DEVELOPMENTAL PERIODS IN THE HISTORIC CONTEXT "EURO-AMERICAN FARMS IN MINNESOTA, 1820-1960"

To begin to identify and understand the major historical forces that have shaped Minnesota farms, the historic context "Euro-American Farms in Minnesota, 1820-1960" has been divided into eight developmental periods, listed below:

Period 1: Early Settlement, 1820-1870
Period 2: Development of a Wheat Monoculture, 1860-1885
Period 3: Diversification and the Rise of Dairying, 1875-1900
Period 4: Industrialization and Prosperity, 1900-1920
Period 5: Developing the Cutover, 1900-1940
Period 6: Development of Livestock Industries, 1900-1940
Period 7: Depression and the Interwar Period, 1920-1940
Period 8: World War II and the Postwar Period, 1940-1960

Each period is briefly described on the following pages.

Summary information on the number and size of farms in Minnesota and how this changed through time can be found in the individual farm elements section entitled "Farms".

Hewn log building near the Minnesota River southwest of Blakely, probably LeSueur County, 1940. (MHS photo by Paul Klammer)

PERIOD 1: EARLY SETTLEMENT, 1820-1870

During the early settlement period, millions of acres of land west of the Mississippi River were acquired by the United States government through land cession treaties with Native Americans. European-American pioneers moved onto the undeveloped land, many attracted by federal government incentives. The establishment of farms was limited, however, by a river-only transportation system, lack of goods and services, and rudimentary technology.

Milestones of this Period

1819 – Fort Snelling established with gardens and fields
1821 – Farms established along the Red River south of Canada's Selkirk Colony
1837 – Land cession treaties signed with Dakota and Ojibwe for Indian lands between Mississippi, St. Croix, and Crow Wing rivers
1841 – Preemption Act allowed squatters with established claims on surveyed public lands to legalize ownership by paying official price
1847 – Treaty with Ojibwe opened two large tracts near St. Cloud to settlement by the Winnebago
1848 – One of Minnesota's first federal land offices opened in St. Croix Falls
1849 – Minnesota Territory established
1850 – Minnesota census reported a total of 157 farms and about 6,000 residents
1850 – Farmers made up 64% of U.S. labor force
1851 – Treaties of Traverse des Sioux (July) and Mendota (August) opened to Euro-American settlement lands east of the Red, south of the Mississippi
1854 – Treaty of La Pointe opened Ojibwe lands in Minnesota's arrowhead to Euro-American settlement
1854 – Preemption privilege extended to unsurveyed public lands
1854 – Minnesota Territorial Agricultural Society established
1855 – Land cession treaty negotiated with Ojibwe for lands in the Iron Range region
1856 – Grasshopper plagues over two seasons
1857 – Congress authorized land grants to railroads for four lines in Minnesota
1857 – Panic of 1857 – land values fell, immigration slowed, railroad construction stopped
1858 – Minnesota became the 32nd state
1861-65 – U.S. Civil War
1862 – Congress approved new land grants for Minnesota railroads after lines planned earlier were not built
1862 – Homestead Act became law
1862 – U.S. Government-Dakota Conflict
1864 – Grasshopper plagues over three seasons
1865 – Most evacuees back in southwest Minnesota after U.S. Govt.-Dakota Conflict

See also

Farms
Boundary Markers
Woodlots
Fields and Pastures
Appendix: Focus on Gov Land Programs

EURO-AMERICAN AGRICULTURE AT FORT SNELLING AND THE RED RIVER VALLEY

Euro-American farming in present-day Minnesota began on a small scale around the region's first trading posts, missions, and military posts. (Euro-Americans were not the only people farming during the early settlement period, however. Native Americans grew crops including corn, potatoes, turnips, and pumpkins.)

Most historians name the fields near Fort Snelling, established in 1819, and farms along the Red River, established in 1821, as the two earliest centers of Euro-American farming. The farms at the Red River in northwestern Minnesota were established by a small group of Scottish settlers and Metis people in an unofficial southern extension of the Selkirk Colony near present-day Winnipeg. According to historian Stanley N. Murray, by the mid-1830s the Red River farmers "were able to provide the fur trade with flour, potatoes, dairy products, and fresh meat. The market for these foodstuffs was never large, but after twenty difficult years, the Selkirk colonists had established an oasis of semi-commercial agriculture in the middle of a vast wilderness" (Murray 1967: 17, 47-48; Balmer 1926: 210).

The Selkirk farms generated American interest in the fertility of the Red River Valley and were visited and watched throughout the 1850s and 1860s. Among the observers were James J. Hill and other transportation and land developers who came to believe in the agricultural potential of the Red River Valley and investors' ability to make steamboats, railroads, farms, and other ventures profitable in that region (Murray 1967: 47-48).

LOSS OF NATIVE AMERICAN OWNERSHIP OF THE LAND

The first Europeans who came to present-day Minnesota found the region already settled by Native Americans. According to one study of land use in Minnesota, Native Americans were recognized as "having a right of occupancy but not of ownership" (Dana et al 1960: 63). This semantic sleight-of-hand set a precedent for Euro-American use of the 820,000 square miles of land acquired in the Louisiana Purchase of 1803. "By 1804 . . . the United States was in full control of all of Minnesota and in a position to dispose of the land as Congress saw fit. Before clear title to the land could be conveyed, however, it was necessary to liquidate the Indian right of occupancy. For many years the method followed in obtaining cession by the Indians of their possessory rights was through treaties" (Dana et al 1960: 63, 67).

Major cession treaties for Minnesota lands were negotiated with the Dakota, Objibwe, and other groups, primarily in the 1830s-1850s. They opened the door to agricultural development as well as intensive logging. Writing about the 1830s, historians Eileen McMahon and Theodore Karamanski explained that Native Americans "reluctantly accepted the [1837] treaties because of the growing environmental degradation of their embattled homelands. . . . The Dakota no longer had the broad sweep of territory over which they had traditionally ranged during their annual subsistence cycle. . . . The Chippewa [Objibwe] who were accustomed to operating within a smaller territorial range than the Dakota suffered less than their rivals. Even so adjustments were forced on them" (McMahon and Karamanski 2002: chpt. 1).

Historian William Folwell wrote of the 1851 treaties:

> No sooner was the signing of the treaties with the Sioux in 1851 noised abroad than enterprising white men began to cross the Mississippi and invade the 'Suland.' They made their claims, opened roads, cut timber, and built houses and even mills. They naturally followed up the valleys of the streams flowing into the Mississippi, that of the St. Peter's [the Minnesota River] being best known through traders and missionaries. There is a tradition that some impatient immigrants actually staked out their claims to cover the garden patches of the Indians. The Indian agent exerted himself in vain to prevent this unlawful occupancy of the Indian country (Folwell 1921/ rpt. 1956: 352-353).

Historian Hiram Drache wrote, "Cheap, fertile land was the chief reason for the great settler's rush to Minnesota between 1854 and 1857 when 5,250,119 acres of public land were sold. . . . Land, the great exploitable commodity of Minnesota, attracted the pioneers who were also encouraged by the availability of water and trees" (Drache 1964: 17).

The timing of the "early" or "pioneer" settlement phase varied throughout the state, with southeastern Minnesota moving through its frontier phase and into a commercial wheat monoculture sooner than most of the rest of the state.

FEDERAL GOVERNMENT ENCOURAGEMENT TO SETTLEMENT

The federal government provided strong incentives for settlement in the 1840s-1870s. Not only did Congress hope to raise revenues through the sale of public domain land, but encouraging pioneers to settle on the "frontier" helped advance other government interests including federal Indian policy, the development of intercontinental transportation (e.g., railroad-building), and the harvest of natural resources including timber.

The U.S. government surveyed present-day Minnesota between 1847 and 1903 to facilitate its sale. The survey divided the land into a regular grid of townships and sections, and the public land was offered at $1.25 per acre, the standard federal minimum. By 1855 Minnesota had six federal land offices to handle the paperwork, and eventually land offices were located as far afield as Crookston.

