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Economic strength at mid-year

July and early August is frequently a critical period for the Ninth district economy because this is usually the time when crop production 'hangs in the balance.' It appears now that we may be lucky again this year as crop prospects generally are on the optimistic side. Rainfall, although on the light side in some areas, has been sufficient to virtually insure an excellent small grain harvest. Temperatures, on the cool side in recent weeks, also have promoted small grain development. Corn and soybeans have made generally good progress during July but warmer weather and generous rainfall are needed during August for high crop yields. It now appears reasonable to expect that total crop and livestock production in 1958 will approximate last year's near record and, with relatively favorable farm prices, farm income should continue to exceed that of last year. District farm income during the first five months of this year was up 6½ percent from the same period in 1957.

A look at the district's nonagricultural economic indicators in recent weeks also is reassuring. In fact, aside from continued depressed conditions in the iron ore mining and lumbering areas, the district economy is evidencing growing strength. Bank debits during June registered a plus 10.8 percent over June of 1957, department store sales were up 3 percent, and weekly earnings in manufacturing were up 1.6 percent. Recent trends in construction contracts appear stronger, too.

Dairying in the Ninth district

The first in a series about the dairy industry of the district, this article deals with the northeastern part of the district . P. 5

The banking picture also is favorable with a growing level of demand and time deposits and with loans and discounts in June some 15 percent above last year. Business loans at the city banks have recently advanced by more than in the comparable period last year in contrast to earlier weakness. District nonagricultural employment, although still 2 percent below last year's in June, has been increasing since March. Nationally, June employment was 4.1 percent below a year ago. Most of the district's economic indicators are currently relatively more favorable than those of the country as a whole. This is due in part to the fact that the 1957-58 recession was largely industrial while agriculture, so important in the district, experienced a mild boom.

The national economy in recent weeks has been charting an upward trend in many important areas. The industrial production index lifted two points in June. Steel production is up. Housing starts are the highest since the summer of 1956. The average number of hours worked per week in manufacturing during May and June showed the largest 2-month gain in recent years. The stock market and the 22 basic commodity price index is up. Personal income in June was at $352 billion, about $2 billion higher than in May.

In spite of the optimism in recent weeks, it is still too early to say positively that the 1957-58 recession is now behind. The real test of the economic upturn will most likely come after Labor Day. The trend will be heavily influenced by international developments. It is probable that the forces of recovery will be fed by increased expenditures for defense. However, there is no assurance that even though the 'turn' has occurred, the economy will quickly regain its 1957 peak. It is likely that in the months ahead, unemployment will still remain a problem. Growth in the labor force adds substantially each year to the number seeking employment. Reduction of unemployment will depend on whether the recession has actually ended and how swiftly the economy advances over the next several months.

The following selected topics describe particular aspects of the district's current economic scene:

DISTRICT EMPLOYMENT PICTURE

Although employment in the Ninth district has been increasing since March, the increase has been less than seasonal. In fact, total nonagricultural employment this year, as compared with a year ago, has shown a progressively larger reduction each month. In May the district was 2.2 percent down from a year ago and in June, preliminary figures for the two district states with the largest employment, Minnesota and Montana, indicated a decline of 2.3 percent. However, the district is faring better than the nation as a whole which recorded a decline of 4.2 percent in May 1958 compared with May 1957.

Mining, manufacturing and construction employment have been hardest hit, and in that order. Mining areas have suffered particularly; in May, district mining employment was down 25 percent from a year ago. In Minnesota and Montana mining employment was down about 25 percent in June. District employment in manufacturing and construction in May was off 7 percent and 5 percent respectively from a year ago.

Insured unemployment in the district has been dropping significantly each successive month since March, but not nearly as fast as a year ago. In 1957, unemployment stood at about 55,000 in April and 33,000 in May. This year unemployment in April was 91,000 and in May 69,000. From preliminary reports it appears that the same trend continued through June and into July.

DEPARTMENT STORE SALES

Department store sales in the Ninth district have been creeping upward since March but at a slower pace than in the same period a year ago. The department store sales index, based on the 1947-49 average and adjusted for seasonal variations and difference in number of trading days, reached its low point of the past year-and-a-half in October

1957 when it stood at 119. Since then it has varied, reaching 132 in December and March, then settling down to rates of 120, 123 and 124 in April, May and June respectively, for a second quarter average of 122. The June index was up 5 points from the October low.

In 1957, April, May and June indexes were 123, 126 and 126 respectively, making a quarterly average of 125. Thus sales this year were 3 percent below like months a year ago in April and May, 2 percent lower in June (seasonally adjusted) and about 2½ percent lower for the quarter.

SPRING PIG CROP ABOVE 1957

The U.S. 1958 spring pig crop totaled 52,745,000 head, an increase of 2 percent over a year ago, according to recent U.S. Department of Agriculture estimates. The estimated number of sows farrowed this spring was 3 percent above a year earlier, but the number of pigs saved per litter was 1 percent below last year. There were 7.05 pigs saved per litter in the December-May period in 1958 compared with 7.12 in 1957. The June estimate of the spring pig crop was considerably lower than the 6 percent increase estimated for the nation in March.

Estimates of the Ninth district 1958 spring pig crop exceeded the crop of last year by 10 percent. Indications were that a total of 6,913,000 pigs were farrowed and saved in the district in the December-May period this year.

The number of sows farrowing this fall in the United States will be 13 percent above 1957 if the current estimates are realized. The fall pig crop based on these early estimates of intended farrowing is to reach 41,500,000 pigs; the largest fall pig crop since 1943. The total 1958 pig crop for the nation is expected to reach 94,245,000 head, 7 percent more than last year, and 5 percent above the average 1947-56 crop. District fall farrowing intentions are estimated to be nearly one-fourth higher than fall farrowings of 1957.

Because the hog-corn ratio has been quite favorable over a considerable number of months the increase in the pig crop that may be forthcoming this fall has been anticipated for some time. Farmers have not responded as rapidly as had been expected in increasing hog numbers during the recent period of a favorable corn-hog price relationship.

CAR REGISTRATIONS REMAIN LOW

Ninth district new passenger car registrations in May were almost 16 percent behind those in the same month a year ago. South Dakota's 59 percent increase in registrations was more than offset by a 26 percent decline in Minnesota and a minus 17 percent in both Montana and North Dakota. The five-month cumulative decrease for the four states fully within the district was 15 percent.

