

# More Profitable Farming in Northeast Minnesota

W.L. Cavert  
Division of Agricultural Extension  
G.A. Pond  
Division of Farm Management  
Agricultural Experiment Station



## UNIVERSITY OF MINNESOTA

### AGRICULTURAL EXTENSION DIVISION

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F. W. Peck, Director, Agricultural Extension Division, Department of Agriculture, University of Minnesota, Co-operating with United States Department of Agriculture.

THE problem confronting most farmers in Northeast Minnesota is that of making a satisfactory living on a small area of tillable land. According to the 1925 census, the average acres of crop land per farm in representative counties were as follows: Aitkin 33, Beltrami 29, Cass 39, Clearwater 49, Crow Wing 46, Itasca 18, Morrison 66, and Pine 36. It is evident that operating a farm with only 20, 30, 40, or 50 acres of tillable land is mainly a means of obtaining a job, and that the returns depend largely on the amount of productive work that can be provided. Therefore, the farmer on a limited acreage should plan to keep such kinds of livestock as would provide a market for a large amount of labor in addition to utilizing feed.

Where the acreage is limited, crops can be grown that make intensive use of the land, such as potatoes, alfalfa where it grows well, and truck crops where there is an available market.

Each enterprise must do its part—have high producing cows and high crop yields per acre, without an unreasonable overhead for labor, machinery, and buildings.

For farmers in the United States as a whole, decreasing the agricultural surplus is a major problem, yet for most farmers in this region, as individuals, receiving an adequate income depends on using available land to fullest capacity and, where it can be economically done, getting enough more acres under cultivation that the overhead for the time of the farm family, buildings, and machinery can be reduced to a reasonable figure.

## PLANNING A PROFITABLE LIVESTOCK SYSTEM

It is generally agreed that dairy cows are the most satisfactory type of livestock for the region.<sup>1</sup>

According to cost figures kept at Askov on 24 farms for 1925, 1926, and 1927, each dairy cow required 197 hours of man labor and returned from 0 to 57 cents per hour for the time expended. Only one farmer fell below 19 cents per hour.<sup>2</sup>

The detailed figures as to the average income and expenses per cow for 24 farms per year for 1925, 1926, and 1927 are as follows:

<sup>1</sup> The herd pictured on the cover is that of Geo. Boyer, Aitkin. The photograph was furnished by Christian Nash, county agent for Aitkin County.

<sup>2</sup> Price conditions have changed decidedly since the data were collected at Askov in 1925-26-27. The cost data can be readily adjusted to the changed conditions by applying current prices to the various products and to the quantities of feed, labor, and other items required in production.

The suggestions as to the type of farming best adapted to Northeast Minnesota are believed to be valid for both the conditions prevailing in 1925-27 and for those likely to prevail in the near future.

**Receipts**

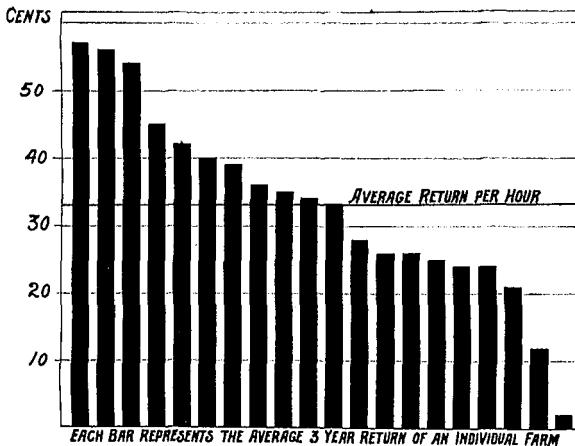
Average of 24 farms for three years with an average of 11 cows per farm:

Butterfat, lb. ....	255 at \$0.50	\$127.50
Skimmilk, lb. ....	5,664 at 0.25	14.16
Manure, ton .....	7 at 1.50	10.50
Appreciation .....		0.88
<b>Total .....</b>		<b>\$153.04</b>