Even before public domain land was officially surveyed, however, settlers or "squatters" poured into Minnesota Territory. Dana and others explain:

> 'Squatting' . . . was an inevitable result of the slowness of the government to survey the public lands and to offer them for sale. . . . Congress recognized squatting, or preemption, as an inescapable fact of frontier life by passing numerous acts legalizing the practice in specific situations and for specific periods. Finally it approved of preemption as a basic policy in the 'Log Cabin Bill' of September 4, 1841. That act authorized every head of a family, widow, or single man over twenty-one years of age, who was a citizen of the United States or who had declared his intention to become a citizen, to settle upon and purchase at $1.25 per acre not more than 160 acres of surveyed, unoccupied, unreserved, nonmineral public lands, subject to certain restrictions (Dana et al 1960: 100-101).

Preemption at first only applied to surveyed lands. After considerable lobbying by Minnesota territorial officials and others, preemption was extended to unsurveyed lands in Minnesota and four other states in 1854. Beginning in 1862, unsurveyed lands in all states could be preempted.

THE 1850s

Immigrants poured into Minnesota in the 1850s, particularly after the 1854 preemption act and after the creation in the mid-1850s of a combined river-rail transportation route between Minnesota and the East Coast via Chicago.

While many of the territory's new residents were farmers and loggers, there was also a flood of land speculators. Folwell wrote of the new Minnesotans, "The whole urban population was more or less infected with the virus of speculation. . . . Every man who had credit or could obtain it invested in property which ever continued to rise in value" (Folwell 1921/ rpt. 1956: 363). As the state's population grew, agriculture was so minimal that Minnesota was not raising enough to feed itself, and nearly all food except garden produce and wild game had to be shipped up the Mississippi from regions farther south.

The speculative bubble burst in August of 1857 when a large New York finance company failed. According to Folwell, "The panic struck Minnesota with extreme violence. The eastern banks and other creditors called their loans. . . . Everybody was in debt and the territory was literally emptied of money" (Folwell 1921/ rpt. 1956: 363-364). Railroad-building halted, immigration abruptly stopped, and land speculators living here "were forced to become farmers" (Larson 1926: 18).

Those who were farming suffered rough times. Wheat prices had been depressed before the crash, and the state's farmers found themselves with little income. According to one account, farmers in the New Ulm area, after planting their seed potatoes, "had to dig them back up to feed their staving children" (Rippley and Paulson 1995: 91).

THE 1860s

Drama in the 1860s also shaped early farming. The first major event was the Civil War, which began in 1861. Wartime demand led some Minnesota farmers to raise tobacco, sorghum, and sheep when the Union army needed wool for uniforms and blankets, and as Southern production of cane sugar, tobacco, and cotton was curtailed. While the war also caused some labor shortages, most of this disruption occurred east of Minnesota and, according to historian Merrill Jarchow, "all in all, large numbers of Minnesota farmers lived through the years from 1861 to 1865 rather undisturbed by events of the war" (Jarchow 1949: 15). During this period Minnesota wheat production nearly doubled between 1861 and 1865, despite severe drought in 1862 and 1863 (Jarchow 1949: 12).

More influential in Minnesota was the U.S. Government-Dakota Conflict in which hundreds of Euro-American settlers and Native Americans were killed. Many parts of south central and western Minnesota were virtually depopulated for several years, despite new military posts established to encourage white settlement. According to Drache, the outbreak of the conflict in August 1862 "was so terrifying that in less than one week a majority of the [Euro-American] inhabitants of twenty-three counties had vacated their homes. The scare was so intense that in nineteen counties none of the refugees had returned to their homes prior to November, 1863. And it was not until 1865 that the settlers could return with complete safety" (Drache 1964: 19).

In the political arena, the Civil War period brought three ground-breaking laws that advanced Minnesota agriculture. In 1861 when Southern states seceded from the Union, the balance of power tipped in Congress, allowing passage of key agrarian reforms long-blocked by Southern senators. In 1862 – almost simultaneously – Congress established the United States Department of Agriculture (USDA), gave free farmland to settlers via the Homestead Act, and granted land for the creation of agricultural colleges through the Morrill Land Grant College Act. All three measures were supported by state- and county-level agricultural societies, including those formed in Minnesota in the 1850s.

The 1860s also saw some very low crop yields. The 1861 growing season was so poor, for example, that the fall crop in central Minnesota was an almost complete failure.

The Homestead Act of 1862 was greeted with enthusiasm in Minnesota and its full text published in newspapers throughout the state. The law gave 160 acres of land (valued at $1.25 per acre) or 80 acres of land (valued at $2.50 an acre) to adults or heads of families who were citizens (or citizen applicants), provided the land had been surveyed and the homesteader lived on the land for five years.

Like the 1841 Preemption Act, the Homestead Act initially applied only to public acreage that had been surveyed, but in 1880 unsurveyed public land was also included. After 1874, settlers on the treeless prairie could receive another 160 acres by planting and maintaining 10 acres of trees (Hart 1998: 155-157; Jarchow 1949: 41, 66, 69-70).

ETHNIC ENCLAVES

Historians estimate that roughly 1 million immigrants moved to Minnesota between 1820 and 1975 ("Introduction" 1981: 3). European immigrants began to arrive during the state's early settlement period and continued to come in large numbers through 1920. Many became farmers, acquiring land where they found suitable topography, adequate transportation, low-cost acreage offered through federal programs, and/or fellow immigrants who had gathered via informal networks or through the efforts of a formal settlement program. While some immigrants tended to disperse geographically and assimilate culturally, others lived in concentrations or enclaves that persisted for several generations.

One group of German immigrants, for example, settled in the Minnesota River Valley between Fort Snelling (near St. Paul) and Fort Ridgely (near the western Nicollet County line). These families were part of a much larger group of German immigrants that settled in the center of the state. According to scholar Hildegaard Binder Johnson, central Minnesota – including the Minnesota River Valley and adjacent counties to the north such as McLeod, Meeker, Wright, and Stearns – became the largest region in Minnesota to be occupied predominantly by a single ethnic group (Johnson 1981: 164).

Most German immigrant farm families came to the Minnesota River Valley in a pattern of "chain migration," whereby the newcomers joined family and friends already established in the area (Rippley and Paulson 1995: 2, 103). Chain migrants tended to create, and remain living within, tightly-knit cultural communities. Communities of chain migrants – like the greater New Ulm area in the Minnesota River Valley – tended to retain Old World cultural characteristics – including farming practices and building construction techniques – longer than comparable communities. Historians Rippley and Paulson have written, "Chain migrants were less apt to seek acculturation. They were

less likely to marry outside their 'cocoon' and were less inclined toward assimilation with American society." The authors compared German-Bohemian immigrants in the New Ulm area with Minnesota's Danish immigrants, who they say did not follow chain migration patterns. The Danes tended to "disperse" more readily than Germans and to assimilate sooner, including being relatively quick to abandon Danish as their primary language (Rippley and Paulson 1995: 2-4).

German immigrants in and around the New Ulm area created a cultural community that was almost homogeneous in its ethnicity. In 1860, for example, Courtland and Lafayette townships in Nicollet County were 80 to 99 percent German, according to census data (Johnson 1981: 163). According to Rippley and Paulson, in 1870 only 8.7 percent of "New Ulm area Germans" were marrying outside of their ethnic background. In large numbers, these German immigrant families continued to speak German. As late as 1970, 41 percent of New Ulm residents still claimed German as their principal language, compared to 8 percent statewide (Rippley and Paulson 1995: 4, 148).

TECHNOLOGY

While pioneers were enthusiastic and political events encouraging, Minnesota agriculture developed slowly, only able to advance as fast as technology would allow. With virtually no improved roads in much of the state, settlement followed navigable rivers, which were blocked with ice during the winter. Historian Arthur J. Larsen wrote, "Since the lands along the rivers were the most accessible, they usually were the first to be taken up, although, from the agricultural standpoint, they often were inferior to those farther removed from navigable streams. The settlers were eager to get at the lands in the interior, but the absence of roads was a formidable obstacle" (Larsen 1940: 226-227).

