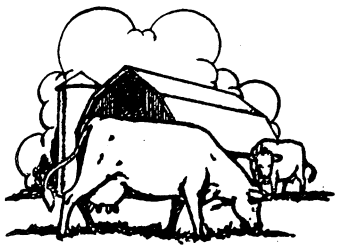

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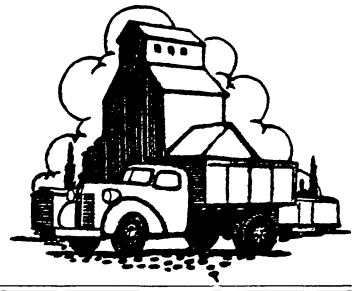

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Should Corn Land Be Used For Silage?

Ermond H. Hartmans

The purpose of this article is to analyze the position of corn silage within the total farm operation. It is an effort to determine where and when farmers are economically justified in using corn land for silage purposes.

Comparison of Cost per Unit of Feed Value

A detailed cost study on a number of farms in southern Minnesota during the years 1951, 1952, and 1953 showed an average production cost of $35.96 per acre of corn harvested for grain and of $45.13 per acre if harvested for silage. These costs prevailed with average yields of 59 bushels of corn and 8.3 tons of silage. Assuming average feed analysis figures, the cost per 100 pounds of total digestible nutrients for either grain or silage is then $1.36.

Since 8.3 tons of corn silage supplies approximately 3,320 pounds of TDN, and 59 bushels of husked corn only approximately 2,640 pounds of TDN, corn silage makes a more intensive use of land. On farms with limited amount of land, corn silage provides the possibility of producing a greater feed supply without increased cost per pound of TDN.

Let us now relate the above cost data to the 1950 Minnesota Census averages of 42 bushels of corn and 8.3 tons of silage per acre. Assuming that differences in yield do not change the cost of production, the cost per 100 pounds of TDN would now be $1.53 for husked corn as compared to $1.36 for silage. On a feed cost basis, farmers with above yields seem to be justified in using corn land for silage purposes. However, several other factors must be considered.

Comparison of Utilization Value

In the former feed cost comparison the conclusion holds true only if either corn or corn silage can be alternately used with the same feeding results. A share of the TDN requirements in a ration may consist of either corn or corn silage. Within a certain range, almost complete substitution exists and for only that range the above feed cost figures are valid. But corn performs also the function of a concentrate feed. Certain livestock enterprises, such as hogs and poultry, require a large amount of grain feed.

To determine the most economic use of corn land among others, the question has to be answered whether corn as grain or as silage gives the greatest return per unit of feed input. Since feed is only one of the cost components of any livestock enterprise, the answer to this question can only be approximated.

Corn land is very limited in supply as compared to land suitable for forage. On that basis alone, it should be obvious that the returns of products from corn should be higher than those from forage crops. Let us analyze this for hogs and dairy.

It takes approximately 16 bushels of corn plus 100 pounds of 36 per cent protein feed to produce a 225-pound hog. Sixteen bushels of corn supply approximately 710 pounds of TDN. The value of a 225-pound hog may be set at $36. Feed represents 80 per cent of the total production costs. Corn supplies approximately ⅞ of all feed nutrients. With this background, it is reasonable to credit approximately 0.7 (80 per cent of ⅞) of the $36.00 to corn, which amounts to $25.20. On this basis, the value of corn when utilized through hogs is $3.56 per 100 pounds of TDN.

Feeding a dairy cow with a production of 300 pounds of butterfat the year around takes approximately three months of full pasture, 2½ tons of alfalfa-brome hay, 6 tons of corn silage, 26 bushels of ear corn, and 150 pounds of protein feed. If butterfat is sold at $1.00 per pound, the value produced would be $300. Feed cost of a dairy cow amounts to approximately 50 per cent of the total cost. In the above ration ⅓ of the total feed nutrients is furnished by corn silage. On this basis, 1/6 of gross product (50 per cent of ⅓) can be credited to corn silage, which amounts to $50. Six tons of corn silage supplies 2,400 pounds of TDN, and the return per 100 pounds of TDN for corn silage would be $2.08.