**Expenses**

Hay and fodder, lb. ....	3,327	\$ 21.56
Succulent feeds, mostly silage, lb. ....	6,755	17.27
Corn and small grains, lb. ....	814	14.15
Oilmeal, lb. ....	178	4.75
Bran, shorts, and mixed commercial feeds, lb..	492	7.78
Skimmilk, lb. ....	63	0.16
Pasture, days .....	162	5.88
<b>Total feed .....</b>		<b>71.55</b>
Shelter .....		11.18
Interest on cow .....	\$65.33 at 6 per cent	3.92
Miscellaneous items .....		0.67
<b>Total except labor .....</b>		<b>\$ 87.32</b>
Return for 197 hours of labor (receipts less expenses)		65.72
Return per hour .....		\$ 0.33

**LABOR RETURN PER HOUR FROM 20 DAIRY HERDS  
ASKOV, 1925-26-27**



No credit has been given for the value of calf at birth and no charge has been made for sire service. These items would about offset each other.

The foregoing results are typical of the returns received by the better farmers in Northeast Minnesota. Most of these 24 herds have

been graded up by the use of purebred sires, a part of them have been in a cow testing association for several years. As a whole these farmers give more than usual attention to providing grain in the kind and amount needed for economical production.

In addition to the return of 33 cents per hour, these farmers had secured the satisfactory price of \$15 per ton for hay, \$5.62 per ton for silage, \$1.79 per hundredweight for grain, and \$5.98 per head for pasture per season. All other costs, including shelter, were included.

The advantage of a well handled dairy herd for these farmers is indicated by the fact that in this case 11 average cows provided a labor return of \$723 per year. It is important to keep in mind that a large proportion of this work came in the winter, when otherwise there might not have been an opportunity for productive employment.

At the present time butter is decidedly lower in price than the average received by these farmers in 1925, 1926, and 1927. However, there seems to be every reason to believe that over a period of years butter will sell at as favorable prices as it has in recent years as compared to other livestock products.

It is interesting to note that the returns per hour varied up to 57 cents. Figure 1 shows the average return per hour for each of the 20 farms that were in the project for the full three years. Only one farm returned less than 19 cents per hour. At present, many city workers either have no employment or are working on part time, but for the same kind of work, one city worker usually gets about the same as another. The dairyman is always sure of a job, but the pay largely depends upon the intelligence he puts into the work.

Aside from the prices of butterfat and feeds, some of the most important items in getting a good return per hour are: Feeding balanced rations according to the production of each cow; controlling such diseases as abortion, tuberculosis, and garget; using sires of high producing ancestry; and attention to the many details that go with the successful care of livestock.

It is interesting to note that the cost of pasture is put at less than \$6.00 for the season, while that of other feed was \$65.67. The cattle probably secured the equivalent of full feed from the pasture for about four months at a cost of \$1.50 per month compared to over \$8.00 per month for the rest of the year. This suggests that good pasture is one of the big items in securing a high production at low cost. A shortage of pasture may easily increase the feed bill \$10 to \$20 per year per cow, or \$100 to \$200 per year for ten cows. Every effort should be made to have good pasture as long as possible. On many farms additional pasture can be secured at small expense by cutting the brush and seeding alsike and timothy. Cutting the weeds before they go to seed will help many pastures materially. One way to make

sure of plenty of pasture is not to keep more cows than can be handled in a moderately dry summer. The productivity of many pastures is greatly decreased by turning the cattle on them too early in the spring and keeping them closely grazed at all times. Experiments at the Wisconsin Agricultural Experiment Station have shown that a bluegrass pasture that had been kept closely cut with a lawn mower for the two preceding years yielded only 500 pounds of air-dry clippings per year, while an adjoining tract that had been cut only once a year in each of the three preceding years yielded 2,660 pounds of hay—five times the yield where the conditions were similar to that of an overstocked pasture.<sup>3</sup> This indicates that if a pasture is continuously overstocked and eaten off in the spring before the grass gets a good start, the feed per acre is greatly decreased.

