| <b>Returns per acre</b>         |                |                |                |                |
| <b>Gross</b>                    |                |                |                |                |
| Grain.....                      | \$45.82        | \$73.24        | \$52.08        | \$69.36        |
| Straw.....                      | 1.01           | 1.33           | 2.67           | 1.30           |
| Pasture.....                    | .90            | .90            | ....           | ....           |
| Total.....                      | 47.73          | 75.47          | 54.75          | 70.66          |
| Net.....                        | 9.14           | 33.75          | 16.29          | 27.47          |

<sup>a</sup> Costs include growing, harvesting, storing, and marketing charges.

Table 16. — HAY: Annual Costs\* and Returns per Acre  
(Four areas, 1948-1953)

|                                 | Western         |                |                      |                          | Northwestern             |                          | Central              |                      | South             |
|---------------------------------|-----------------|----------------|----------------------|--------------------------|--------------------------|--------------------------|----------------------|----------------------|-------------------|
|                                 | Alfalfa<br>1948 | Clover<br>1948 | Mixed<br>hay<br>1948 | Mixed<br>alfalfa<br>1949 | Mixed<br>alfalfa<br>1949 | Mixed<br>alfalfa<br>1950 | Mixed<br>hay<br>1951 | Mixed<br>hay<br>1952 | Mix<br>ha<br>1953 |
| Number of farms.....            | 21              | 11             | 12                   | 26                       | 29                       | 29                       | 27                   | 22                   | 34                |
| Acres in crop per farm.....     | 16.4            | 19.1           | 19.7                 | 27.9                     | 29.0                     | 30.9                     | 28.1                 | 26.5                 | 38.1              |
| Yield per acre, tons.....       | 2.24            | 1.41           | 1.40                 | 2.21                     | 2.33                     | 2.54                     | 1.70                 | 1.69                 | 1.7               |
| Times cut.....                  | 2.5             | 1.2            | 1.7                  | 2.1                      | 2.1                      | 1.9                      | 1.7                  | 1.4                  | 1.3               |
| <b>Labor and power per acre</b> |                 |                |                      |                          |                          |                          |                      |                      |                   |
| Man hours, direct.....          | 9.6             | 4.9            | 5.5                  | 8.2                      | 7.1                      | 7.4                      | 6.0                  | 5.7                  | 4.8               |
| Man hours, indirect.....        | 3.6             | 1.4            | 2.7                  | 3.0                      | 3.6                      | 3.4                      | 2.3                  | 2.4                  | 2.3               |
| Tractor hours, direct....       | 5.5             | 2.4            | 2.9                  | 4.4                      | 4.2                      | 4.6                      | 2.9                  | 2.6                  | 2.9               |
| Tractor hours, indirect..       | .7              | .4             | .5                   | .6                       | .6                       | .8                       | .3                   | .2                   | .3                |
| Truck miles, direct.....        | .2              | .2             | .1                   | .1                       | .2                       | .5                       | .6                   | .6                   | .2                |
| Truck miles, indirect....       | 1.2             | .4             | .1                   | 1.3                      | 1.4                      | .8                       | 4.1                  | 3.1                  | 1.7               |
| <b>Costs per acre</b>           |                 |                |                      |                          |                          |                          |                      |                      |                   |
| <b>Land</b>                     |                 |                |                      |                          |                          |                          |                      |                      |                   |
| Taxes.....                      | \$ 2.01         | \$ 1.93        | \$ 1.86              | \$ 2.54                  | \$ 2.27                  | \$ 2.47                  | \$ 2.72              | \$ 2.76              | \$ 1.7            |
| Interest, 4 percent.....        | 7.15            | 8.11           | 7.19                 | 8.32                     | 6.64                     | 6.78                     | 10.13                | 10.86                | 5.9               |
| Total.....                      | 9.16            | 10.04          | 9.05                 | 10.86                    | 8.91                     | 9.25                     | 12.85                | 13.62                | 7.6               |