The four-county Twin Cities metropolitan area, which in the first five months accounted for over one-third of all registrations in the four full states, showed a decline of 18 percent in June from a year ago. This pattern continued into July when the first 14 days' registrations were down 18 percent from the same period a year ago. Dealers generally are not expecting much improvement until the large inventories now on hand are depleted and the new 1959 models are introduced.

LOANS AND DEPOSITS DISPLAY STRENGTH

Loans of city member banks in the district, exclusive of loans to other banks, rose by $36 million in June. In the same period last year, an increase of $22 million was reported. The larger increase in June this year was occasioned partly by commercial and industrial loans which rose by $21 million in contrast to a gain of $14 million in the year earlier period. Also, loans to brokers and dealers in securities rose $9 million in June 1958 while they were unchanged in the year earlier period. Worthy of note is the fact that business loans displayed more buoyancy in June than was true a

year ago. Previously in 1958 city bank business loans had declined in contrast to an increase in the same period a year earlier. Country member bank loans in June were up by $17 million or by $2 million more than in June last year.

Country bank deposits increased $13 million in June—the same amount reported a year earlier. But city bank deposits gained $122 million—$93 million more than a year earlier. Primarily responsible for the larger gain this year were U.S. government deposits. While net withdrawals of $24 million were made a year earlier, $64 million was added to such balances in June this year. Time deposits of city and country banks grew by $6 million and $12 million respectively during June. A year earlier the respective increases were $4 million and $13 million.

Change in selected items at district member banks, first half of 1957 and 1958

(millions of dollars)

	City		Country	
	1958	1957	1958	1957
Loans	$+21*	$+21*	$+49	$+47
Investments	+131	—21	—15	—46
Demand deposits	+62	—95	—68	—113
Time deposits	+30	+26	+71	+79

*Other than loans to banks.

Reflecting in part the credit expansion and deposit creation permitted by successive reductions of reserve requirements earlier this year is the contrast of deposit movements at district member banks in the first half of this year and last. In the first six months of this year, demand deposits fell but $4 million although a decline of $208 million was registered a year earlier. Time deposits rose $101 million in the period this year, an amount only $4 million less than the gain a year earlier.

Through June in 1958 the loan totals at both city and country member banks grew by almost exactly the same amounts as they had a year earlier. A weakness in business loans at the city banks, relative to a year earlier, was offset in the totals by additional loans in other categories.

JULY CROP FORECAST

Winter wheat crop prospects have again been revised upward to a record of 1,130 million bushels. The July 1 U.S. Department of Agriculture estimate is 61 million bushels above the forecast of last month. The yield per harvested acre is indicated at a record 27.1 bushels for the United States.

Ninth district winter wheat crop prospects were estimated at 67 million bushels, 7 million bushels above the estimate of last month. The state estimates indicated slightly higher acreages for harvest in Montana and South Dakota than was forecast June 1. And per acre yield estimates for these two states were revised upward to 23 bushels per acre for Montana and 25 bushels per acre for South Dakota.

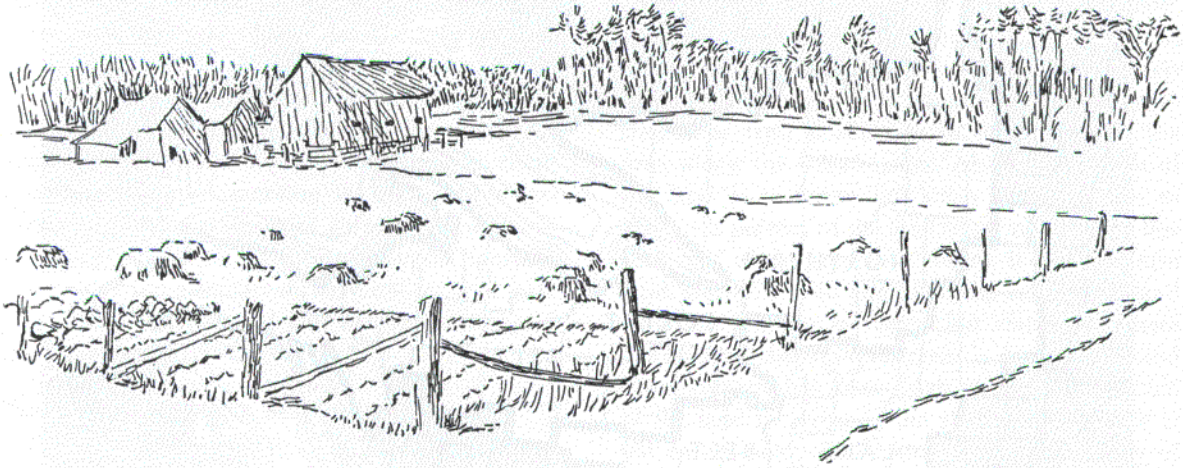
Another record acreage of soybeans is forecast for the United States; this is a continuation of an upward trend which has been present for nine consecutive years. The July 1 forecast of growers' intentions indicates that 23.4 million acres of soybeans will be harvested in 1958, 13 percent above last year.

District soybean acreage for harvest is expected to reach 3.6 million acres, 23 percent more than last year.

The U.S. 1958 corn crop is forecast at 3.3 billion bushels, 3 percent below last year, but 5 percent above an average of the last ten years. The July 1 estimate of the Ninth district corn crop indicates a crop of 438 million bushels, which is 12 percent below last year. The district acreage for corn harvest is down only 1 percent from 1957, but yield prospects are off considerably at this early date.

Feed grain production in the United States, while off from last year generally, is expected to be considerably larger than average. In addition to the 3.3 billion bushel corn crop, the oat crop is forecast at 1.25 billion bushels and barley at 423 million bushels. Grain sorghum will be harvested from an estimated 20.5 million acres, down from 25.7 million last year but far above the 14.3 million-acre-ten-year average.

This article is the first in a series and deals with dairying in the northeastern part of the district.