### GETTING FULL VALUE OF BY-PRODUCTS

It is interesting to note that the by-products of the dairy business, the skimmilk and manure, were valued at nearly \$25 per cow under conditions prevailing in 1925-27. In addition, the calf is worth from nothing to \$10 at birth, according to sex, breeding, and condition. This suggests that it is worth while to give careful study to the question of getting the maximum return from these by-products.

**Skimmilk.**—Skimmilk has been utilized chiefly for calves and hogs, with some for poultry. In this section hogs and poultry are at a disadvantage as compared to grain-surplus sections because corn and oats are more than 50 per cent higher in price than in the surplus-grain sections in Southwest Minnesota; while the price of hogs, eggs, and poultry are in most cases no higher than in the grain-surplus sections. The result is that a farmer is faced with the alternative of either buying a considerable amount of high-priced grain or feeding skimmilk to hogs in such large quantities that the return is relatively small.

Calves give relatively small returns for skimmilk after they reach an age of five or six months and will thrive on ordinary feeds. Furthermore, if the supply of feed is limited and family labor is available it is desirable to limit the calves raised to those needed for dairy replacement so that a larger proportion of the feed may be fed to cows, thus giving a market for more labor. In recent years some of the larger creameries in this section have installed machinery for manufacturing dry skimmilk powder. The whole milk is delivered to the creamery and the creamery manufactures the whole product instead of cream alone. As markets develop for milk powder there will probably be a

<sup>3</sup> Graber, L. F., Nelson, N. T., Luekel, W. A., and Albert, W. B., *Organic Food Reserves in Relation to the Growth of Alfalfa and Other Perennial and Herbaceous Plants*. Wis. Research Bull. 80, p. 101.

long-time tendency to utilize skim milk in this way in the sections having high-priced grain.

**Manure.**—Most farms in Northeast Minnesota give a decided response to manure, and it is well worth while to make every effort to conserve its full value. At the Duluth Experiment Station, manure applied in a 3-year rotation of potatoes, oats, and clover hay gave an increase of \$2.48 per ton of manure where applied at the rate of 10 tons per acre; and of \$1.76 per ton where applied at the rate of 20 tons per acre.<sup>4</sup> For the 10-ton application, the potato yield was increased 38 bushels, the oat yield 7.3 bushels, and the hay yield 0.9 tons. Potatoes were figured at 40 cents a bushel, oats at 35 cents a bushel, and hay at \$8.00 a ton. The manure was applied to the clover seeding in the fall, after the companion crop had been harvested. Manure applied at the rate of 10 tons per acre was worth over 70 cents a ton more than when 20 tons was used. Other factors in getting full value for the manure are conserving the liquid and getting it on the field as promptly as possible.

**Selling the calf.**—A grade bull calf has little value at birth, but a fat veal calf weighing 130 to 140 pounds has usually been worth from 8 to 11 cents a pound. Altho gains usually cost more than they sell for, there may be a profit because by fattening the calf one is able to sell the original 70, 80, 90, or 100 pounds at veal prices.

Experiments have shown that 9 to 10 pounds of milk are required per pound of gain. If a calf weighs 80 pounds at birth and is carried on whole milk to a weight of 130 pounds at the rate of 10 pounds of milk for one pound of gain, 500 pounds would be required. If it is worth \$1.60 per hundredweight, the cost would be \$8.00. If the calf sells for \$13, the equivalent of \$5.00 is had for the calf at birth. The bigger the calf at birth and the lower the test of the milk, the greater will be the profit. Calves will do as well on milk testing 3 or 3½ per cent as on richer milk. Hence some economy can be effected by vealing the calves on milk from low-testing cows.

### Hogs

Hogs in Northeast Minnesota are kept largely to utilize skim milk and to provide meat for home consumption. The average amount of pork produced per farm on the Askov cost route was 1,961 pounds, or the equivalent of 10 pigs weighing 196 pounds. The 1925 census showed that on the average there was about one brood sow to two farms in Aitkin, Cass, Clearwater, Crow Wing, Hubbard, Itasca, and Pine Counties.