Connections between Minnesota and outside markets were also limited. According to Larsen:

> Before 1867 Minnesota had no rail connections with exterior points. The [Mississippi] river carried its products to St. Louis and to the Mississippi railheads of roads leading to Milwaukee and Chicago. Transportation, both by river and by rail, was slow, unreliable, and expensive. The river was in some respects an unsatisfactory highway. Since it was closed a large part of the year, certain problems in the storage, sale and shipment of grain arose, but irregularities in the navigation of the river due to low water in the open season were even more serious (Larson 1926: 39-40).

Limited transportation prevented the dissemination of goods and services that made farming easier. A scattering of entrepreneurs established grist mills, saw mills, lime kilns, post offices, and stagecoach stops – usually on their own farms – which often became the nuclei of small commercial centers. If nearby farmers had excess grain or produce to sell, it was usually collected and traded there.

Farming itself was constrained by limited technology. Fields had to be painstakingly created by hand-cutting trees and grubbing stumps, or by breaking thick prairie sod with oxen and walking plows drawn by mules. Planting and harvesting implements were crude, inefficient, and dependent on much hand labor. (In 1860 there were 10,000 more oxen than horses in Minnesota, according to Jarchow. Ten years later, horses outnumbered oxen by 50,000 (Jarchow 1949: 147).)

According to Merrill Jarchow, "The Minnesota commissioner of statistics, J. W. McClung, in 1860 estimated that it cost $795 [roughly $17,500 in 2003 dollars] to open a farm, including the price of implements, provisions, oxen, cows, a team and wagon, breaking about twenty acres, and building a house and fence."

Jarchow explained:

> One of the first tasks confronting the settler was to build a cabin, and during its construction, the family often lived with a kind neighbor. Another was to break a little land for a crop. Many settlers did not know how to break land and many had the wrong kind of plow. Others had no horses nor oxen, and they had to hire the job done. . . . Potatoes, corn or rutabagas were the usual crops sown on newly broken land, corn often being inserted in an opening made with an ax in the sod. By the following spring the land would be ready for a wheat crop. After building a cabin, breaking some land, and planting a few crops, the pioneer frequently had to turn his attention to the problem of fencing, since until the late 1870s livestock was allowed to run at large (Jarchow 1949: 6-7).

While pioneers in wooded areas constructed buildings of logs, those in treeless areas used another available material – sod. Jarchow wrote:

> Beyond the wooded areas materials for log cabins and frame shanties were not easy to obtain, and, after the vanguard of settlement had pushed into the treeless areas, a different type of shelter was needed there until the railroads came and until the farmers could afford to import lumber. Once again, the pioneer exercised his ingenuity and utilized the materials at hand. He found an answer to his need in the thick prairie sod everywhere available, which he cut into bricks suitable for building. In the 1860s, 1870s, 1880s and even later, western Minnesota was dotted with sod houses of various types and sizes. . . . [In Brown county] a Danish family built a sod house large enough to accommodate not only themselves, but their cows and oxen as well. . . . Some houses were built completely of sod while others had sod bricks laid on the outside of frame shacks. The walls of sod barns frequently were three or four feet thick; yet rain, sun, wind, mice, and rotting grass reduced them to piles of dirt in a few years (Jarchow 1949: 83).

By the end of the early settlement period, much of the state was agriculturally undeveloped. According to Jarchow:

> As late as 1870, four-fifths of the population in Minnesota was [still] concentrated in the southeastern part of the state, accessible to the Minnesota, St. Croix, and Mississippi rivers. This area, in general, was wooded, the kind of area congenial to the pioneers, for it furnished them with materials for fuel, fences, and houses. Only with reluctance did they venture out on the open prairie, where tradition maintained that the soil was less fertile, and where winds, blizzards, fires, insect pests, Indians, and lack of transportation facilities seemed to doom the settler to failure or death (Jarchow 1949: 80).

CHARACTERISTICS OF FARMS FROM THE EARLY SETTLEMENT PERIOD, 1820-1870

- new farms
- farms concentrated in southeastern Minnesota and near rivers

- farms with subsistence-level, diversified farming systems
- farms with a small but growing number of improved acres
- farms using horse-, oxen-, and human-power
- "traditional" or ethnically-based farming methods
- "traditional" or ethnically-based building design and construction
- few barns (most kept animals outside or housed in very simple or temporary shelters)
- small buildings built with native materials
- dugouts, log houses, sod houses
- timber frame buildings
- pole and straw buildings
- worm fences
- well-preserved resources from this period expected to be rare

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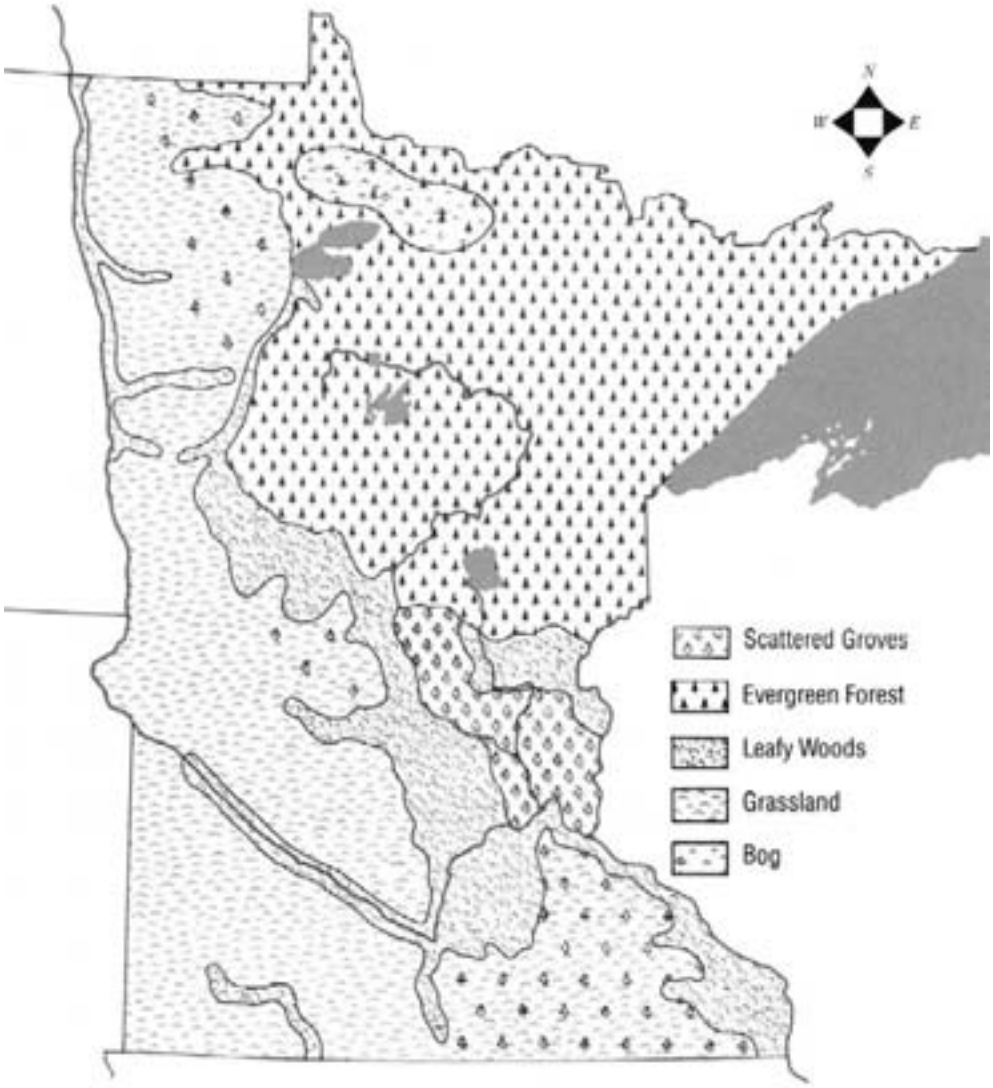

Minnesota's vegetation at the advent of Euro-American settlement. The "scattered groves" and "leafy woods" in the southeastern quarter of the state were called the Big Woods. Much of western Minnesota was prairie grasslands, and the northern half of the state was dominated by coniferous forest. From Rhoda Gilman's *The Story of Minnesota's Past* (1989).