Dairying in the Ninth district

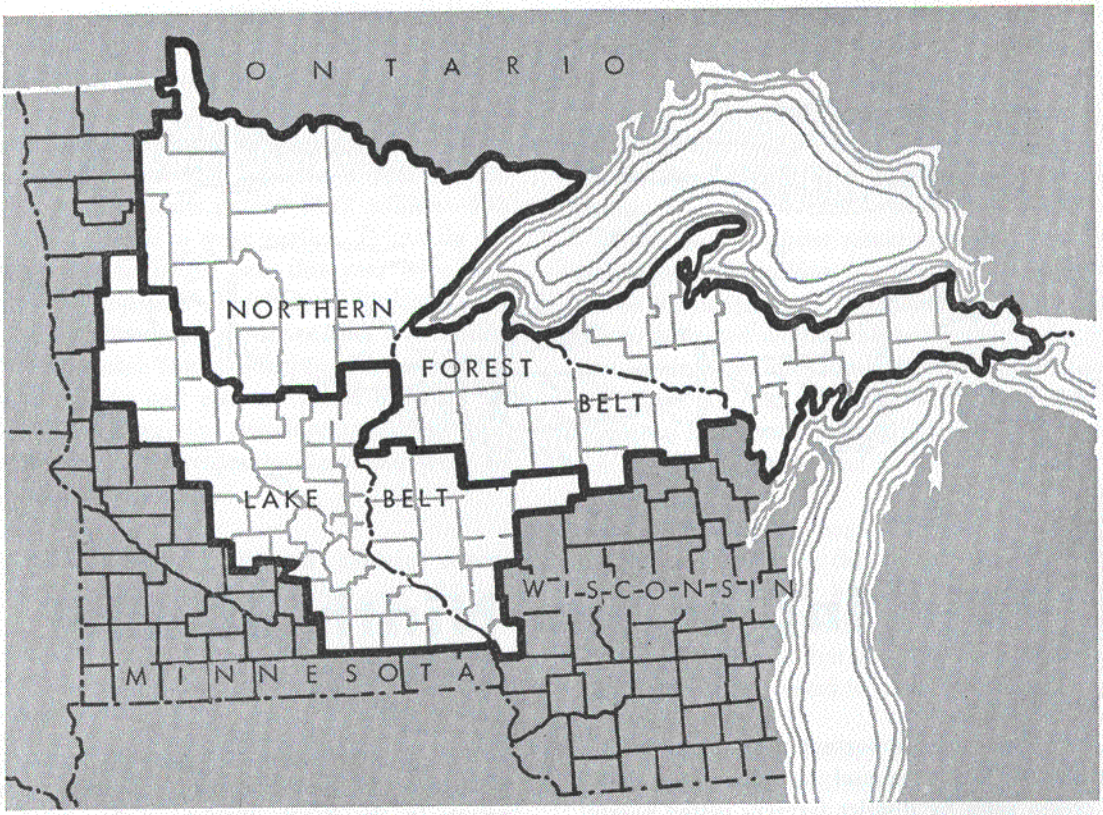
Dairying is an important part of the Ninth district's $3 billion annual farm business. Milk and cream sales by district farmers netted nearly $500 million in 1956, an amount equal to 16.5 percent of the total value of farm products sold in the district. In 1956, our region supplied about 13 percent of the nation's total milk supply.

Although dairying is still an important part of the agriculture of the Ninth district, it has declined in relative importance in recent years. Less than 20 years ago dairy farming provided nearly one-fourth of the total cash receipts to district farmers. As the over-all decline has taken place, production patterns have shifted within the district. The dairy industry has become more specialized—the dairy cow has ceased to find a place as a sideline enterprise on many district farms. This has been particularly true in the Dakotas, Montana and western Minnesota. Thus, even though milk is produced in every county of the district, dairy farming is of major importance in only a few selected areas of the district. The major dairy regions in the Ninth district are located in the eastern part of the district. The purpose of this (and two subsequent articles) is to examine the scope and prospects of dairy farming in the district's major dairy regions.

The two commercial dairy areas delineated as the "northern forest belt" and the "central lake belt" (see chart 1) accounted for a combined total of 62 percent of farm sales of dairy products in the Ninth district in 1956. In these two areas dairy product sales were responsible for nearly one-half of cash receipts from farm marketings.

Areas of specialization emerge in the production of agricultural commodities as farmers select, over a period of time, the most profitable enterprise alternative (or combinations of alternatives) open to them. Factors that determine areas of specialization are both physical and economic.

Chart 1—Commercial dairy areas in the Ninth district



Climate, soil and topography are the important physical factors that determine cropping alternatives in an area, which, in turn, determine the livestock alternatives. The multitude of economic factors influencing area specialization are summarized for the farmer in terms of the relative costs, prices and profits of all the alternative enterprises (or combinations of enterprises) available to him.

Changes occur in areas of specialization as new, more profitable alternatives emerge, or as reshuffling occurs in the relative profitability of existing alternatives. Changes are constantly occurring in production techniques, demands for products and in the quantity and quality of natural resources in an area that over time effect changes in agricultural specialization.

In both the northern forest and central lake belt areas, the soil, topography and climate are such that much of the cropland can be used most efficiently in the production of grasses and legumes for hay and pasture. Since roughages (grasses and legumes) are important in the cropping pattern in the area, the livestock economy must necessarily be based on roughage-consuming animals. Alternatives are few; they include beef raising, sheep raising and dairying.

Dairy farming has long been the dominant enterprise in the area. Although beef cattle and sheep could be raised, dairying makes good use of the abundance of roughages and utilizes the land more intensely than the other available alternatives. Furthermore, the farms are small; and dairying is able to employ the relatively large labor

supply available on these small farms.

Outside of the forest and the lake belt areas, dairy farming in the district has been declining in relative importance as a source of income. The trend in the western part of Minnesota, North Dakota, South Dakota and Montana has been toward increased importance of beef cattle as roughage consumers. Equally important in these areas has been an increase in the relative importance of cash grain sales as a source of farm income. In addition, pasture conditions, markets and production alternatives have not favored milk production in the central and western portions of the district.

The northern forest belt dairy area

This first article will deal with dairying in the northern forest area. Subsequent articles will consider dairying in the central lake belt area and other phases of the dairy industry in the Ninth district.

Land in the northeastern portion of the Ninth district, which is coincident with the so-called 'cutover' forest area, has a very uneven, poorly drained topography typical of glaciated areas. Its soils have formed under cool, moist forests and are light colored, acid soils which are quite infertile. Many lakes and bogs dot the landscape. Rock outcroppings, sandy ridges and even plains are found in many parts of the area.