The following table shows the results of the hog business on cost-route farms for 1925, 1926, and 1927.

<sup>4</sup> Based on report of Northeast Experiment Station, 1926-1927, pp. 33 and 34. M. J. Thompson, Supt.

**Average Requirements and Cost for 100 Pounds Gain on Hogs**

(Average of 23 Farms for Three Years)

Feed:		
Corn, oats, and barley, lb.....	165	\$3.01
Various commercial feeds, lb.....	71	1.14
Potatoes and rutabagas, lb. ....	174	0.42
Skim milk, lb. ....	1,472	3.68
Pasture .....		0.19
Total feed cost .....		<u>\$8.44</u>
Man labor, hours .....	10.0	2.00
Horse work, hours .....	0.5	0.05
Shelter .....		0.64
Interest on breeding stock .....		0.29
Miscellaneous .....		0.05
Total cost .....		<u>\$11.47</u>
Less manure and other credits .....		0.35
Net cost per cwt. ....		11.12
Selling price per cwt. ....		11.17
Profit .....		0.05

For an average of the three years, hogs paid 25 cents per hundred-weight for skim milk, 20 cents an hour for labor, and made a market for about 1.7 tons of cull potatoes and rutabagas per farm at \$4.20 per ton. The average farm marketed 288 hundredweight of skim milk to hogs for \$72 and 196 hours of labor for \$44.

According to E. F. Ferrin, in charge of swine husbandry at University Farm, relatively little return is secured for skim milk when more than 5 pounds of milk is fed per one pound of grain. Some of these farms fed as much as 10 to 20 pounds of milk for each pound of grain. Unless some other use could have been found for the milk it would probably have paid to keep more pigs, even tho the extra grain had to be purchased.

The labor requirement was 10 hours per hundredweight of gains compared to a usual requirement of two to four hours per hundred-weight on Southern Minnesota farms. The difference is due largely to the small size of the herds in Northeast Minnesota and to the fact that the hogs are all slop-fed. It does not take much longer to care for 50 to 100 than for 10 to 20 hogs.

Young pigs make better use of large amounts of milk than do older ones, so farmers in these sections usually do not carry pigs to heavy weights. It is better to produce 25 pigs weighing 170 pounds each than 18 pigs weighing 235 pounds each. Farmers in this section will usually find it advisable to have their spring pigs farrowed in late March or early April and sell them in September or early October. Where only a few litters are raised, one can frequently handle early pigs by farrowing them in the barn. Light hogs frequently bring a

substantial premium in September. An average of the years 1921-29, inclusive, for the South St. Paul market, shows that hogs weighing 160-200 pounds averaged \$10.38 in September compared to \$9.56 in October, \$8.63 in November, and \$8.61 in December.

### Poultry

Poultry, like hogs, are chiefly grain consumers but they have the advantage that in some sections eggs and poultry can be sold at a premium. The best opportunity to get special prices for eggs and poultry is to farmers located near the larger cities such as Duluth, Virginia, and International Falls, or neighboring summer resorts.

Farm flocks are small in Northeast Minnesota. The average number of hens per farm, according to the 1925 census, was as follows in representative counties: Aitkin 35, Beltrami 27, Cass 37, Crow Wing 49, and Itasca 29. The small number is due to high feed prices and the small amount of grain to be picked up about the farmsteads.

The following figures show the average returns of farm flocks at Askov for the years 1925, 1926, and 1927.

#### Receipts

Eggs, 822 dozen .....	\$215
Poultry .....	38
Manure .....	5
Total .....	<u>\$258</u>

#### Expenses

Feed .....	\$146
Shelter .....	22
Interest .....	6
Poultry bought .....	19
Decrease of inventory .....	1
Miscellaneous .....	10
Total .....	<u>\$204</u>
Return for 306 hours of labor.....	\$ 54
Return per hour .....	17.6 cents

These flocks were mostly Leghorns. The average production per hen was 128 eggs. The average flock was 78 hens and the accompanying young stock. The feed used per 100 hens was 2,280 pounds farm grains, 4,786 pounds commercial feeds, 67 pounds meat scraps, 3,968 pounds skim milk, 1,405 pounds cottage cheese, and 1,085 pounds various succulent feeds, chiefly rutabagas.

