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farm business
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COMPARATIVE RETURNS FROM CROPS AND LIVESTOCK

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Crops contribute a larger part of the income on Minnesota farms than we usually realize. On a large proportion of livestock farms, crops contribute more than do livestock. This can be illustrated by data from the records of the farmers in the Southeast and Southwest Minnesota Farm Management Services.

Records for the years 1952 through 1958 are used for this comparison. This period is long enough to provide a reliable average.

These farms were larger and better managed than the average for their communities. The earnings are, therefore, somewhat higher. The relationships between crops and livestock, however, are likely to be typical of other farms.

These farms, as an average for the group, can be classified as livestock farms. Approximately four-fifths of the cash sales were from livestock. Most of the income from the sale of crops was used to buy feed. In one sense, then, practically all of their **cash income** came from livestock and livestock products.

Value Produced by Livestock

The cash income from sales, however, is not the best measure of the importance of livestock; some adjustments are necessary. These are shown in table 1. To the value of sales, add the value of products used in the home and any increase in inventories. From this total subtract the cost of animals which have been purchased.

The net figures, $13,037 in the Southeast and $16,164 in the Southwest, represent the average value per year for livestock and livestock products produced on these farms. Both of these figures are lower than the comparable sales, but both figures represent a rather large volume of livestock production.

This value of livestock production is in part merely a sale of crops in a different form. The value of feed used is shown in table 1. In the Southeast, for example, the farmers took feed worth $8,626, converted it into livestock and livestock products, and in so doing increased the value to $15,404. In terms of the value added on the farm, the contribution of the livestock was then the return over feed cost, or $5,411.

One reason for the larger value of feed fed in the Southwest was that these farms were larger. The farmers in both areas fed the equivalent of their full crop production. The value of crop production per acre was about the same in both areas.

The farmers in the Southeast produced a larger value of livestock for each dollar of feed than in the Southwest. This was largely due to the larger proportion of dairy cattle in the Southeast than in the Southwest. As an average, dairy cattle have returned $200 for each $100 of feed while hogs and feeder cattle have returned $150 or less. This, however, does not mean that dairying is more profitable than feeder cattle or hogs. Labor and other costs are so high for dairy cattle that farmers need a return of $200 for each $100 of feed in order to return market prices for these items.

Crop Value Exceeds Livestock

How does return above feed cost compare with the value of crops produced on these farms? This is shown in table 2. In both areas the value of the crops produced on the farms was considerably higher than the value added by livestock.

The figures in the preceding table are averages for a group of farms. There are rather large differences among the individual farms.

The value contributed by crops was considerably higher than that added by livestock. But was this offset by differences in the costs of raising the crops and of handling the livestock? It is impossible to make an accurate allocation of costs between the two.

Table 1. Average Returns Per Farm From Livestock, Southeastern and Southwestern Minnesota Farm Management Services, 1952-1958

Items of comparison	South-eastern Minnesota	South-western Minnesota
Number of farms per year	162	138
Sales of livestock and livestock products	$14,755	$21,883
Used in the home	403	356
Increase in inventories	246	761
Total	$15,404	$23,000
Purchases of livestock	$ 1,367	$ 6,836
Value of livestock production	$13,037	116,164
Cost of feed	$ 8,626	$11,253
Return over feed cost	$ 5,411	$ 4,911

Net Returns High for Crops

One way to compare the costs for crops and for livestock is to allocate each item according to the proportion of use. Such a comparison is given in table 3. Complete data for these allocations were not available, but personal acquaintance with the farms and experience in summarizing the records gives a fairly adequate basis.

Table 2. Comparison of Value Added by Crops and Livestock. Southeast and Southwest Minnesota Farm Management Services, 1952-1958

Item	Southeast	Southwest
Value per farm per year		
Return over feed cost	$ 5,411	$ 4,911
Value of crops produced	$ 8,124	$10,284
Other production	$ 470	$ 527
Total value produced	$14,005	$15,722

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Comparative Returns

(Continued from page 1)

In both areas the return to labor spent on crops is higher than for livestock; also, in both areas livestock takes considerably more labor than do crops. As an average the return per hour is much higher for crops than for livestock.

As stated earlier, no allocation of costs of this type can adequately explain the place of crops and livestock in the farm organization. There are two important reasons for this.