The annual rainfall in the area averages 25 to 35 inches. The summers are cool, the growing season averages from a low of 80 days along the Canadian border to a high of 140 days in some parts of the area where the Great Lakes moderate the season. The winters are long and cold; minimum season temperatures reach -40 to -50 degrees Fahrenheit.

The agriculture of the northern forest belt is based mainly on roughage production and dairying. Potato production is important in some localities, as is fruit production in other parts of the area along the Great Lakes. About one-fourth of the land is in farms but some counties have as little as 5 percent of the land in farms. Usually less than half of the land in a county is used as farm land. Between 1940 and 1945 the acreage of land used for farming increased but since 1945 there has been a substantial decrease in farm land. Land abandonment has been high in the area. Much of the land in farms in the area is such that it is not easily incorporated into other units. Many of the fields are isolated and could not be economically combined with other units. Thus, in many cases where farmers have left farming for off-farm employment or retirement the land has been abandoned.

Chart 2—Percent of land area in farms by counties

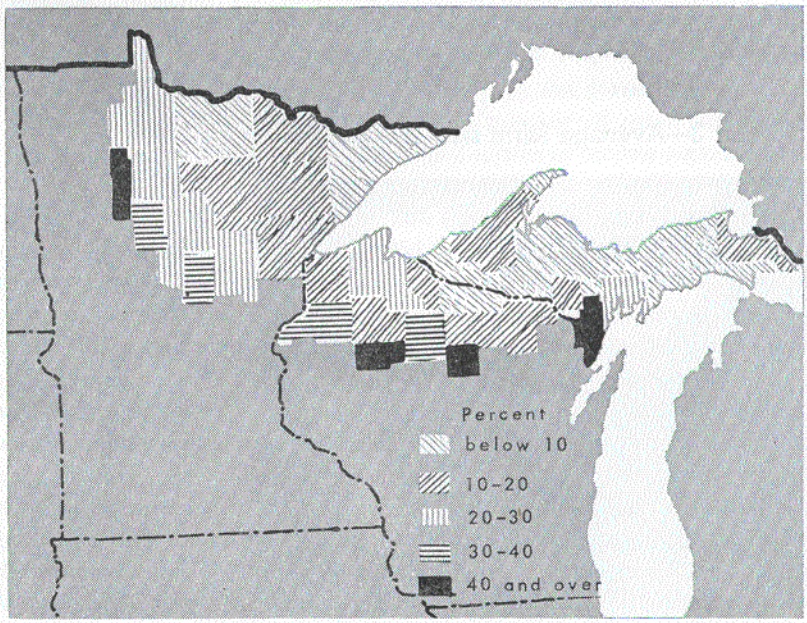


TABLE 1—LAND IN FARMS, NORTHERN FOREST BELT

Year	Acres in farm
1940	6,574,000
1945	6,965,000
1950	6,849,000
1954	6,198,000

Because much of the land area is rough, nontillable or wooded, the farms in the area are small with a very small amount of cropland. The average farm in the region in 1954 contained 163 acres with 48 acres or 29 percent of its land classified as cropland. Tilled fields frequently are small, irregular patches of land. Hay production on these farms is mainly from native grasses growing on stony, rough, uncultivatable land. Much wooded acreage is used for grazing land.

The average size farm has been increasing as farm numbers have decreased, but the units are still relatively small and, in most cases, the agriculture may be characterized as supplying a bare subsistence level of living (table 2).

Because farms tend to be small and relatively unproductive, and farm incomes low, off-farm sources of income and movements out of agriculture are important alternatives to the people in the area. For example, in 1954, 45 percent of the farm operators in the northern area received a greater cash income from off-farm work than they received from the sale of farm produce.

Chart 3—Average farm size by counties

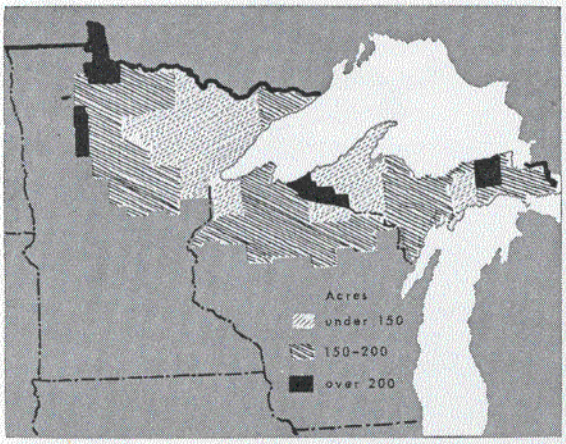


Chart 4—Percent of farm land used for crop production by counties

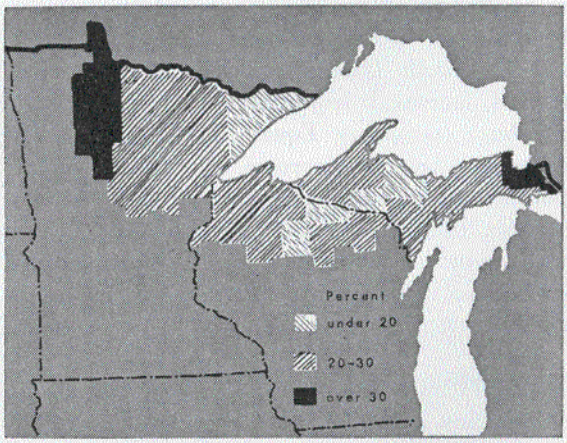


TABLE 2—NUMBER OF FARMS AND FARM SIZE IN THE NORTHERN DAIRY AREA

Year	Number of farms	Average size farm in acres
1940	64,280	127
1945	56,926	122
1950	46,834	146
1954	39,676	163

According to the economic classification of farms included in the 1954 Census of Agriculture, 68.4 percent of the farms in the northern area were classified as commercial farms. Of these commercial farms, 83 percent had sales of less than $5,000.

In general, all farms with sales of farm products valuing $1,200 or more were classified as commercial. Farms with sales valuing $250 to $1,199 were classified as commercial only if the farm operator worked off the farm less than 100 days or if the income of the farm operator and members of his family from nonfarm sources was less than the total value of all farm products sold.