Some of these farmers followed the plan of concentrating their skim milk by allowing it to sour and then pouring off the whey. This concentrated milk is designated as cheese in this report.



Occasional farmers in Northeast Minnesota have done well with flocks of 500 to 2,000 birds, especially where they had an opportunity to sell eggs at a premium; but the farmer who buys grain at retail and sell eggs at prevailing wholesale prices needs a high degree of skill in order to show a profit. A flock of poultry well handled may provide a better outlet for a part of the skim milk than hogs.

Experiments at the Minnesota experiment station and at other stations have shown that hens without access to water will drink enough skim milk to supply their protein requirements. In one Idaho experiment, Leghorn hens handled in this way consumed 167 pounds of sour skim milk per year. The amount of skim milk produced per cow was 5,664 pounds. At this rate, it would take 34 hens to consume the skim milk from one cow.<sup>5</sup>



Fig. 2. Flock of Ole A. Engebretson, Clearbrook

This flock won second place in the 1930 State Lamb Production Contest for flocks of over 100 ewes. His 110 ewes raised 140 lambs that averaged 76 pounds at 135 days.

## Sheep

No data were secured on sheep in connection with the Askov cost route, as practically no sheep were kept on those farms. Sheep seem to be well adapted to farms in this section, as lambs raised on pasture without grain will top the market, and little grain is required for the ewes. They are well adapted to a region that produces excellent forage but a deficit of grain. In 1925, the average number of ewes per farm was less than two in Aitkin, Beltrami, Cass, Crow Wing, Itasca, and Pine Counties. Farmers who are raising more good hay and fodder than is required by the cows that can be milked by the family labor

<sup>5</sup> Pankhurst, R. T. Value of Certain Feeds for Production and Quality in Eggs. Idaho Agricultural Station Bulletin 134, May, 1924.

may find a flock of sheep a good means of utilizing hay and fodder and making more rapid progress in subduing brush than would be possible without them.

### Beef Cattle

Beef cattle are likely to be profitable where there are large quantities of cheap roughage. Northern Minnesota has cheap pasture, but hay is frequently high in price and a larger quantity is required than in regions farther south or west, as the snow is usually too deep for winter grazing. Furthermore, the problem of most farmers is to find a market for spare hours rather than for surplus feed. The labor required in caring for 10 dairy cows would care for 60 beef cows.

### ADOPT A GOOD CROPPING SYSTEM

In planning the cropping system for Northeast Minnesota, one should keep in mind: (1) the need of an intensive cash crop so that the limited amount of land may give profitable employment to the farmer and his family; and (2) the need for an abundant supply of winter forage for the livestock.

In practice, this usually means that the cropping system centers around potatoes and hay with some corn for fodder or silage in the districts best adapted to corn growing, and with sufficient oats or barley to serve as a companion crop in seeding down for hay, and to provide a part of the grain needed for feed.

The extent to which hay is the major crop is shown by the fact that in 1929, in Beltrami County, tame hay crops of various kinds occupied 50 per cent of the crop land except wild hay. In Itasca County the corresponding figure was 64 per cent and in Pine County 40 per cent. Farther south, the percentage of crop land occupied by hay decreases. For example, in Mille Lacs County it is 28 per cent. This is, in part, because corn is a more important crop, Mille Lacs County having 17 per cent of the crop land, except wild hay, in corn compared to 2 per cent in Itasca County.