A settlement-era barn in Belle River Township, Douglas County. Photo taken in 1983. (MHS photo)

A settlement-era barn, still looking sturdy at the turn of the century. Location unknown, circa 1900. (MHS photo by Louis Enstrom)

According to historian Merrill Jarchow, there were 10,000 more oxen than horses in Minnesota in 1860. By 1870 horses outnumbered oxen by 50,000 (Jarchow 1949:147). Location unknown, circa 1910. (MHS photo by Harry Darius Ayer)

PERIOD 2: DEVELOPMENT OF A WHEAT MONOCULTURE, 1860-1885

As Minnesota farmers moved out of the subsistence phase and into commercial agriculture, the majority grew wheat as their exclusive cash crop. Wheat farming developed first in southeastern Minnesota where the grain was shipped to market on river boats. Around 1870, yields began to decline at the same time that land prices were rising with population growth in southeastern counties. As southeastern farmers began to diversify to maintain profitability, the wheat monoculture shifted to the state's new frontier – the vast western territories now accessible on the new network of rail lines. Minnesota led the nation in wheat production, Duluth became the country's premiere grain shipping port, and Minneapolis became the international leader in flour milling.

Milestones of this Period

1858 – First flour was exported from Minnesota; until then flour had been imported
1862 – Minnesota's first rail line, the St. Paul and Pacific, began to operate between St. Paul and St. Anthony
1862 – Federal Homestead Act became law
1862 – USDA established
1862 – Congress passed Morrill Land Grant College Act to further agricultural education
1865 – U.S. wheat exports began a rise that lasted to 1880
1869 – University of Minnesota College of Agriculture established
1870 – Population of Minnesota rose to 439,616, up 255% in ten years
1871 – Northern Pacific finished a line between Duluth and Moorhead opening the Red River Valley to agricultural development and Great Lakes shipping
1871 – Duluth Ship Canal constructed
1871 – First middlings purifier installed in Minneapolis' Washburn B Mill; market for northern spring wheat created
1873 – First carload of wheat was shipped from Moorhead to Duluth
1873 – Failure of Jay Cooke organization sparked Panic of 1873 and halted construction of Northern Pacific and St. Paul and Pacific railroads
1873 – After the Cooke collapse, railroad investors developed bonanza farms on land that had been collateral for railroad bonds
1873 – Grasshopper plagues through 1877
1873 – Federal Timber Culture Act passed, State Tree Bounty Law passed
1878 – Wheat grown on almost 70 percent of Minnesota farmland
1878 – Congress authorized dredging a 4 1/2'-deep Mississippi River shipping channel
1878 – James J. Hill and partners acquired the Northern Pacific and St. Paul and Pacific and renewed construction
1879 – Robust boom period in western and northwestern counties; lasted until late 1880s

See also

Farms
Threshing Barns
Granaries, Elevators, Bins, Dryers
Appendix: Focus on Minnesota Crops
Appendix: Focus on Mechan Techno

Wheat, which was the first crop grown commercially on a large scale in Minnesota, was a frontier crop, dependent on abundant and inexpensive land. It had arrived in Minnesota after moving westward along with the U.S. frontier. Wheat was "the premier lazy man's crop, taking relatively little labor [and little expertise] to produce," according to historian David Danbom (Danbom 1995: 147).

In 1839 little wheat was grown west of Indiana and 20 years later, by 1859, wheat fields were covering southeastern Minnesota and, for the first time, "the value of the wheat shipped from the state exceeded that of furs, which had been the most important commercial product since trading began," wrote historian Henrietta Larson (Larson 1926: 17-18). In the 1870s wheat fields appeared in Minnesota's new frontier – the Red River Valley. Nationwide, the center of U.S. wheat production in 1839 was in West Virginia, and by 1909 it had shifted west to the Iowa-Nebraska border (Olmstead and Rhode 2002: 6).

Farmers were encouraged by a strong market for Minnesota wheat that was created by rising U.S. population as millions of Europeans immigrated to America. Demand for food also increased in western Europe, especially England. Larson wrote:

> Wheat was an important element in the diet of the people of those [European] regions. And it was also easily stored, transported and graded so as to become an article of trade earlier and for longer distances than more bulky and more perishable products. Its value was high compared with its weight, so that transportation to a distant market was economically possible. Furthermore, the fertile, clean, virgin soil of the frontier could produce a better grade of grain with the use of less capital and labor than was possible in the older sections [of the U.S. and Europe] where land had been cultivated longer. Therefore, the demand for food in those far-away regions was expressed in Minnesota as a demand for wheat, and no product brought so regularly a good price throughout the early years of Minnesota's history as did wheat (Larson 1926: 25-26).

Market demand, technological innovations, population growth, and transportation improvements created an overall pattern of intense agricultural expansion in Minnesota and nationwide, according to Danbom. By several measures U.S. agriculture doubled from 1870 to 1900. And while "the [U.S.] farm population was doubling between 1870 and 1900, the urban population was tripling" (Danbom 1995: 133).

Minnesota's success in wheat growing was also made possible by advances in technology. Important mechanical developments of the 1840s-1870s included new reapers, threshers, self-binders, and countless other devices and techniques, many developed by ingenious farmers and shared with others. On the biotechnology front, plant breeders had produced 'Red Fife,' North America's first hard spring wheat, which was introduced to the U.S. in the mid-1850s. 'Red Fife' allowed wheat to thrive in northern latitudes and, as a consequence, it was successfully grown across Minnesota, Wisconsin, the Dakotas, and southern Canada. 'Red Fife' was also a precursor for later varieties including 'Marquis,' which, after it was introduced in 1912, became the leading spring wheat in the northern plains (Olmstead and Rhode 2002: 9, 12, 15).

By 1890 Minnesota became the national leader in wheat production, and Minneapolis and Duluth had become the nation's largest wheat markets.

PHASE I OF THE WHEAT ERA: SOUTHEASTERN MINNESOTA, 1860-1875

Wheat farming in Minnesota passed through two distinct phases. The first began during the early statehood period of the late 1850s and was linked to river transportation. During this phase, most wheat was grown in fields laboriously cleared from the hardwood forests of southeastern Minnesota. Most of the grain was threshed by hand, and the wheat was transported down rivers or hauled in slow wagons to Mississippi River ports. It eventually reached railheads from which it was shipped to terminal markets like Chicago and Milwaukee.

Farmers who had wheat to sell brought it to local merchants and millers. For the best prices, farmers hauled their wheat to towns that were located on or near major rivers. Larson wrote:

> The larger towns within a day's hauling of the river became fairly satisfactory markets for farm products. . . . The first cash wheat market in the interior [the portion of Minnesota west of the Mississippi] seems to have been at Chatfield, a prominent trading town, where a federal land office was located. Milo White, a general merchant, began to buy wheat for cash in 1859. He built a warehouse for storing the grain, and shipped by team to LaCrosse in winter [where there was a rail connection to the east] (Larson 1926: 21-22).

Between 1860 and 1875, wheat production nearly doubled every five years (Folwell 1926/ rpt. 1969: 66). Much of the wheat was planted by farmers taking advantage of incentives like the Homestead Act of 1862. According to historian Theodore Blegen, "Even in the Civil War years, up to 1865, a million and a quarter acres of public lands were entered by more than nine thousand claimants; and the rush for homesteads went steadily forward through the next decades" (Blegen 1975: 344).

In 1870 the principal wheat-growing counties in Minnesota were Olmsted, Goodhue, Fillmore, Wabasha, Dakota, and Winona – all in southeastern Minnesota (Jarchow 1948: 12-13).

PHASE II OF THE WHEAT ERA: SETTLEMENT OF THE WESTERN COUNTIES, 1875-1885

The second phase of Minnesota wheat growing began around 1875. It was characterized by several interrelated patterns and events: the depletion of soils and the rise of land prices in southeastern Minnesota, the construction of railroads throughout the state, the establishment of farms on Minnesota's prairies, the phenomenon of bonanza farming, the rise of Minneapolis milling, and the development of organized colonies and settlement movements.