TABLE 3—PERCENT OF FARMS IN EACH ECONOMIC CLASS OF NORTHERN DAIRY AREA, 1954

Value of farm products sold	Percent
$25,000 or more	.5
$10,000 to 24,999	3.1
$5,000 to 9,999	13.4
$2,500 to 4,999	31.3
$1,200 to 2,499	36.3
$250 to 1,199	15.4
	100.0

Northern forest area farmers supplied only $54 million or 11 percent of the total dairy products produced in the district in 1956. Yet, the dairy enterprise is extremely important to the agriculture of the area. Nearly 59 percent of farm income in the area was derived from dairy product sales in 1956 (table 4). This was substantially above the 1940 position when 43 percent of farm income in the area was received from dairy sources.

TABLE 4—ESTIMATED PROPORTIONS OF FARM INCOME FROM VARIOUS SOURCES, NORTHERN DAIRY AREA

	1940	1950	1956
Dairy products	43.2%	51.8%	58.5%
Poultry	6.5%	8.7%	9.3%
Livestock (other than dairy, poultry)	17.3%	21.2%	11.8%
Total livestock	67.0%	81.7%	79.6%
Crops	30.4%	14.2%	15.6%
Forest products	2.6%	4.1%	4.8%
Total marketings	100.0%	100.0%	100.0%

In 1956 the average forest belt dairy area farm operator received a $2,750 gross income from the sale of farm products. Assuming that production expenses average approximately 60 percent[1] of cash receipts, the average net income from the farm operation would have been $1,100 in 1956.

[1] Production expenses average 60.8 percent of cash receipts on western Wisconsin dairy farms in 1956. However, it is likely that production expenses for the northern area farmer amount to more than 60 percent of cash receipts because of slightly higher feed costs in the northern area. Agriculture Information Bulletin No. 176, USDA, Agricultural Research Service.

Trends in milk production

Milk production in the forest belt is estimated to have been 1,704 million pounds in 1956, 10 percent above the 1940 level, but slightly below the peak of 1,753 million pounds reached in 1946.

TABLE 5—NUMBER OF FARMS REPORTING MILK COWS, NUMBER OF COWS AND PRODUCTION PER COW IN THE NORTHERN DAIRY REGION

Year	Farms reporting cows	Total no. of cows	Av. no. cows per farm	Total milk produced	Milk produced per farm	Milk produced per cow
				(millions of lbs.)	(lbs.)	(lbs.)
1940	51,601	317,000	6.1	1,551	30,058	4,892
1945	44,674	356,000	8.0	1,752	39,217	4,921
1950	36,592	295,000	8.1	1,625	44,409	5,508
1954	30,520	301,000	9.9	1,709	55,996	5,677
1956		299,000		1,704		5,699

The trends in dairying that are evident throughout the industry are also apparent in the northern forest region. As the number of dairy herds has decreased the size of herds has increased and production per cow has increased (table 5).

Approximately four-fifths of the farmers in the area reported keeping milk cows throughout the period under study.

The dairy industry in the forest belt area includes a very large number of small herds that are maintained as a source of income supplemental to off-farm work (see chart 5). The fact that production per cow in the area reached only 5,695 pounds in 1956 is indicative that much of the industry has not received the attention that is true in the areas where a bigger share of the industry is composed of larger, more specialized operators. For example, production per cow reached 6,811 pounds in the central lake belt dairy area in 1956 as compared with 5,695 pounds in the northern forest belt area.

Approximately 40 percent of farms classified as commercial farms in the northern area reported herds of less than ten cows in 1954, while only 2 percent of the herds exceeded thirty cows (table 6).

Fluid milk markets influence production

Milk consumed in fluid form is typically produced in the immediate areas surrounding the centers of population. This geographic pattern emerges in the production of milk for fluid uses for three basic reasons. First, milk is a very bulky commodity (milk is about 87 percent water), and thus, transportation costs are high. Second, fluid milk is a very perishable commodity and sanitation considerations are important. Third, local public health officials impose numerous sanitation restrictions on the milk supply entering a particular market, and many of these sanitation restrictions serve to limit the supply area. Recent developments in the transportation of milk have tended to reduce the transportation barrier considerably. Large, insulated, bulk tank trucks are now able to move fluid milk great distances without deterioration.

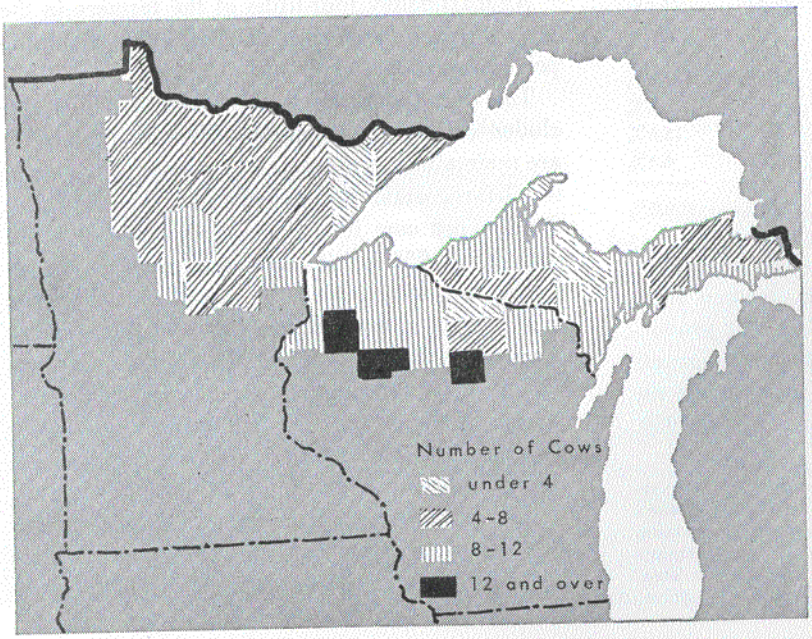
Also influencing the production patterns of milk for fluid consumption in some markets are Federal Marketing Orders. The Federal Marketing Orders grew out of the Agricultural Adjustment Act of 1933 which had a basic objective of raising prices of agricultural commodities. The Federal Milk Market Order provides a formula, or a method of determining a minimum price for milk. The pricing formulas are complicated devices designed to calculate the price of milk each time there is any change in one or more of the numerous factors affecting the market for milk. The pricing mechanisms differ from market to market. Also each market order may contain several formulas that provide for price calculations for milk used in different products, e.g., bottle milk, ice cream, cottage cheese.