Alsike or red clover in mixture with timothy is the leading hay crop in all this region, but alfalfa is coming to occupy a position of importance in sections where the soil is naturally well adapted to the crop or where it can be made to grow satisfactorily by the application of lime, sulphur, or phosphate. The Division of Soils of the Agricultural Experiment Station, University Farm, has in recent years maintained alfalfa experimental fields at Crow Wing, Crow Wing County; Backus, Cass County; Bemidji, Beltrami County; and Park Rapids, Hubbard County. Alfalfa has been raised with fair to excellent success, but in each case certain soil treatments were necessary. At Bemidji, sulphur fertilizers doubled the yields of alfalfa. At Backus and Crow Wing, lime increased the yields.

A farmer without experience with alfalfa should start with a small acreage, first getting complete instructions from his county agent or the Division of Soils, and then expand the acreage as his success warrants. There is no question that alfalfa is the outstanding hay crop for sandy soils.

Hay is always high in price if there is a local shortage, as by the time the baling, freight, and handling expenses are paid the buying price is high tho the farmer who sold the hay got a low price. A good rule is to plan the hay acreage so that there will be an ample supply in case of drouth. Then, if the crop is large, some can be carried over to a less favorable year.

In Carlton, Aitkin, St. Louis, Lake, Itasca Counties and in parts of other counties, alfalfa is a crop of minor importance. In such locations it is well to depend upon alsike and timothy, trying alfalfa only in an experimental way until one learns to handle it successfully.

Red and alsike clover seed are profitable crops in certain localities, particularly in sections far from market and on farms where all the hay crop is not needed for livestock.

One objection to alfalfa is the lessened opportunity to rotate crops. This can be overcome, in part, by depending upon such commercial fertilizers as are needed for alfalfa and using the manure on other crops.

### Potatoes

Potatoes are the leading cash crop in Northeast Minnesota. They are well adapted to soil and climatic conditions and, if the price is satisfactory, give an opportunity to secure a large income from a small acreage. However, the market is uncertain.

The following figures show the average cost of producing potatoes per acre at Askov for the years 1925, 1926, and 1927.

Man labor, hr. ....	64½ at 25 cents	\$16.13
Horse work, hr. ....	63 at 11 cents	6.93
Tractor, hr. ....	¾ at 75 cents	0.56
Seed, bu. ....	11½ at 92 cents	10.58
Spray material .....		0.62
Manure .....		8.92
Machinery .....		2.70
Rock picking .....		0.95
Land .....		5.00
Miscellaneous .....		0.33
Total .....		<u>\$52.72</u>
Less credit for culls .....		1.19
Net cost .....		<u>\$51.53</u>
Cost per bushel with average yield of 124 bushels		0.42

For these three years, the average farm price of potatoes in this locality was 90 cents per bushel and the average cost per bushel was

42 cents. Over a period of years, cost and selling price would not be far apart. During 1924 and 1927, in some localities, potatoes were so low in price that they were not worth the cost of harvesting. One successful grower in Chisago County grows a certain acreage each year. Half of the crop is sold in the fall and half in the spring. In this way the speculative features are reduced to a minimum. If any change were to be suggested in the foregoing plan, it would be a slight reduction in acreage after unusually profitable years, and some expansion after two low-price years in succession.

### Small Grain

The chief small grain in this region is oats. In addition to providing part of the grain feed and straw for bedding, it furnishes a crop in which clover may be seeded.

If the hay crop is short, it is usually more economical to cut the oats for hay and buy more grain rather than to be short of hay.

The following figures show the average cost per acre of raising small grain (mostly oats) at Askov in 1925, 1926, and 1927.

Man labor, hr. ....	13½ at 25 cents	\$ 3.37
Horse work, hr. ....	21¼ at 11 cents	2.33
Tractor work, hr. ....	¼ at 80 cents	0.20
Seed, bu. ....	3.1 at 65 cents	2.02
Twine, lb. ....	2.6	0.35
Threshing .....		1.44
Manure .....		6.72
Rock picking .....		0.74
Machinery—depreciation, interest, repairs, etc....		0.99
All other items .....		0.08
Land rent and taxes .....		5.00
Total .....		<u>\$23.24</u>
Less credit for hay cut on headlands .....		1.03
Net cost per acre .....		<u>\$22.21</u>

The average yield was 41 bushels per acre and the cost per bushel was 54 cents. However, no credit has been allowed for the straw, and the straw is all carefully saved for bedding.