First, the livestock provide the market for a large part of the crops. If a large number of farmers were to eliminate their livestock, crop prices would fall, and the value of crop production would be lower. The above comparison of values, however, will be useful for any individual farmer who considers the possibility of shifting to a cash crop type of farming.

The second reason is that crops and livestock are closely interrelated; a change in one will affect the other. Many items of cost are used jointly by the crops and livestock. For example, although family labor is available throughout the year, most of the work on crops comes during 6 or 7 months. The workers may be able to handle livestock in the other months with little or no increase in labor cost and without seriously interfering with the crops. The same is true with other items of cost.

Crops and Livestock Interact

Crops and livestock are also interrelated on the production side. (1) Some crops, as pasture, have only a limited cash market; livestock can improve this market. (2) With livestock a farmer may be able to use a rotation which will control erosion, maintain soil structure, or otherwise hold crop yields at a high level. (3) Livestock may also help to improve crop yields by returning plant nutrients to the soil in manure.

Each farmer, as he plans his crop and livestock organization, must consider these interrelationships. To make a decision he must estimate the probable income and expense for each feasible alternative. Averages and comparisons such as those presented here can stimulate his interest and suggest new alternatives.

The data from the records of the farmers in these farm management services show that crops are a very important part of the farm. A large number of farmers may find it profitable to do a new job of figuring for their farms. Even if they find they should not change, as may be the case for most farmers, they may increase the attention they give to their crops.

RISK IN FEEDING EFFICIENCY DAIRY AND HOGS

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Records kept by farmers show that chance variations in feeding efficiency for hogs and dairy cattle are large. This has important implications in evaluating the risks involved in production; in evaluating the influence of breeding, feeding, and management practices; and in evaluating performance and making decisions based on farm records. This article reports on variations in feeding efficiency. Reports on variations in price, in feed production, and other factors will be published in the future.

The records for this analysis came from the Southeast and Southwest Minnesota Farm Management Services. Of the total membership, 149 farmers kept records for each of the ten years of 1945-54. Ninety-four of these had dairy cows and 113 raised hogs in all ten years.

The measure of feeding efficiency used for hogs was pounds of feed per 100 pounds of gain. The measure used for dairy was pounds of total digestible nutrients per pound of butterfat.

The 113 hog farmers studied used an average of 500 pounds of feed to produce 100 pounds of gain. This includes the corn, small grains, and commercial feeds. These ingredients have been added pound for pound, without any adjustments for differences in nutrient content. The dairy farmers used 20 pounds of total digestible nutrients, or the equivalent of 25 pounds of corn, per pound of butterfat.

Some of the farmers had higher feeding efficiencies than this, others were lower. We will discuss these differences later in this article.

Feeding Efficiency Varies

On each of these farms the feeding efficiency varied greatly from year to year. For example, the pounds of feed per 100 pounds of gain on hogs on one farm were:

1945—471	1950—609
46—404	51—426
47—573	52—362
48—387	53—437
49—499	54—409

These variations are caused by many factors. Among them are:

1. The makeup of the herds vary from one year to another, due to variations in success in breeding, general thrift, and other factors.

2. The quality of the feed, the weather, and other physical conditions vary.

3. Disease conditions vary, in spite of all precautions by the farmer.

4. The management of the farmer also differs, many times due to personal influences.

Table 3. Returns from and Allocation of Expenses to Crop and Livestock, Southeast Minnesota and Southwest Minnesota Farm Management Service, 1952-1958

	Southeast Minnesota			Southwest Minnesota		
Item	Total	Crops	Livestock	Total	Crops	Livestock
Gross returns:						
Return over feed from livestock	$ 5,411	$	$5,411	$ 4,911	$	$4,911
Crops	8,124	8,124	.....	10,284	10,284	.....
Other	470	.....	.....	527	.....	.....
Total	$14,005	$8,124	$5,411	$15,722	$10,284	$4,911
Expenses:						
Power	$ 2,243	$1,384	$ 859	$ 2,410	$ 1,530	$ 880
Crop machinery	1,111	1,111	.....	1,307	1,307	.....
Livestock equipment	305	.....	305	349	.....	349
Buildings	961	288	673	960	384	576
Misc. livestock expense	451	.....	451	452	.....	452
Real estate and personal property taxes	755	458	297	773	529	244
Insurance and general expense	281	103	178	318	121	197
Interest on investment	2,320	1,508	812	3,367	2,525	842
Total expenses	$ 8,427	$4,852	$3,575	$ 9,936	$ 6,396	$3,540
Return to labor	5,578	3,272	1,836	5,786	3,888	1,371
Estimated hours of labor	.....	1,080	3,550	.....	1,450	2,660

5. Under typical farm conditions there are some errors in the records.

Some of these variations in feeding efficiency were the result of planned changes and represent desirable adjustments. Many of them, however, were unforeseen or were beyond the control of the farmer. These constitute risks in hog production. These are the variations we are conisdering in the first part of this article.