The returns of 8.3 tons of corn silage through dairy would be 33.2[1] × $2.08 = $69.06 and the returns of corn with a 59-bushel yield through hogs, 26.4[2] × $3.56 = $93.98. With a 42-bushel yield the returns would be 18.8[3] × $3.56 = $67.92 per acre of corn land. The net return per acre for corn silage through dairy would be $23.93 as compared with $58.02 for corn with a 59-bushel yield and to $31.96 with a 42-bushel yield through hogs. Although this calculation is an approximation, it is a valuable indication of the utilization value of corn and corn silage wherever a choice exists between feeding corn to hogs or feeding corn silage to dairy.

Similar calculations may be set up for beef cattle and without going into detail here, the returns per 100 pounds of TDN for corn silage through beef cattle amounts to approximately $1.50-$2.00 per 100 pounds of TDN.

Instead of feeding corn through livestock, the farmer has the alternative of selling it as a cash crop. Assuming a price of $1.30 per bushel, the gross return per acre would be $76.70 with a 59-bushel corn yield and $54.60 with a 42-bushel yield. The net returns would be respectively $40.74 and $18.64.

These calculations show that under

(Continued on page 2)

[1] 8.3 tons of silage supplies approximately 3,320 pounds of TDN.

[2] 59 bushels of corn supplies approximately 2,640 pounds of TDN.

[3] 43 bushels of corn supplies approximately 1,880 pounds of TDN.

Land and Labor Affect Type of Farming

S. A. Engene and T. R. Nodland

How farmers develop a type of farming that fits their resources, particularly their land and labor, is illustrated by the 1954 summaries of the Southeastern and Southwestern Minnesota Farm Management Services.

The 1954 records were grouped according to type of farming. Data for those six types which included enough farmers to give a reliable average are shown in the table.

Family Workers, Labor Same

These farmers had the same number of family workers, regardless of type of farming. They also hired about the same amount of labor. It is probable that they hired labor according to personal preferences, and then fitted their farming to the labor supply.

Within each of these groups, these farmers chose a crop and livestock organization that kept the workers reasonably busy. They averaged 440 work units per farm and 258 work units per worker. That means that if they worked at average efficiency they would have to put in 440 ten-hour days per farm, or 258 ten-hour days per worker, to take care of the crops and livestock. Maintenance of buildings and machinery, marketing, farm shopping, and other necessary farm work would be in addition to this.

Work Units Uniform

The numbers of work units per farm and per worker is remarkably uniform among the six groups. It seems that all of these farmers wanted to use all of their labor, and all of them set about the same upper limit to the time they were willing to work each day.

Differences in the amount and quality of their land led to differences in type of farming. In three of these groups, the farms averaged about 200 acres. These data are shown in the first three columns of the table.

These farmers marketed most of their crops through livestock; they sold only a small amount of crops. On these farms the workers were able to take care of this livestock with a reasonable length of work day.

Three Farm Groups Different

There are several important differences among these three groups of farms. The farmers who obtained most of their income from dairy products produced less crops than those in the other three groups. Their crop production was worth $5,968 compared with $6,832 and $7,295 for the other two. Lower crop yields and a smaller proportion of tillable land account for the smaller production.

Dairy cattle help to maximize earnings on these farms, since dairy cattle generally give a higher return for feed fed and utilize more labor per unit than does any other class of livestock. The available labor was able to take care of the work on the cattle.

The other two groups of farms, with larger production of feed, kept fewer dairy cattle, and raised some hogs, for the general livestock farms, some beef cattle and poultry. Since these other livestock generally take less labor than do dairy cattle, this shift in livestock enabled these farmers to feed all of their crops while holding their labor load to a reasonable level.

The other three groups of farmers, shown in the last three columns of the table, operated bigger farms, and produced considerably more crops. One group of 16 farmers kept a dairy herd and raised some hogs. In order to hold labor requirements within the supply available they sold part of their crops, instead of keeping enough livestock to consume all of them.

Another group of 64 farmers kept several classes of livestock, with emphasis on beef cattle and hogs; both of these classes of livestock require relatively little labor. These farmers also sold some crops.