The cost of producing small grain is much higher than in sections that raise 75 to 200 acres of grain per farm.

The acreage of barley has been increasing in recent years. Barley usually gives more pounds of grain per acre on soils that are in a high state of productivity. However, it does not do well on sandy soils.

### HOW MUCH EQUIPMENT IS NEEDED?

One of the problems confronting a farmer on a small acreage is that he needs far more buildings and machinery in proportion to his crop acreage than do larger farms.

## Buildings

One may need nearly as large a house on a small farm as on a large farm. The character of the house is a question of what one can afford for the comfort of the family but in the case of other buildings it is a question (1) as to whether the proposed building will each year add a sum to the farm income greater than the interest on the investment plus the repairs and depreciation; and (2) it is not only a question of whether a proposed investment will pay a profit but whether it is the most profitable use of one's limited resources. For example, careful calculations might show that a new barn, by saving labor and producing some extra returns from the livestock, would pay a small profit but possibly the same money would be better used either in clearing additional land or adding to the machinery, or in giving the children a better education or providing much needed comforts in the home. In general, one should be very cautious about borrowing money with which to construct new buildings. One may figure that if a \$2,400 barn is built, interest at 6 per cent, depreciation, repairs, and taxes will amount to 10 per cent of the investment, or \$240 per year, or \$20 a month. Will the extra income be sufficient to make a good profit on the investment? The usual experience is that dairy cows, if they are kept reasonably comfortable, give about the same quantity of milk in a cheap barn as in an expensive one. Therefore, the up-to-date barn must largely justify itself upon the basis of saving in labor and the lessened waste from having hay under cover.

A bull will do well in a paddock that has an open shed at one end. Yearling cattle do well in sheds that are open to the south and are protected by timber. Sheep will winter fully as well in a good shed, open to the south, as in the most expensive barn, if the lambs do not come until warm weather.

An important item in considering investments in buildings is the fact that it is usually impossible to sell a small farm for sufficient to recover anything beyond a very modest investment in buildings.

The problem with machinery is similar to that with buildings except that a second-hand machine always has some value; while money unwisely invested in buildings may be almost a complete loss. Before buying any machine, carefully estimate the yearly cost and set this against the cost of hiring the machine or doing the work by hand. One farmer who raises about four acres of potatoes found that he could rent a digger from a neighbor for \$2.50 per day. Thus his total cost per year was less than \$5.00. This is materially less than interest on a \$140 investment. A new digger would have cost him \$140. In addition, there would be depreciation, repairs, and shelter. This particular farmer had barely sufficient funds for operating, so by renting a digger

and several other large machines he was much better provided with necessary funds than would otherwise have been the case.

Frequently neighbors co-operate in the ownership of the more expensive pieces. However, it may be just as satisfactory to hire machinery as to own it in partnership.

### Power

Horses are the leading source of power for field work on most Northeast Minnesota farms, altho tractors are of increasing importance. Reports in 1929 from 28 Minnesota farms with less than 100 crop acres indicated that as an average a tractor saved less than one horse, while on farms of over 200 crop acres a tractor displaced over four horses. The foregoing figures indicate why horses have continued to be the major source of power for field work in this region.<sup>5</sup>

The following are the average figures as to cost of keeping horses on the Askov route for 1925, 1926, and 1927.