These chance, or unforeseen, variations in feeding efficiency cause variations in the value of the feed fed, and hence in the net returns from the hogs. Or, if we look at the farmer's problem as he is planning his year's business, they represent uncertainties or risks.

The Variations Are Large

How big are these uncertainties? As an average for all of the hog farmers, this variability was 140 pounds of feed,[1] or 28 percent[2] of the average feed used. We can explain it in this way. Assume that for a given farmer the long time average feed per 100 pounds gain is 500 pounds. In two-thirds of the years the feed used would lie within 140 pounds or 28 percent of this figure; that is, it would lie between 360 and 640 pounds. In one-third of the years the feed used would be less than 360 or more than 640 pounds.

Only a part of this is true variability; a part is due to errors in the records. Based on experience in working with these farmers, it seems likely that 110 points or 22 percent is true variability.

This figure can be used to determine the possible accuracy of estimates of feed needs for the coming year. On the basis of past averages the farmer mentioned in the preceding paragraph would say that his best estimate of feed needs for the coming year would be 500 pounds per 100 pounds of gain, or 70 tons of feed to raise and finish 100 hogs to an average of 250 pounds.

[1] Standard deviation. Calculated by analysis of variance; this is the variance due to error and years and does not include variance due to farmers.

[2] Coefficient of variation.

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Variations in the Feed Bill

Apply the variability of 22 percent to this; this gives a range of 55 to 85 tons for the entire group of pigs. The farmer can say that there are two chances out of three that his final feed requirements will fall within those limits; there is one chance in three that the quantity of feed will lie outside those limits.

At 2½ cents per pound, or $50 per ton, for a hog ration, there are only two chances out of three that the total value of feed will lie between the limits of $2,730 and $4,270. This is a large risk.

How does this variability compare with dairy? The same measure for feed per pound of milk is 18 percent. This also has been corrected for possible errors in the records. On the basis of the average of past years the farmer might estimate his feed bill for a herd of 25 cows to be $3,500. There is one chance in three that his actual bill will be less than $2,870 or more than $4,130. The risks in estimating the feed bill for dairy is a little less than for hogs.

One other way to evaluate these figures is to see what they mean in year to year variations in income. Even if a farmer were able to hold his production of hogs or milk steady from year to year, costs would vary, as we have shown. If prices of the products remained constant, his net income would vary by the same amount. For simplicity, we have assumed that the farmer buys his feed; if he raises his own feed the variations in his crop yields must also be considered.

The best measure of the net return for our purpose is the amount that the family has available for living and saving. This is the amount that they earn for the use of their labor and management and for the use of the capital that the family provides. These vary a good deal from one farmer to another, so we will have to depend upon averages.

In order to compare the variations in net income it is necessary to base the calculations on enterprises of comparable size. A herd of 25 cows would use about the same amount of labor as 450 or more hogs.

A rough estimate of the income and expense in the past decade might have been:

Table 1. Comparative incomes and expenses for dairy and hog production.

Item	Dairy	Hogs
Gross income	$7,000	$20,000
Feed cost	3,500	14,000
Return over feed cost	3,500	6,000
Expense other than labor and interest	1,500	3,000
Earnings for labor and capital	2,000	$ 3,000

The figures would vary from one farm to another. On some farms the return would be higher for dairy cattle than for hogs. As an average for the years we studied, however, the profits were higher for hogs than for dairy cattle.

Variations in Net Income

Now let us see how much the variability in feeding efficiency will affect this profit. The variability of 18 percent for dairy gives a variation of $630 in the feed bill, or a range from $2,870 to $4,130. Using these figures instead of the average feed costs in the tabulation above gives a range in return to labor and capital of $1,370 to $2,630. The returns would lie outside this range in one third of the years.