By the mid-1870s, farmers in southeastern Minnesota who had been planting wheat for 15 years were seeing decreasing yields from depleted soils, crop diseases, and pests. Planting more acres was not an option as the region's land values had risen along with its population. Some southeastern farmers moved to the undeveloped prairies of western and northwestern Minnesota, joining tens of thousands of European immigrants who were also migrating there. Others decided to stay in southeastern counties, invest in new equipment and livestock, and diversify (Nass 1989: 131).

Larson explained, "Supremacy both in the amount and quality of wheat raised was passing to the region bordering on the Red River. The rich virgin soil of that section proved to produce excellent wheat in large yields, and the cultivated area of the northwestern part of the state was extended

considerably" (Larson 1926: 118-119). According to Larson, "The [state's] tilled area increased almost fourfold in the decade following the [Civil] war. The growth in wheat production was even greater" (Larson 1926: 55-56). By 1900, Minnesota's four largest wheat-growing counties were Polk, Clay, Marshall, and Otter Tail – all in and near the Red River Valley (Drache 1964: 13).

Construction of Railroads. The second phase in wheat growing was linked to the building of railroads that opened the northern plains to Euro-American settlement. In the 1860s, Minnesota's earliest (and long-awaited) railroads were concentrated in the southern and southeastern parts of the state, areas that were already "settled." In 1867 a critical connection to eastern markets was made when the Minnesota Central completed the first direct rail link to Milwaukee. Around 1870, tracks in Minnesota pushed beyond the frontier, moving rapidly into vast unbroken areas in advance of Euro-American settlement. Major lines were built between St. Paul and Duluth in 1870, between St. Paul and Breckenridge in 1871, and between Duluth and Moorhead in 1871. These tracks tied west central Minnesota and the Red River Valley – which became the state's richest wheat-producing region – with Great Lakes shipping and with Minneapolis flour mills. They also opened much of the state to Euro-American settlement (Larson 1926: 59-60).

In the fall of 1873, just as the first wheat was being shipped eastward from the Red River Valley, Jay Cooke and Company – the Northern Pacific's major investor – collapsed. The catastrophe sparked the financial panic of 1873 and the ensuing five-year depression, halted railroad construction, and slowed settlement. (The halt in railroad building encouraged Red River steamboating, however. Wheat was shipped from northwestern counties on barges (towed by wood-burning steamboats) to the Northern Pacific railhead at Fargo-Moorhead, and from there was shipped eastward to Duluth and Minneapolis.)

Transportation improved and farm development accelerated again in 1878 when James J. Hill's St. Paul, Minneapolis and Manitoba railroad laid the first tracks up the Minnesota side of the Red River. Until this point, the eastern bank had been bypassed by farmers in favor of the Dakota side where the soils were better drained. Completion of Hill's so-called "St. Vincent Extension" opened the Minnesota side to farming. According to historian Howard Dickman, "The completion of Hill's railway lines in late 1878 loosed a flood of settlers into this area and beyond into eastern North Dakota. Even after the high tide of this 'Dakota Boom' receded in the late 1880s and hard times came in the early 1890s, Minnesota continued to grow. Agricultural settlement did not appreciably slacken until the turn of the century, by which time most desirable prairie lands . . . were either occupied or in private hands" (Dickman 1977: 50, 52).

Bonanza Farming. With the failure of Jay Cooke's company in 1873, railroad investors acquired vast amounts of land in the Red River Valley that had been used as collateral for the railroad construction bonds. More than 1.7 million acres of railroad land entered private ownership between 1873 and 1878. More than half of the land went to a small group of about 60 investors whose acquisitions averaged more than 14,000 acres each (Murray 1957: 60). Around 1874 these men began to develop "bonanza" farms in the Red River Valley to demonstrate the viability of farming there, to generate traffic for the railroads, and to attract new settlers.

Most bonanza farms were located on the western bank of the Red River since the Minnesota side was more prone to flooding. However, large-scale farms began to appear in Minnesota after Hill's St. Vincent Extension was built in 1878. One group of four farms near Kennedy in Kittson County, for example, totaled 65,000 acres.

Bonanza farms – like most wheat farms – suffered from the droughts in 1887-1889 that "hit the Red River Valley with exceptional severity" (Briggs 1932: 36). A few years later, the Panic of 1893 devastated many bonanza farmers who had over-expanded on borrowed capital. By the mid-1890s, most bonanza farms were being divided into smaller, more conventional operations.

While many of the bonanza farms were short-lived (ca. 1875-1893), Blegen explains "these huge farms contributed to the fame of the Red River Valley, on both the Minnesota and the Dakota sides, as an incredibly rich wheat-producing area. The bonanza farm was wheat growing on a grand scale, taking advantage of machinery in large quantities, cheap land, and virgin soil" (Blegen 1975: 345). In fact, with their large-scale mechanization and economies of scale, bonanza farms were Minnesota's first "factory" farms, preceding by nearly a century the large specialized farms that developed in Minnesota after World War II.

Minneapolis Milling. The second (post-1875) phase of Minnesota's wheat boom was encouraged by technological breakthroughs in the flour milling process. Machines and techniques, such as the middlings purifier, enabled the Minnesota "patent" flour milling process. They were introduced in Minneapolis mills in the early 1870s and made Minnesota hard spring wheat just as viable for bread flour as high-quality winter wheat grown elsewhere. Minneapolis rose to become an international leader in flour milling, just as Duluth became a world-class grain shipping port. Both markets were supplied with grain grown by soaring numbers of northern wheat farmers and purchased by a new class of professional wheat buyers or middlemen. The grain was shipped on Minnesota's growing network of rail lines after being collected and stored in a new system of "line" elevators built in small towns along the tracks (Larson 1926: 118-119).

Colonization and Settlement Activities. Railroads played a much stronger role in agricultural development than merely shipping the products of Minnesota farms, and much of this activity began during the wheat-growing era. To encourage investors to construct rail lines, Congress granted rail companies 10 million acres of free public land in Minnesota – about 20 percent of the state's total land area – in a set of transfers that constituted "by far the largest grant made by the government for any single purpose," according to one source (Dana et al 1960: 98).

Railroad companies sold parcels of their land to prospective farmers and encouraged them to settle along the tracks, to trade in railroad-platted townsites, and to patronize grain elevators and lumberyards that the railroad or an associate owned. In a 1926 article, historian James B. Hedges explained the impetus behind the settlement activities of western railroads like the Northern Pacific:

> The railroads east of the [Mississippi] river were, for the most part constructed through territory already well settled and in a relatively high state of productivity. . . . The railroads, first built to fill in gaps between important waterways, naturally found developed trade awaiting them. . . . [The eastern railroads were] thus practically assured in advance of a profitable business.
>
> West of the Mississippi the railroads were built in comparatively new and unsettled country, and frequently anticipated by a generation the needs of the region tributary to them. . . . To overcome the timidity which such a situation created in the mind of the investing public, the railroad land-grant . . . was developed. By this method large bounties of the public domain were offered in promotion of railway construction. Despite this . . . aid, however, railroad companies often found themselves with their lines completed,

> looking in vain for the traffic which could come only as the prairies were converted into homesteads. It came about, then, that the first great problem of these railroads was one of colonization (Hedges 1926: 311-312).

In essence, wrote Hedges, railroads west of the Mississippi were "forced . . . to adopt definite colonization programs in order to make their existence on a profitable basis possible." As these programs were instituted in Minnesota and elsewhere, the railroads became "the most important single factor in the development of the Trans-Mississippi country" (Hedges 1926: 311-312).

The Northern Pacific established a land department in 1871, the same year it completed its Duluth to Moorhead line. The company then launched an aggressive campaign to advertise and sell land, distribute seed and seedings for fields and shelterbelts, extend credit on favorable terms, build hotels and reception houses (also called immigrant houses) near depots, and sell pre-built homes to settlers who could afford them. The Northern Pacific and other lines recruited settlers from "every corner of Europe and Eastern America," provided discounted and free transportation, carried on agricultural experiments, established demonstration farms, and disseminated technical agricultural information (Drache 1964: 25-26). Logging companies engaged in similar efforts to sell excess their land, and both railroad and lumber companies worked in concert with church groups and through land developers and other intermediaries. Prospective farmers were also recruited to Minnesota by state and federal agencies, and other organizations.