The last group, 24 farmers, produced the largest amount of crops. These men concentrated on feeder cattle and hogs. In this way they were able to feed a large share of their crops and yet not use more labor than other farmers.

Resources Adjusted to Situations

These farmers differed considerably in the resources available. They apparently adjusted their operations to their situations, and developed types of farming that utilized their labor with the addition of much hired labor.

These comparisons are based upon the data for only one year, and therefore are suggestive rather than conclusive. Similar comparisons will be made for other years, with the results reported later.

Relationship of Type of Farming to Land and Labor
Southeast and Southwest Minnesota Farm Management Services, 1954

	Dairy	Dairy and hog	General livestock	Dairy, hog, and crops	General livestock and crops	Feeder cattle, hog, and crops
Number of farms	23	41	69	16	64	24
Acres per farm	210	200	200	285	275	365
Number of workers						
Family	1.3	1.3	1.3	1.3	1.3	1.4
Hired	.5	.4	.3	.6	.4	.5
Number of work units	457	459	444	443	427	421
Work units per worker	254	270	278	233	251	222
Return over feed from livestock	$3,924	$4,817	$4,333	$ 3,470	$ 2,859	$ 5,257
Value crops produced	5,968	6,832	7,295	10,328	10,873	14,944
Value of feed fed	7,214	9,279	9,764	7,809	9,063	12,716

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Should Corn Land—

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average census conditions of 42 bushels of corn or of 8.3 tons of silage, corn silage fed through dairy will return slightly more per acre than the cash crop, however considerably less than by feeding the corn through hogs.

Here again, it must be emphasized that corn silage represents only a small part of the total input. The availability of other inputs such as labor, buildings, other feed, etc. may justify the use of corn land for silage purposes, unless other feed is available which can be used as a substitute for corn and for which no other higher alternative utilization value can be obtained.

Alternative Value as Related to Other Substitute Crops

Hay silage—Many recent studies have shown that grass silage of good

quality is a good substitute for corn silage. Wherever grass silage, under the prevailing cropping plan, can furnish the required forage feed it is very doubtful whether corn silage is ever economically justified.

When grass silage replaces corn silage, the value of such grass silage, at the least, is equal to the cash value of the corn that may be harvested from the corn land formerly used for silage. The return per 100 pounds of TDN in that case is \$2.90 [130 ÷ (56 × 0.8)]. When 7½ tons of hay silage per acre is harvested, or a total of 2,700 pounds of TDN, in replacement of corn silage, the value of the crop is at least 27 × \$2.90 = \$78.00. This is equivalent to 60 bushels of corn at \$1.30 per bushel.

If the additional corn also is utilized through an increased hog program, still a higher value has to be put on the grass silage. With this in mind, farmers using corn silage at present should certainly make every effort to raise their roughage feed requirements from their present grass acreage by using the most effective production methods possible. For them, increased production of their grasses, in effect, means increased corn production. The extra grass produced as a result of a good fertility program can be used as a substitute for corn silage and leaves the corn land to be used entirely for grain purposes.

Oat silage—Another substitute for corn silage is oat silage. On almost all farms in Minnesota a relatively large part of the land is in oats. Yet a detailed cost study in southern Minnesota during the years 1951, 1952, and 1953 shows that the net return for oats yielding 43 bushels per acre is only \$1.30. The use of oats for silage instead of corn represents one of the most obvious income opportunities.

Oats cut for silage yield conservatively 5 tons of green material per acre. It takes, in other words, 20 acres of oats to fill a 100-ton silo. The alternative would be to fill the silo with corn silage.

Assuming a favorable corn silage yield of 10 tons per acre, 10 acres of corn land would be required to fill the same 100-ton silo. Under these conditions, we get the following comparisons:

1. The silo is filled with 20 acres of oat silage. Now 10 acres of corn can be harvested, yielding a total of approximately 600 bushels of corn with a cash value of \$780.

2. The silo is filled with 10 acres of corn silage. Now 20 acres of oats can be harvested for grain, yielding approximately 900 bushels of oats (at \$.65 per bushel) with a cash value of \$585.

In conclusion we find that in both cases the 100-ton silo is filled with an almost identical feed, however, when the oats were put in the silo and the corn was harvested for grain, \$195 profit was gained.