The Federal Marketing Orders are applied only to interstate milk markets; there are approximately 68 of these orders in effect at this time. Although a Federal Order does not delineate the supply area in any market, the pricing provisions of the Order do much to influence the supply area of the market. This is true because a Federal Market Order does specify that the milk moving into the market under Federal

TABLE 6—DISTRIBUTION OF COMMERCIAL FARMS REPORTING MILK COWS ACCORDING TO HERD SIZE, NORTHERN DAIRY AREA, 1954

Herd size	No. of farms with milk cows	Percent of total
Less than 10	9,355	39.1%
10-29	14,019	58.6%
30-49	501	2.1%
50 and more	44	.2%
Total	23,919	100.0%

Chart 5—Average number of cows per farm by counties



Order must be compensated for at the same price regardless of source. Thus, there is no incentive to distributors to seek milk at lower prices from areas that may have production-cost advantages.

If the pricing formula in any market operating under a Federal Order establishes a very favorable return relative to alternative enterprises, increased milk production will naturally result. And, in many markets production has increased at a more rapid rate than the fluid markets have grown.

Federal Milk Marketing Orders are in effect in the Ninth district in the following market areas: Minneapolis-St. Paul market, Sioux Falls-Mitchell market, the Eastern South Dakota market, the Black Hills South Dakota market and the Duluth-Superior market.

The major population centers in the forest belt dairy area encompass the Mesabi Iron Range and the Duluth-Superior area. The Duluth-Superior market is the only northern area fluid milk market currently operating under a Federal Market Order. A market order is also currently under consideration for the Upper Peninsula of Michigan which is in the northern dairy area.

The supply area of the Duluth-Superior fluid milk market lies entirely within the forest belt area. The milk supply for that market is derived mainly from the counties of St. Louis, Carlton and Lake in Minnesota, and Douglas, Bayfield and Ashland in Wisconsin.

Milk production per farm supplying the Duluth-Superior market approaches twice the production of other dairy farms in the area. The fluid market producers tend to be large specialized producers, depending on dairying or at least on farming for their entire income (table 7).

The total supply of milk entering the Duluth-Superior market more than doubled since 1950, while milk production increased only about 9 percent in the northern area outside of the Duluth-Superior market. During the period since 1950 the proportion of total milk receipts from sales of fluid milk in the Duluth-Superior market dropped from 54.1 percent to 44.1 percent indicating that milk production in that market increased more rapidly than consumption expanded.

TABLE 7—MILK PRODUCTION PER FARM IN THE DULUTH-SUPERIOR FLUID MILK MARKET AS COMPARED WITH THE AREA OUTSIDE OF THAT MARKET

Year	Duluth-Superior market	Northern area outside Duluth-Superior market
1950	75,940 lbs.	43,146 lbs.
1954	96,647 lbs.	53,864 lbs.
1956	113,606 lbs.	61,942 lbs.

Dairying in the northern area—1975?

Since future demands for dairy products are not known and future supplies of dairy products cannot be determined exactly, the position of the dairy industry in an area cannot be forecast with any degree of certainty. However, numerous people are interested in the probable future trends in the industry and it is possible, given certain assumptions, to make some projections about the direction of movement in the dairy industry for future years.

The projections presented are not to be considered as forecasts, but merely as projections of past trends. Actual future production may depart sharply from these projections for any number of reasons, including the eventualities of war or business depression.

Projections of the future demand for dairy products

The growth in the demand for dairy products will depend on population growth, growth in consumer incomes, possible changes in consumers' tastes and preferences, and developments in products that may substitute for dairy products. For the purposes of projecting the future demand for dairy products based on past trends, the assumption will be made that neither consumers' tastes and preferences relating to dairy products will change, nor will there be any additional developments in substitute products.

Per capita consumption of dairy products expressed in total milk equivalents in 1956 equaled 707 pounds of whole milk. A per capita consumption projection through 1975 can be made within our framework based on an estimate of the income elasticity[2] of demand for dairy products, and a projection of per capita disposable income. A projection of per capita disposable income was made on the basis of an annual rate of increase of 2 percent (see table 8).

TABLE 8—PROJECTED PER CAPITA DISPOSABLE INCOME IN UNITED STATES*

Years	Dollars**
1960	1,849
1965	2,041
1970	2,253
1975	2,488

*Based on an annual rate of increase of 2 percent.
**In constant 1956 dollars.

An income elasticity estimate of .10[3] was used to project the relationship between per capita consumption of dairy products and per capita real income. An income elasticity of demand for dairy products of .10 indicates that for every 10 percent increase in per capita income there would occur a 1 percent increase in the per capita consumption of dairy products.

TABLE 9—PROJECTED PER CAPITA MILK CONSUMPTION, POPULATION AND TOTAL MILK CONSUMPTION IN THE U.S.

Year	Per capita consumption (lbs. of milk)	Population* (thousands)	Total milk consumption (billions of lbs.)
1960	713	177,840	126.8
1965	720	190,296	137.0
1970	727	204,620	148.8
1975	735	221,522	162.8

*Statistical Abstract of the U.S. 1957, U.S. Department of Commerce, Bureau of the Census.

The projections of per capita consumption of dairy products in terms of whole milk equivalents made on the basis of the per capita income projections in table 8 and the income elasticity estimate of .10 are shown in table 9.

A projection of population for the period through 1975 was selected from numerous population projections made by the Bureau of the Census. The population estimates selected were based on a projection of 1950-53 fertility rates through 1975 (see table 9).

The total consumption of milk was determined by a multiplication of the projected per capita consumption rates and the population projections (also in table 9).

How will the northern forest belt area share in this future dairy market? A review of the relationship between the total production of milk in the United States and the northern dairy area indicates that since 1940 the northern area has never supplied over 1.5 percent of the total milk supply in the nation, and since 1947 the trend has been downward. A straightline projection of this relationship made through 1975 is shown in table 10.

TABLE 10—PROJECTED PERCENTAGE OF THE NATION'S MILK SUPPLY DERIVED FROM THE NORTHERN FOREST BELT DAIRY AREA

Year	Percent
1960	1.37
1965	1.32
1970	1.27
1975	1.22

In order to arrive at a projected total milk production from the northern forest belt, two steps are involved. First, it is assumed that total farm production of milk for the nation will be 3.5 percent greater than total civilian consumption of milk. (This is the average difference that existed during the last five years.) Thus, the U. S. consumption projections were multiplied by 103.5

[2] Income elasticity of the demand for dairy products measures the responsiveness in the per capita consumption of dairy products related to changes in per capita incomes.