Farming on the Prairie. Until 1870, most Minnesotans farmed in the hardwood forests. Historian Hiram Drache wrote, "The railroads changed the picture by luring farmers to the prairies. This was especially true after the farmers learned that they could improve as much prairie land in three years as they could woodland in twenty years. Wheat, the most transportable farm commodity, quickly took over as the major crop" (Drache 1964: 22).

According to Blegen, "Lands patented under the Homestead Act reached 255,648 acres in 1873 and a peak of more than 367,000 in 1885. Generally through the 1870s and 1880s the totals never fell below 200,000 acres a year" (Blegen 1975: 344). In recognition that "the 160 acres available under the Homestead Act might not be enough to support a family in much of the [prairie] region, Congress sought to make more land available for settlers. The Timber Culture Act, passed in 1873, allowed farmers to claim 160 acres in addition to what they held if they planted 40 acres with a specified number of trees" (Danbom 1995: 144-145). The Act was amended in 1878 to reduce the required amount of trees to 10 acres. The Minnesota legislature passed its own version of the timber culture incentive in 1873, offering a cash bounty to farmers who planted and maintained trees on prairie lands or along public highways.

Farming on the plains offered challenges different from those in the woods. There were fears that the soil wasn't fertile, and prairie areas lacked timber for firewood, lumber, and shelter from the wind.

Fortunately, railroads carried some manufactured goods to prairie farmers, including those using local sod as a primary building material. Folwell wrote:

> It was not necessary for the thrifty prairie farmer to live long in his shack or sod house. The managers of sash and blind factories in the principal river towns early developed a plan for furnishing all the timber, boards, shingles, and finishings for houses, as well as the

> doors and windows and their frames, and shipping them out [along railroads] in carload lots. On a ready foundation the balloon frame of light timbers, nailed together without mortise or tenon, was soon run up, and the roof boards and shingles were nailed on. The rough sheathing of the walls next went on, often reinforced by a layer of heavy tarred paper. Outside of these was put the siding, which had been planed smooth at the factory. The frames for doors and windows were next put into their places and the moldings were run around the openings. When the floors were laid, the stairs built, and the doors and windows adjusted, the house was habitable for summer weather. . . . With air-tight wood stoves or base-burning coal stoves the family was comfortable even when the fiercest of cold waves swept over the prairie (Folwell 1926/ rpt. 1969: 63-64).

KING WHEAT

According to historian Everett E. Edwards, "During the eighties [1880s] Minnesota forged ahead from fifth to first rank among the leading wheat-producing states of the Union. In the following decade, it not only retained this pre-eminent position, but nearly doubled its output" (Edwards 1938: 148). Another source wrote, "In the space of forty years, from 1850 to 1890, Minnesota had become the leading wheat producing state of the nation. Peak wheat crop was harvested in 1899, when Minnesota again led all states with over 95 million bushels, 14.5% of the nation's total" (Minnesota Institute 1939: 8-9). In 1890 about half of all Minnesota crop land was planted to wheat.

Years of exclusive wheat culture eventually caught up with Minnesota farmers. Deteriorating soil quality, repeated outbreaks of the fungal disease called "rust," and invasive weeds like Russian thistle, which moved into Minnesota around 1890, depressed yields and farm income. By the late 19th century, experts were urging farmers to diversify and Minnesota agriculture entered a new era.

CHARACTERISTICS OF FARMS FROM THE PERIOD OF WHEAT MONOCULTURE, 1860-1885

- farms using horse-, oxen-, and human-power
- farms with growing number of improved acres
- relatively few buildings to house animals
- buildings used to store grain
- timber frame buildings
- three-bay (also known as English) barns, primarily in the southeast
- in the southeast, early buildings of framing and native materials like log and stone
- in the west, early buildings of sod and materials bought from early trackside lumberyards
- new farms, especially near railroads
- windbreaks, woodlots, and shelterbelts planted in prairie areas
- structures associated with bonanza farms
- designs influenced by local carpenters
- designs influenced by Eastern agricultural publications and early agricultural societies

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A limestone barn in southeastern Minnesota. Fellows Farm, near Rochester, Olmsted County, 1973. (MHS photo by Thomas J. Lutz)

A woodframe farmhouse in western Minnesota likely built in the 1880s. Norman Farm, Mandt Township, Chippewa County, circa 1920. (MHS photo)

This farmhouse, which is larger and fancier than most in west central Minnesota, represents the period when farmers in prairie areas were growing wheat almost exclusively. Quaal Farm, Hantho Township, Lac qui Parle County, circa 1920. (MHS photo by Chalmers and Son)

After grain was cut, it was tied into bundles or sheaves. Several sheaves were stacked together to form the shocks shown here, which remained in the field for a short time to dry. The back-breaking work of cutting, tying, and stacking was eased by mechanical reapers, which became prevalent in the 1850s, and by reaper-binders, developed in 1875. Mosscrip Farm, Washington County, 1947. (MHS photo by Norton and Peel)

PERIOD 3: DIVERSIFICATION AND THE RISE OF DAIRYING, 1875-1900

To maintain profitability, most Minnesota farmers were compelled to move from pioneer wheat farming to a more diverse set of crops and livestock. The change began in the 1870s. Dairying became an important part of this diversification, but grew gradually because it required a large capital investment and new farming skills. The growth of Minnesota's dairy industry was stimulated by increasing population and technical advances such as winter-hardy alfalfa, the Babcock butterfat test, the centrifugal cream separator, and the silo. In the 1890s, Minnesota farmers began forming cooperative creameries, which helped spread dairy farming and soon dominated dairy marketing and processing.

Milestones of this Period

1858 – First Grimm alfalfa planted; grown only in Carver County for several decades
1867 – State Agricultural Society made early call for farm diversification
1870 – Minnesota's first cheese plants established in the late 1860s
1871 – Louis Pasteur invented pasteurization
1878 – Minnesota Dairyman's Association formed
1880 – Minnesota's first butter plants (creameries) established in the late 1870s
1882 – Minnesota Butter and Cheese Association founded
1884 – Hand-cranked, centrifugal cream separator introduced
1885 – Minnesota State Dairy Commission established (became Minn. Dept. of Agriculture)
1886 – Minnesota Farmers' Institutes began
1887 – Hatch Act created federally-funded agricultural experiment stations
1889 – *Minnesota Farmers' Institutes Annual* published an early article on silos
1889 – USDA became a cabinet-level department
1890 – Clark's Grove Cooperative Creamery established; became the model for other creameries
1890 – S. M. Babcock developed a test for butterfat in milk
1891 – University of Minnesota established a dairy school with T. L. Haecker as instructor
1891-93 – Widespread bankruptcies and financial depression
1895 – USDA established a dairy division
1895 – Agricultural engineering course formally established at the University of Minnesota
1896 – Power machinery first taught at the University of Minnesota
1897 – Minnesota's first four free rural mail delivery routes established at Farmington
1898 – Minnesota had 664 creameries
1900 – Grimm alfalfa came to the attention of Univ. of Minn.; dissemination soon began
1902 – Steel stanchions for dairy cows introduced
1905 – Milking machine marketed
1913 – Haecker's *Feeding the Dairy Herd* published; used for the next 60 years

See also

Farms
Dairy Barns
Combination or General Purpose Barns
Silos
Springhouses and Springboxes
Milk Houses

DIVERSIFICATION

In the 1870s, economic forces compelled Minnesota farmers to move from wheat farming into higher-grossing enterprises such as horticulture, sheep or poultry raising, corn and hog or beef production, and dairying. Regions east of Minnesota had followed a similar pattern in the mid-1800s, as historian Hiram Drache explained:

> Wheat production was deemed best adapted to the conditions of frontier agriculture. As land became more valuable, it had to be used for livestock production and dairying rather than wheat raising. This accounted for the shift from wheat to diversified agriculture in the states east of Ohio in mid-century. Where land was still cheap, as on the frontier, the rent charge was low and the farmer used as much land as possible in relation to labor and capital. Wheat best answered these conditions. But later when land prices rose, the farmer shifted to greater gross income crops (Drache 1964: 12).