| Labor.....                      | 10.49           | 5.12           | 6.25                 | 8.92                     | 6.89                     | 6.88                     | 6.88                 | 7.25                 | 5.1               |
| <b>Capital</b>                  |                 |                |                      |                          |                          |                          |                      |                      |                   |
| Tractor.....                    | 4.31            | 2.00           | 2.05                 | 5.16                     | 4.57                     | 5.41                     | 2.94                 | 2.97                 | 3.4               |
| Truck.....                      | .34             | .05            | .02                  | .29                      | .18                      | .15                      | .53                  | .49                  | .2                |
| Other machinery.....            | 6.80            | 4.01           | 3.91                 | 7.15                     | 8.51                     | 9.67                     | 8.91                 | 8.39                 | 8.3               |
| Manure.....                     | 1.29            | .84            | 1.29                 | 1.34                     | 2.57                     | 2.97                     | .75                  | .74                  | 1.8               |
| Other fertilizers.....          | .65             | .45            | .35                  | 1.22                     | 1.31                     | 1.42                     | 1.11                 | .78                  | 1.3               |
| Seed.....                       | 2.07            | 1.95           | 1.81                 | 2.25                     | 2.64                     | 2.50                     | 1.62                 | 1.36                 | 2.1               |
| Other crop expense.....         | .07             | .07            | .03                  | .06                      | .02                      | .09                      | .03                  | .04                  | .0                |
| Buildings.....                  | .70             | 1.20           | .61                  | .97                      | .77                      | .52                      | 1.09                 | 2.16                 | 3.4               |
| General farm expense....        | 2.61            | 3.89           | 1.64                 | 2.25                     | 2.08                     | 2.57                     | 3.07                 | 2.50                 | 1.5               |
| Total capital costs....         | 18.84           | 14.46          | 11.71                | 20.69                    | 22.65                    | 25.30                    | 20.05                | 19.43                | 22.3              |
| Management.....                 | 1.18            | 1.73           | 1.57                 | 2.00                     | 1.74                     | 2.14                     | 2.32                 | 1.89                 | 1.6               |
| <b>Total costs.....</b>         | <b>39.67</b>    | <b>31.35</b>   | <b>28.58</b>         | <b>42.47</b>             | <b>40.19</b>             | <b>43.57</b>             | <b>42.10</b>         | <b>42.19</b>         | <b>36.8</b>       |
| <b>Net cost per ton.....</b>    | <b>\$16.00</b>  | <b>\$15.91</b> | <b>\$17.36</b>       | <b>\$17.19</b>           | <b>\$15.88</b>           | <b>\$15.70</b>           | <b>\$22.50</b>       | <b>\$20.14</b>       | <b>\$19.1</b>     |
| <b>Price per ton.....</b>       | <b>22.50</b>    | <b>18.00</b>   | <b>18.00</b>         | <b>22.50</b>             | <b>22.50</b>             | <b>22.50</b>             | <b>21.00</b>         | <b>22.50</b>         | <b>24.0</b>       |
| <b>Returns per acre</b>         |                 |                |                      |                          |                          |                          |                      |                      |                   |
| <b>Gross</b>                    |                 |                |                      |                          |                          |                          |                      |                      |                   |
| Hay.....                        | \$48.37         | \$24.53        | \$22.14              | \$49.70                  | \$52.40                  | \$57.02                  | \$36.33              | \$38.13              | \$41.3            |
| Pasture.....                    | 3.83            | 2.47           | 3.48                 | 4.20                     | 2.47                     | 3.63                     | 3.63                 | 4.65                 | 3.0               |
| Seed.....                       | . . . . .       | 6.44           | .79                  | .28                      | .73                      | .05                      | .21                  | 3.50                 | .9                |
| Total.....                      | 52.20           | 33.44          | 26.41                | 54.18                    | 55.60                    | 60.70                    | 40.17                | 46.28                | 45.3              |
| Net.....                        | 12.53           | 2.09           | -2.17                | 11.71                    | 15.41                    | 17.13                    | -1.93                | 4.09                 | 8.4               |

\* Costs include growing, harvesting, and storing charges.













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