### Cost for Keeping a Horse

Feeds used	
Roughage, mostly hay, lb. ....	4,674
Grain, lb. ....	1,177
Silage and succulent feeds, lb. ....	183
Skimmilk, lb. ....	182
Pasture, days ....	127
Total value of feed.....	\$51.32
Labor, 84 man hours at 20 cents.....	16.80
Shelter .....	11.12
Equipment including harness .....	4.49
Interest .....	5.25
Various cash items .....	1.75
Depreciation .....	6.46
Total expenses .....	\$97.19
Manure credit .....	10.19
Net expense .....	\$87.00
Hours worked per year .....	772
Cost per hour .....	\$ 0.11

Recent experiments at the Northeast Experiment Station, Duluth, as well as the experience of numerous farmers, has shown that decided economies can be effected in the keeping of horses on northern farms by keeping the horses on pasture during nights and idle days.<sup>5</sup> When the horses were working steadily, pasturing nights and Sundays cut the hay consumption in half and also saved considerable labor. Horses

<sup>5</sup> Cavert, W. L., Sources of Power on Minnesota Farms, Minnesota Experiment Station Bulletin No. 262, p. 45. 1930.

<sup>6</sup> Report of Northeast Experiment Station, 1926-27, pp. 56-60, M. J. Thompson, Supt

for the small farm have the great advantage that they can be used in units of one, two, three, four, or more horses per team as may be needed, while with a tractor the size of the mechanical power unit can be varied only by having tractors of different sizes.

It is particularly important to make careful advance calculations as to probable expenses and savings before purchasing tractors and trucks, as they represent large investments.

In every locality there is need of a certain number of engines for silo filling, threshing, wood sawing, and for heavier field work such as land clearing and breaking. Unless there is considerable belt work to be done, it is likely to be cheaper for one who has less than 100 acres under cultivation to hire such work than to own a tractor. Frequently one can hire his trucking done at considerably less than the interest, depreciation, license, insurance, and repairs on a truck.

### HOME LIVING FROM THE FARM

One of the advantages of the farm as a place to live is that one usually has a house to live in, part of the food, and frequently a part of the fuel. For the years 1925, 1926, and 1927 the average value of the dairy products, eggs, potatoes, poultry, and meat furnished by the farm for family use on these Pine County farms was \$201. Wood from the farm amounted to  $9\frac{1}{2}$  cords worth \$4.00 per cord, or \$38. These farmers lived in houses that had an average value of \$2,160. If one assumes that the rent was worth 10 per cent of the value, this item would amount to \$216. Therefore, the total contribution of the farm towards the family living would be \$455. These items would cost much more in town than on the farm.

A farmer usually sells his products at wholesale price and buys his farm and household supplies at retail price. His best opportunity to sell a part of his products at retail price is to make an effort to have the farm provide as much of the family living as possible, especially on small farms where the cash income is likely to be limited. Particular attention should be given to having a farm garden of generous size, not only as a means of saving cash, but plenty of vegetables go a good way toward making certain that the family has a well balanced diet.

If the garden is laid out in long rows about three feet apart, much of the work can be done with the horse cultivator.

## SUMMARY

1. The problem confronting most farmers in Northeast Minnesota is that of making a living on 20, 30, 40, or 50 acres of tillable land.

2. Dairy cows have proved to be the most satisfactory livestock, as they provide a market for available labor as well as for feed.

3. A dairy cow required 197 hours of labor per year. The return per hour above all expenses except labor varied from nothing to 57 cents per hour. The average was 33 cents.

4. Hogs were at a disadvantage as compared to surplus-grain sections. They added to the farm income when there was no other way to utilize skimmilk.

5. Poultry flocks are usually small, owing to the high price of grain. In some localities there is an opportunity to get higher prices for eggs than prevail in the main producing sections.

6. Sheep can furnish a market for any hay and pasture not needed by the dairy herd.

7. The cropping system should provide an abundant hay and pasture supply for the livestock, and, usually, an intensive cash crop. Potatoes are the most generally adaptable cash crop.

8. Before investing in additional barns or equipment one should not only make careful calculations to estimate whether the increased income will more than cover interest, depreciation, and repairs; but also carefully consider other needs of the farm or family that may be more important.

9. One of the advantages of the farm as a place to live is that one usually has a house to live in, part of the food, and frequently a part of the fuel. The value of food, house rent, and fuel furnished for family use on these farms was \$455 per year.

10. The average amount of work per horse was 772 hours per year. The cost was 11 cents per hour. Horses are the most important source of power on these farms.