By the 1870s, the soil in Minnesota's earliest-settled region was exhausted from 20 years of raising only wheat. The area's population was increasing and land values were rising, making it hard for farmers to increase their earnings by adding acreage. Grasshoppers and other pests, crop diseases, declining yields, and low wheat prices all encouraged diversification (Edwards 1938: 148-149). Wheat farming shifted to Minnesota's western and northwestern frontier where land was less expensive while, "the older southern and eastern sections of the state turned to other types of agriculture, especially from 1878 onward," according to historian Merrill Jarchow (Jarchow 1949: 185).

In 1867 the Minnesota State Agricultural Society issued an early call for diversification when it adopted a resolution stating that "the continual cropping of wheat, year after year, in the same field, without even a change of seed, is bad farming, and ought to be discouraged," explained Jarchow (Jarchow 1949: 253). Farm diversification was also promoted by the agricultural press and by the nation's young agricultural colleges, Farmers' Institutes, and experiment stations.

Diversification was also advanced by corporate interests such as railroad companies that were rapidly building lines across central and western Minnesota. Howard Dickman, biographer of James J. Hill, explained:

> Most of the farmers who poured into western Minnesota and eastern North Dakota in the 1880s raised only wheat. But Hill knew that these farmers' reliance on the 'one crop system' was not in their, nor his, long run interest. Experience demonstrated that unless agriculturalists practiced crop rotation and adopted diversified farming systems, even the most fertile land would eventually 'give out.' In the long run, these farmers, or more likely their sons and grandsons, might move on if the land lost its fertility and ceased to afford them a living. But the railroad had an enormous capital investment in its roadbed and its other physical plant; it was here to stay. Hill could not afford to have the soil 'give out' (Dickman 1977: 68).

James J. Hill and others encouraged farmers to use "dual-purpose" beef-dairy cows; add poultry, beef cattle, sheep, and hogs to their farms; and plant alternative crops like potatoes and sugar beets. Land developers, agricultural processors, and other agribusinesses also pressed for diversification to help maintain and increase the farm productivity on which their industries depended.

Diversification protected farmers from being completely wiped out by the failure of a single crop, and in fact, market prices for meat and grain tended to move in opposite directions so that farmers who produced both had some risk protection (Danbom 1995: 256). Minnesota farmers who had diversified found they were better able to weather times of economic depression.

Diversification also had other advantages. Bringing in regular "egg money" and a "milk check" improved cash flow which, under a wheat-only regimen, was dependent on a single payment for the grain harvest in the fall. Livestock and poultry feeding made better use of the family's total labor pool, including children. Diverse operations spread farm labor more evenly throughout the year: corn required work in spring and fall, alfalfa needed labor in the summer, wheat in summer and fall, and milking and stock-fattening used winter labor (Roberts et al 1956: 510). With a mixed crop and livestock system, the farm could also make good use of farm by-products. Livestock could be let into the fields to eat crop residue missed during harvest, for example, animals could be fed crops like culled potatoes or corn that had failed to ripen, and excess skim milk could be fed to young pigs and calves. Manure could be spread on the fields to increase fertility, and land too steep or rocky for tilling could be used for pasture. Even the process of grazing (e.g., the trampling of hooves, dropping of manure, and shearing of plants) could have a beneficial effect on pastureland if well managed. Rotating crops, important to diversification, improved soil texture and fertility. Good rotation could also ensure that a feed crop, a cash crop, and a soil-building crop were always being grown.

Steady mechanization, which had begun with the adoption of many new horse-drawn implements in the mid-19th century, helped farmers diversify. By 1900 Minnesota farmers used horse-drawn riding plows, disc plows, harrows, two-row corn planters, one- and two-row cultivators, grain drills, mowing machines, hay rakes, mechanical hay stackers, and grain binders. Yet many farm jobs were not yet mechanized. Corn was picked by hand, and silos were generally filled by the backbreaking method of loading in bundles of green cornstalks one-by-one. Cows were milked by hand, the cream separator was cranked by hand, manure was loaded and spread with a pitch fork, and most of the hay crop was loaded and unloaded with hand forks. Farm products were still transported by horse-drawn wagon.

By the mid-1890s diversification was well underway, and between 1900 and 1910 wheat's share of the total value of Minnesota farm products dropped from 31 percent to 20 percent. (In some areas, such as the Red River Valley, wheat was still dominant in the 1930s.) The drop in wheat production came along with corresponding rises in the value of other crops and in dairy products and livestock (Robinson 1915: 210).

According to Jarchow, "Diversification did not come all at once, nor did it affect all parts of the state equally. Some farmers carried on mixed agriculture in the midst of specialized wheat areas, and some clung to wheat almost solely in areas of diversification" (Jarchow 1949: 185).

The effect of diversification on Minnesota's built environment was profound. Livestock farming, and especially dairying, required farmers to make significant capital investments for new buildings and equipment. Two-story barns (usually housing animals below and feed such as hay above), silos, corncribs, and fenced fields became a significant part of Minnesota's rural landscape, as did a whole array of other structures related to animal husbandry. Diversified farming dominated Minnesota agriculture until the late 1950s.

DAIRYING

As most Minnesota farmers strove to diversify, dairying "proved to be the ultimate substitute for wheat" (Edwards 1938: 148-149). During the early settlement period, most Minnesota farms kept a milk cow or two for home use. The cows were pastured during the growing season, turned out into the stubble fields after harvest, and in the winter fed wild hay, corn fodder, turnips, bran, oats, and distillers' grain from local breweries. The family cow would go dry in the fall because of poor quality rations, but with spring and the first flush of nutritious grass, she usually delivered a calf and started her flow of milk again. The homesteader's milk room was a dugout, cellar, or springhouse. The milk was poured into shallow pans or crocks to cool and separate. After the cream floated to the surface, it was skimmed off and churned into butter. The milk was consumed by the family, or fed to the pigs and calves. Any extra butter was traded at the local store for necessities (Jarchow 1949: 207-210; Wayne 1977: 28, 32).

Pioneer cows were generally hardy "blizzard" cows that could withstand outdoor living and harsh weather but did not produce much milk or butterfat (Jarchow 1949: 219). They were bred indiscriminately, milked for a few years, and then slaughtered for meat. Likewise, early settlers' bulls were simply "cow fresheners" chosen with little attention paid to breeding. Still, these animals helped open up the Minnesota frontier. According to Minnesota dairy historian Ralph Wayne, "They provided milk and butter for the family. . . . They were also the main source of farm work, power and transportation in the early days" (Wayne 1977: 28).

In the 1870s, Minnesota dairy farming began to grow beyond subsistence levels. It became well-established over the next three decades.

Dairy farming was a natural choice for Minnesota farmers, many of whom had come from places like Scandinavia where dairying was important. Minnesota's climate was good for growing grass and hay, and hilly regions that could not be cultivated made good pasture. Just as important, "the [national] butter market had not yet been captured by another region," unlike the cheese market which Wisconsin already led (Keillor 2000: 101-102). These factors led many Minnesota farmers to move to dairy products as their main cash crop. From 1870 to 1910, dairying developed in a region that stretched from southeastern to central and west central Minnesota. Dairying was especially prominent during this period in Houston, Fillmore, Winona, Faribault, Freeborn, Mower, Carver, Otter Tail, Douglas, and Stearns counties. Because pigs could be fed the excess skim milk, hog raising was strongly associated with dairy farming except in areas near large cities where there was a consumer market for the fluid milk (Jarchow 1949: 185-215; Wayne 1977: 27; Tweton 1989: 270).

Dairy farming was labor intensive and a family enterprise. Everybody, even young children, helped milk twice a day and do other chores. Women often led the milking, separated cream, made butter and cheese, and cleaned all equipment. Men and older boys traditionally cleaned the barn. Wayne explained, "The size of the herd was often determined by the number of people available to milk cows by hand – the bigger the family the larger the herd" (Wayne 1977: 11).