The following rule may be set up:

Under present price conditions of corn at \$1.30 per bushel and oats at \$.65 per bushel, there is an economic advantage in filling the silo with oat silage rather than with corn silage whenever the bushel yield of corn is equal or higher than oats.

Conclusions

1. A simple general answer cannot be given to the question whether corn land should be used for silage; a lot depends on the individual farm situation.

2. On many farms the use of corn land for silage is economically **not** justified, under present conditions.

3. Corn as a cash grain crop usually gives a higher return per acre of corn land than corn silage fed to dairy or beef cattle.

4. Corn as a grain fed to hogs returns the highest net product per acre of corn land.

5. On many farms a switch from corn silage to grass silage will be economically advantageous. This is certainly so when this switch can be made without changing the present cropping program.

6. On most farms a switch from corn silage to oat silage is economically advantageous.

Skim Milk—Sell or Feed It?

S. A. Engene

Shall you sell your skim milk, or is it worth more as a feed? Many farmers must answer this question.

Most of the skim milk goes to hogs whenever a farmer tries to feed all he produces. Calves will use only a small part, possibly 15 per cent. Few dairy farmers have enough chickens to use all of the milk. The question then is, how much is skim milk worth as a hog feed?

One hundred pounds of skim milk will replace about 7 pounds of tankage and one-fifth bushel of corn, according to feeding experiments. With tankage at \$6.00 per 100 pounds and corn at \$1.50 a bushel, skim milk would be worth 72 cents a hundred.

To figure it, consider 7 pounds of tankage at 6 cents a pound is 42 cents; one-fifth bushel of corn at \$1.50 a bushel is 30 cents; 42 + 30 = 72 cents. If you value corn at \$1.25 a bushel, 100 pounds of skim milk will be worth 67 cents.

Another rule of thumb is that 100 pounds of skim milk is worth as much as one-half bushel of corn. The two rules give about the same estimate, although the first is a little more reliable.

These rules apply as an average for the full feeding period, up to the time the hogs are sold. The milk is worth considerably more than this when pigs are small, and less as they grow bigger.

This is usually the highest value you can put on your milk. It is worth this much if you have exactly the right number of hogs so that your skim milk will balance the ration. If you feed more than that, the extra milk has much less value.

About two pounds of skim milk are needed to balance each pound of grain in raising hogs to 250 pounds. More milk than this is needed for each pound of grain when the pigs are small, and less when they approach market weight.

By doubling the amount of milk fed, up to four pounds of milk per pound of grain, the value is cut by one-third. That would bring its value down to 48 cents.

Unfortunately, most dairy farmers are unable to use all of their milk at the most efficient level at all times; milk production and hog production are not matched that well.

As a rough figure, if a farmer feeds his hogs in dry lot he should have about 1½ hogs on hand for every cow he is milking. If he has his hogs on good legume pasture he will need almost twice as many hogs, since the pasture provides considerable protein.

This is the number he will need in order to get full value from his milk. Whenever the number of hogs drops below this, his milk will be worth less.

At the present time, then, the top value of skim milk is near 70 to 75 cents for 100 pounds. For most farmers it would be less than that, with little value on farms with no hogs or other use for the milk.

Shall he sell his milk? That depends upon the price he can get when he sells, using the net price, after delivery and other costs have been considered.

Minnesota Farm Prices, May and June 1955

Prepared by Harlan C. Lampe

Average Farm Prices for Minnesota, May and June 1955*

	May 1954	May 1955	June 1954	June 1955
Wheat	2.15	2.29	2.12	2.26
Corn	1.36	1.30	1.38	1.33
Oats	.72	.65	.71	.66
Barley	1.11	1.07	1.07	1.03
Rye	.87	1.00	.88	1.02
Flax	3.72	3.02	3.56	3.05
Potatoes	.70	1.80	.75	1.30
Hay	15.00	15.50	14.80	16.40
Soybeans†	3.54	2.26	3.53	2.22
Hogs	24.60	15.90	19.50	17.50
Cattle	16.90	16.50	17.40	17.60
Calves	18.70	17.80	17.50	18.00
Sheep-lambs	20.85	16.34	19.55	18.18
Chickens	.140	.166	.156	.168
Eggs	.275	.28	.270	.28
Butterfat	.62	.62	.62	.62
Milk	2.90	2.95	2.85	2.90
Wool†	.50	.41	.50	.41

* Average prices as reported by the USDA.