[3] The income elasticity estimate of .10 for total milk equivalents was accepted from the following source: Daly, Rex F., "The Long-Run Demand for Farm Products," **Agricultural Economics Research**, Volume VIII, Number 3, July 1956, U.S. Department of Agriculture p. 8.

TABLE 11—PROJECTED TOTAL MILK PRODUCTION IN THE U.S. AND NORTHERN AREA

	United States	Northern area	
	billions of pounds	Percent of U.S. total	millions of pounds
1960	131.2	1.37	1,797.4
1965	141.8	1.32	1,871.8
1970	154.0	1.27	1,955.8
1975	168.5	1.22	2,055.7

percent to convert them to production projections. The results are given in the second column of table 11.

Second, the share of national production to come from this northern dairy area is calculated according to the gradually declining percentage projected in table 10. Results are the total projected production of milk in the northern forest belt area as shown in the fourth column of table 11.

A projection was made of farm numbers for the forest belt area by projecting the trends in farm numbers for the individual counties based on the period 1940-1954 and summing the results (table 12). According to these projections there will be 16,532 farms in the northern forest area in 1975, less than one-half the number in 1954. Also, the average farmer in the northern area in 1975 will be producing 124,347 pounds of milk annually, an amount just slightly above the current average production of the Duluth-Superior fluid milk market producers.

Milk production per cow in the northern area in 1975 will reach 6,955 pounds of milk annually according to a projection of the trend in milk production per cow established during the base period 1946-1956 (table 13). The number of cows per farm projected through 1975 indicates 17.9 cows per farm in that year compared with 8.1 cows per farm in 1954.

TABLE 12—TOTAL PROJECTED NUMBER OF FARMS AND MILK PRODUCED PER FARM IN THE NORTHERN DAIRY AREA

Years	Number of farms	Milk produced per farm
1960	29,624	60,674 lbs.
1965	24,647	76,066 lbs.
1970	20,309	96,302 lbs.
1975	16,532	124,347 lbs.

TABLE 13—PROJECTED PRODUCTION PER COW AND COWS PER FARM

Year	Production per cow	Cows per farm
1960	6,064 lbs.	10.0
1965	6,361 lbs.	12.0
1970	6,658 lbs.	14.5
1975	6,955 lbs.	17.9

The preceding projections are simple straight-line projections of past trends and any number of technological changes that may have been initiated during or since the base period would not be fully accounted for in these projections. A qualitative examination of the dairy business in the forest belt area coupled with some further considerations of future developments may be useful in interpreting the foregoing projections.

Dairy farming in the northern area can be segmented into several types of enterprises. There are some farmers producing milk for fluid consumption, and others producing milk or cream for manufacturing purposes. Further, there are both full and part-time farmers engaging in these various dairy farming activities.

Projections of the dairy business in the northern area should ideally treat each of these types of dairy enterprises separately. However, because of a lack of data, projections of the separate enterprises may only be made on a qualitative basis.

The growth of fluid milk production will be largely determined by the growth of population in the area. The fluid milk producers are typically relatively large specialized producers and as such they will tend to pace the industry in technological advance. The projections of milk produced per farm and production per cow in 1975, no doubt, vastly understate the position that the fluid milk producers will achieve by that time. It is not at all unlikely that milk production per cow will be increased substantially faster than indicated by the projections. The increases in milk production per

cow achieved through the expanded use of superior breeding stock via artificial breeding is only beginning to be felt. Likewise, developments in nutrition which are pouring out from the feed companies, drug companies and colleges will have a tremendous impact on productivity per cow in the future. And, the large specialized dairy operator such as the fluid milk producer tends to be the first to adopt new techniques. Thus, they will tend to exceed the projected averages by wide margins.

The full-time farmers in the northern forest area producing milk or cream for manufacturing purposes will experience essentially the same trends as the fluid-milk market producers. These manufacturing-milk producers will increase herd size as increased mechanization reduces the per cow labor requirements. In fact, technological developments that result in reduced labor requirements, necessitate larger farm units because farmers find it most profitable to expand their operations to make full use of the capacity they have available in equipment and labor. Similarly, the full-time farmers engaged in milk production for manufacturing purposes will tend to increase productivity per cow as rapidly as possible. And they, too, will tend to achieve a greater increase in productivity per cow during the period to 1975 than indicated by the projection.

The major difference between the fluid-milk and manufacturing-milk producers will be in the changes in the numbers of producers in each market. Fluid milk producers have a more profitable outlet than do manufacturing-milk producers and thus, the number of producers in the fluid markets may tend to decrease less rapidly than the number of producers supplying manufacturing-milk markets. However, since the northern area is essentially a single product agriculture, the adjustments of resources to other uses tend to be less rapid than is the case in an area where several alternatives exist. Thus, much of the adjustment in the total of full-time manufacturing milk-producers will take place through retirement from farming of the existing producers. In many parts of the northern area there is a very good chance that the younger members of the farm family will have moved out to more attractive opportunities, and retirement of the present farmers will result in further land abandonment. The rate of land abandonment in the area will probably tend to increase in the future.

Only one distinction is necessary between the full-time farmers selling milk to manufactured product outlets, and those selling cream to the same outlets. In almost all cases the returns to farmers selling cream are less than the returns on milk sales (considering alternative uses of skim milk). Thus, the lower profitability of a cream operation may tend to induce even more rapid changes than found among the manufacturing milk producers. A rapid shift from cream sales to milk sales will probably also continue.

The part-time farmer in the forest belt area will experience somewhat different changes in the future than will the full-time farmer. The part-time dairy enterprise on the individual farm will not show the same rates of growth in size of enterprise or productivity per cow as experienced among full-time dairy farming enterprises. There are essentially two reasons for this. First, the part-time dairy enterprise is geared to available family labor. And thus, the drive to increase herd size will be less among the part-time farmers. Second, dairying as a part-time enterprise will not receive the attention that is given an enterprise which is the sole or major source of income, and for this reason productivity per cow is not apt to increase as rapidly among part-time farmers. Because the dairy enterprise on the part-time farm furnishes only supplementary income it will also be somewhat less sensitive to changes in relative profitability than is true among full-time farmers.