With an average variability of 22 percent for hogs, the variability in the feed bill would be $3,080. Applying this to the feed bill, the range in returns to labor and capital for hogs would be from a loss of $80 to a gain of $6,080. This is, in one-third of the years the return would be either a loss of more than $80 or a gain of more than $6,080. The net income could go lower than for the dairy farmer, but it could also go considerably higher.

The range is much larger for hogs than for dairy. There are three reasons: 1) The percentage variability is a little larger for hogs. 2) A hog enterprise big enough to keep a man busy involves much more feed than for dairy. 3) The margin between total return and feed cost is much lower than for dairy.

In our illustration, then, hogs gave a higher average return to labor and capital than did dairy, but the variability in that income was much more. In other words, the risks were greater. This comparison took into account only the risks in feeding efficiency; they did not take into account the many other risks that are involved. Those will be discussed in later reports.

THE OUTLOOK CORNER

1960 At a Glance

Increased supplies of many agricultural products will depress agricultural prices despite a stronger demand in the year ahead. The following brief statements indicate the demand for, and supply of various agricultural commodities important in Minnesota.

General Economy

The U. S. economy continued to expand production of goods and services during 1959. Gross National Product reached a seasonally adjusted rate of $476.8 billion during the first half of the year. The outlook is good for continued increases in the output of the economy in the year ahead. (The frequency and length of strikes in major industries will affect the rate of increase.) Gross National Product is expected to exceed $500 billion in 1960.

Consumers' incomes and expenditures should continue to increase in 1960. This will mean a continuing strong demand for farm products. However, since livestock marketings are likely to increase during next year, the prospects are for lower prices and a decline in farm income.

Beef Cattle

The cattle cycle is well into the expansion phase. Steer and heifer numbers have made record increases. Increased slaughter in 1960 will result in slightly lower prices.

Cattle feeding profits have been bid into feeder cattle prices. Unless feeder prices decline from present (Oct. 1) levels, most cattle feeders can expect very low labor returns. Cautious buying and careful feeding will be necessary in order to realize a profit in the coming feeding year.

Hogs

Marketings have been high for all of 1959 and are expected to remain fairly steady for the remainder of the year. With fall farrowing intentions 7 percent above a year ago, prospects for a winter price recovery are slim. Prices in the fall of 1960 will depend largely on the size of next spring's pig crop.

Since this crop is expected to be about the same as the 1959 spring pig crop, prices next fall can be expected to be similar to present prices.

Sheep and Lambs

The 1959 lamb crop was 2% larger than last year. With lighter, lower-priced feeders available, profit prospects in lamb feeding appear to be better than in 1959. Incentive payments on wool are assured for the next three years.

The farm flock will continue to be a profitable enterprise.

Turkeys

For late 1959 and early 1960 the tonnage of turkey meat will be about the same as a year earlier. A fairly strong demand balanced against increased competition from other meats indicates an expected price similar or slightly higher than a year ago. With fairly favorable prices in late 1959, it is expected that the number of turkeys raised in 1960 may exceed the record number raised in 1959. The prevailing price situation may shift production slightly toward the heavy breeds.

Eggs

Since per capita egg consumption has dropped in recent years, and supplies of poultry, red meats, and other substitute foods are increasing there is little indication that the *demand for eggs* will strengthen.

Supplies, however, will be much more favorable in late 1959, and especially in early 1960. The number of hens and pullets of laying age on farms was already lower on August 1, 1959 than a year earlier and the spread is apt to widen in the months ahead.

Egg prices in late fall of 1959 and early 1960 would be at least as favorable as a year earlier. They should be decidedly more favorable in the spring of 1960.

Dairy

Total milk production in the U. S. in 1959 will probably decline slightly for the second year in a row. Prospects are for continued improvement in the dairy production-consumption balance in the year ahead. However, in the next few years it is expected that the decline in dairy cow numbers may be halted because of lower prices on meat animals.

Feed Supply

Record feed supplies are expected for the year ahead. This year's corn crop will set a new record. Production of other feed grains is below last year.

Support rates will serve as a floor for corn prices, whereas the other feed grains will probably stay above their respective rates because of the smaller supplies and the lower loan rates.

Soybeans

Early August indications point to soybean supplies on October 1 comparable to last year's record. This year's crop is smaller but carryover supplies are larger than a year ago.

Soybean meal production continues to set new records but the demand from livestock producers has been good. Prices of most high protein feeds, though, have declined from earlier in the year and probably will decline seasonally this fall when the crushings of the 1959 oil seed crops begin to pick up volume.

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