† Not included in Minnesota Farm Price Indexes below.

The Minnesota farm price index changed from 209.5 in May to 218.4 in June. The reason for this difference cannot be explained in terms of price changes alone.

The way in which the index is computed must also be considered. The index tells us that May prices were 209 per cent of the average of May prices in 1935-39 and that June prices were 218 per cent of the average of June prices in 1935-39. If the average prices for May 1935-39 were different from average prices for June 1935-39 the indexes cannot be directly compared.

For example: If average 1935-39 prices for May were $1.10 and present prices averaged $2.20 our index would be 200 ($2.20 ÷ $1.10). If June 1935-39 prices averaged $1.00 and present June prices averaged $2.20 we would have an index of 220 ($2.20 ÷ $1.00). The present price would not have changed but the index would change by 20 points.

Indexes for Minnesota Agriculture*

	May 1955	Average May 1935-39	June 1955	Average June 1935-39
U. S. farm price index	229.3	100	230.6	100
Minnesota farm price index	209.5	100	218.4	100
Minnesota crop price index	219.9	100	231.2	100
Minnesota livestock price index	219.7	100	228.6	100
Minnesota livestock products price index	198.5	100	206.4	100
Purchasing power of farm products				
United States	102.3	100	102.5	100
Minnesota	93.5	100	97.1	100
U. S. hog-corn ratio	11.7	10.7	13.1	12.0
Minnesota hog-corn ratio	12.2	14.6	13.2	15.2
Minnesota beef-corn ratio	12.7	12.7	13.2	12.8
Minnesota egg-grain ratio	9.8	14.6	9.8	14.6
Minnesota butterfat-farm-grain ratio	28.8	29.7	28.7	30.9

* Minnesota index weights are the average sales of the five corresponding months of 1935-39. U. S. index weights are the average sales for 60 months of 1935-39.

The Outlook Corner — Farm Labor [1]

In 1954, total farm employment in the United States was 8.5 million persons—operators, family help, and hired labor—or only 70 per cent of the 1935-39 average of 12.00 million people employed on farms. At the same time, total population increased from 129 to 162 million. In 1954 each farm worker was feeding 19.1 persons compared with 10.7 persons in the 1935-39 period.

At the same time, the population was better fed. The total per capita consumption of red meat and poultry, as reported by the U. S. Department of Agriculture, was up from 141 pounds in 1935-39 period to 181 pounds in 1954, an increase of 28 per cent.

The consumption of fluid milk and cream (cream figured in terms of milk equivalent) increased from 330 pounds per capita in the 1935-39 period to 353 pounds in 1954, a 7 per cent increase.

While the consumption of such expensive foods as meat, poultry, and fluid milk was increasing, the per capita consumption of the staples of the economical diet decreased sharply.

The consumption of wheat flour dropped from 157 pounds per capita in the 1935-39 period to 123 pounds in 1954. Potatoes decreased from 128 pounds in the 1935-39 period to 104 pounds in 1954.

This achievement of a much better diet for a 25 per cent increase in population has been obtained with practically no increase in land. The plantings of 16 major crops rose from 324 million acres in 1935-39 to 332 million acres in 1954, an increase of less than 3 per cent.

The peak farm population (people residing on farms) was 32.4 million in 1933 and by 1954 it was down to 21.9 million, a decrease of 32 per cent.

Of course, some work formerly done on farms is now done in town. The men who drive the creamery truck, build the tractors and trucks, and produce the oil have a vital part in serving the farmer.

At the same time that the farm population has been decreasing, the excess of births over deaths among the farm population has been such that except for the emigration from farms, the farm population would have been well above the 30 million of 1940 and the mechanization at the present high level would not have been feasible.

In general, the emigration from farms has provided a higher standard of living both for those that remained on the farm and those that didn't. This trend is likely to continue.

[1] From material prepared by W. L. Cavert, Director of Research, Farm Credit District of St. Paul.

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