Although the size of the individual part-time dairy enterprise appears very stable the total of all part-time dairy enterprises may be considered quite unstable. In an area which is essentially a single enterprise area, off-farm activities emerge

as the best alternative use of resources. The part-time farming operation in a very real sense becomes a transitional stage in moving resources out of agriculture. As the farm family becomes accustomed to a steady off-farm income and as the supply of family labor diminishes there is a tendency to shift as rapidly as possible away from the farming activity to full-time, off-farm activities. The net effect of these shifts will probably be a rather rapid reduction in the numbers of part-time farmers.

Summary and conclusions

The agriculture of the northern forest area is based mainly on roughage production and dairying.

Farm numbers in the northern area have been declining at a rapid rate. In 1940 there were 64,000 farms in the area; by 1954 the number had declined to 40,000. Farm size has been increasing, but land abandonment has been occurring at a rapid rate also.

Farms are still small and relatively unproductive, thus farm incomes in the area are, on the average, quite low. Eighty-three percent of the commercial farms in the forest area sold less than an average of $5,000 of farm products per farm in 1954.

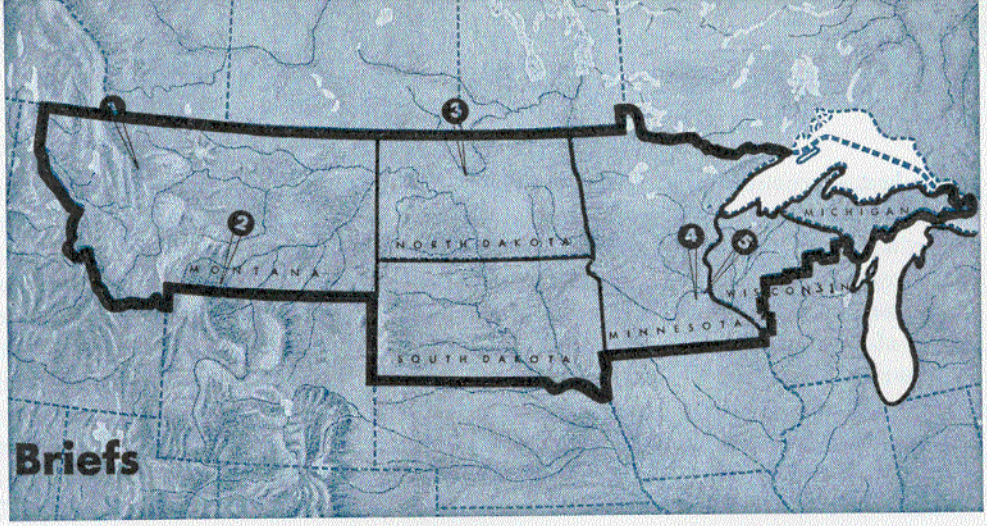
Dairy product sales accounted for 59 percent of total cash farm receipts in the forest area in 1956—up from 43 percent in 1940. Dairy farming in the area is characterized by small units, many of which are operated to supplement income received from off-farm work.

The trends in the northern forest area in dairying are similar to the trends found elsewhere in the dairy business; herd size and production per cow have been increasing, but these changes have been occurring less rapidly than in areas where large specialized dairy operations predominate.

A projection of recent trends in dairying in the northern area to the year 1975 indicates that if the production conditions that have existed during the last ten years are maintained, the dairy farmers in the northern area in 1975 will produce a total of 2,056 million pounds of milk. The average dairy farmer will have 18 milk cows and annual production per cow will approach 7,000 pounds.

It seems logical to expect the dairy business in the northern forest belt to follow the trends as projected. However, it is likely that production per cow will increase at a more rapid rate in future years than it has in the past. The reason is that as dairy units increase in size more attention is given to factors bearing on production. Thus, production per cow should increase faster in the future through better breeding, feeding and management.

Farm numbers are likely to continue decreasing and farm size will undoubtedly continue to increase. Land abandonment is apt to continue also. In fact, as time passes, and the present farmers reach retirement age, it is likely that the rate of these adjustments will quicken in the future.



Economic Briefs

1. First producer in Montana mountain front

Montana's first commercial gas well in the so-called 'disturbed belt' along the east edge of the Rocky Mountains was completed during June. It flowed 6.3 million cubic feet daily through a five-eighths-inch choke from Mississippian formations at a depth of about 3,800 feet. The disturbed belt continues northward into Alberta where, just a few miles north of the boundary, it contains Canada's two largest gas reserves, Pincher Creek field and the newly-discovered Waterton Park field.

2. New lease for Montana char installation

A one-year lease with an option to buy for $450,000 the Red Lodge, Montana char plant has been negotiated by the Husky Oil Company of Cody, Wyoming. The plant was shut down two months ago after a test run because of lack of capital. Production of high grade industrial carbons and by-products from area coal was begun last year. The char making process was developed at Montana State College, financed in part by a $40,000 legislative grant. Cleanup and repair work are underway. The plant will employ about six men.

3. $750,000 Minot phone expansion

Northern States Power Company plans to spend $750,000 for improvement of Minot, North Dakota telephone service over the next two years. Expenditures this year alone will total $467,000. Along with expansion of service facilities, two building projects are planned — an $87,000 addition to NSP's main office in Minot and a $117,000 service building in west Minot.

4. Expanded box production for Minnesota

National Container Corporation recently purchased 77 acres about 27 miles southwest of Minneapolis as the site for a corrugated box plant. This constitutes the first purchase of land in Valley Industrial Park on the Minnesota river. The new 150,000-square-foot plant will replace a smaller unit in St. Paul and will employ 125 to 250 persons. No date has been set for building the plant.

5. Durox plant to be built in St. Paul

A $1,250,000 plant to manufacture products made of cellular gas concrete or durox for the building industry will be started in the St. Paul area late this summer. The plant will be located on a 20-acre site on the St. Paul side of the Mississippi river with access to silica sand deposits needed for the manufacture of durox. This material, invented and used in Sweden for 35 years, is made from silica sand, lime and cement. When aluminum powder is added, the mixture rises like bread dough. Durox of Minnesota, builders of the plant, will manufacture the products under a franchise from the Swedish-American Institute. The Durox corporation has long-term plans to construct warehouses in eight cities in the Upper Midwest.