As dairying advanced, farmers formed the State Dairyman's Association in 1878 and the Minnesota Butter and Cheese Association in 1882. Milk cow numbers stood at about 275,500 in 1880, a fivefold increase since 1860 (Jarchow 1949: 207). Still, the shift to dairy farming was gradual because a milking operation required large investments in livestock, buildings, fences, equipment,

and labor. Dairy cows, unlike scrubby native cows, were expensive and delicate. To return a profit, they needed good shelter and nutrition, comfort, and careful handling. Grain farmers had to learn new skills – raising wheat was fairly simple compared with dairy husbandry (Jarchow 1949: 185). "Much time and capital are necessary to convert the grain into a livestock farm," observed a Rochester dairyman in 1882. "The change must be made slowly" (quoted in Jarchow 1949: 215; Grout 1910: 2; Scott 1960: 20; Keillor 2000: 103).

One of the first Minnesotans to promote diversification through dairying was Oren C. Gregg, a progressive farmer from Lyon County and the first superintendent of the Minnesota Farmers' Institutes operated by the University of Minnesota. Gregg, who came to Minnesota from Vermont in 1865, rejected the custom of having cows go dry in the fall and freshen in the spring. After experimenting with feeds, breeds of cattle, and husbandry methods in the 1870s, he induced his cows to calve in the fall after the busy harvest season, and produce a steady flow of milk all winter (Scott 1960: 21-22; Blegen 1975: 393-394). Gregg became a champion of winter dairying and invited other farmers to see the results. Railroad companies, "recognizing that diversified agriculture would produce heavier and more certain traffic than wheat growing," sent agents to study his methods, according to historian Roy V. Scott. In the 1880s, the Winona and St. Peter Railway paid Gregg's expenses so he could travel around the state sharing his ideas at dairy conventions and county fairs (Scott 1960: 21-22).

Minnesota dairying was stimulated by other innovations as well. In the 1850s and 1860s, a Carver County farmer, Wendelin Grimm, developed "everlasting clover," a vigorous strain of alfalfa that could survive Minnesota winters. Grimm alfalfa was a nutritious feed for beef cattle and dairy cows, yielding three or four cuttings a year. It also enriched the soil with nitrogen. By 1910 the crop was promoted by the University of Minnesota and the Minnesota Extension Service, and being widely adopted by state livestock farmers. Grimm seed was initially in short supply, but by 1920 Minnesota dairymen were advocating "an acre of alfalfa for every cow" (Nass 1989: 131). By the late 1930s Minnesotans were planting more than 1.3 million acres of Grimm alfalfa (Blegen 1975: 396; Wayne 1977: 31).

Silos – air tight structures that preserved green fodder for the winter months – transformed the profitability of dairy farming and helped spread dairying throughout Minnesota. The state's first silos were built in the late 1880s and by World War I they were becoming standard. Silos transformed dairy farming by allowing farms to feed dairy cows nutritious green material year-round, which encouraged them to remain fresh through the winter. A silo could increase the livestock-carrying capacity of a farm by more than one-fourth (Wayne 1977: 30-37). Silos were coupled with new field machinery that allowed farmers to cultivate more land and raise enough quality feed to sustain winter milking.

Other mechanical advances fostered dairying. The centrifugal cream separator became available in Minnesota about 1885, eliminating inefficient passive separation. According to historian Marilyn Brinkman, "Cream separators gave farmers a reliable means of separating cream and skim milk at home and eliminated the backbreaking task of hauling whole milk to creameries. The only drawback of cream separators was their need to be washed after each use – a painstaking chore" (Brinkman 1988: 17). (By 1910, most Minnesota creameries or butter plants were receiving only cream.)

In 1890 the University of Wisconsin's S. M. Babcock developed the first practical test for measuring butterfat in milk. Before that, there had been no reliable way to determine butterfat amounts,

leading to frequent price disputes between farmers and creamery operators (Jarchow 1949: 217-218; Blegen 1975: 394). The butterfat tester also helped farmers identify and cull less-productive cows, resulting in herd improvements. And it allowed farmers to accurately determine which feeds, shelter, and husbandry methods produced the highest butterfat yields (Schlebecker 1975: 184).

Milking machines first appeared in Minnesota about 1905. The earliest machines were "some interesting contraptions," as Wayne has remarked (Wayne 1977: 36). One type, for example, was made of two hinged boards that opened and closed, squeezing the teat, and another used a series of revolving rollers. The first vacuum milking machines used plunger-type kitchen sink pumps. All had serious drawbacks, but gradually improvements were made. By 1910, effective milking units such as the DeLaval, Sharples, Empire, and Hinman were available, and in 1922 the very popular Surge Bucket Milker was invented. The earliest milkers were powered by portable gas engines or batteries. Some Minnesota farms started using milking machines during World War I when labor became scarce and expensive. However, hand milking was still common on small and medium-sized Minnesota farms until World War II. When a farm got high-line electricity, a milking machine was often one of the first pieces of electric equipment purchased (Wayne 1977: 6; Brinkman 1988: 17).

Farmers' earliest source of information on dairying was probably the agricultural press. Regional magazines such as *The Farmer*, *Farm, Stock, and Home*, and national magazines such as *Farm Journal* and *Hoard's Dairyman* published extensively on dairy topics beginning in the 1880s. Breed magazines were another source of information, as were farmers' clubs and agricultural societies. At an 1869 meeting of the Glencoe Farmers' Club, for example, a member described his dairy operation, and reported that his profit from cheese, butter, and whey was averaging $35 per cow (about $470 per cow in 2003 dollars) (Jarchow 1949: 210).

The University of Minnesota's College of Agriculture established a formal dairy school in 1891. T. L. Haecker, its first director, taught at the University for the next 27 years and became known as the "Father of Minnesota Dairying." Haecker promoted winter dairying, developed the first scientific dairy cow feeding regimen, and encouraged farmers to use improved cattle breeds. To his students he liked to say, "Treat the cow kindly, boys. Remember she is a lady – and a mother" (quoted in Blegen 1975: 398). In the late 1880s and 1890s, the University's Minnesota Farmers' Institutes spread advanced dairying methods including those developed by Haecker (Wayne 1977: 47-49; Brinkman 1988: 26).

As dairying expanded, Minnesota farmers improved their stock. In the Red River Valley, cows tended to be "dual-purpose" breeds raised for both meat and milk. Elsewhere farmers began specializing in either beef or dairy cattle. Common dairy breeds in Minnesota were Holstein, Guernsey, Jersey, Brown Swiss, and Ayrshire. By 1880, the state had a few purebred or registered dairy cattle. Farmers with common cattle bought bulls from these herds to introduce higher milk production in their own herds. Experienced dairymen suggested that a profitable cow needed to give at least 5,000 pounds of milk a year (Jarchow 1949: 219; Brinkman 1988: 16). "However, it took a long time to get real improvement in the herds of common red cows and they made up the majority of many herds until after World War I," explains Wayne (Wayne 1977: 28). (Because building a herd was a slow and painstaking process, it was devastating for many Minnesota farmers to be forced to sell their cows during the financial hardships of the Depression (Brinkman 1988: 21).)

A breakthrough in livestock nutrition came in 1913, when the University of Minnesota published T. L. Haecker's *Feeding the Dairy Herd*, which became the standard for more than 60 years (Wayne 1977: 51). Haecker's dairy feeding tables were the first scientific approach to milk cow nutrition, specifying the optimum amount of energy and protein to feed a cow based on her weight, milk production, and the milk's butterfat content. Haecker emphasized the importance of protein in the dairy ration, "a fact that most dairymen at that time had never heard of" (Wayne 1977: 31-32). The Minnesota Extension Service helped disseminate Haecker's findings to farmers around the state through special dairy clinics and county extension work (Wayne 1977: 32).

Cow testing associations and dairy herd improvement associations began in Minnesota about 1910. Through these services, technicians visited member farms once a month to test milk for butterfat content, and consult on ways to improve animal health, reproduction, and feed rations. As a result of better feeding and management, Minnesota's average annual milk production increased 400 percent from about 2,500 pounds per cow in 1890 to 10,120 pounds per cow in 1975 (Wayne 1977: 29, 33; Brinkman 1988: 30-31).

Early Dairy Processing. Minnesota's dairy farming industry could not develop without a processing and marketing system. During the early settlement period, butter- and cheese-making were home enterprises. The quality of farm butter varied greatly but was generally low. Barn sanitation was often poor and facilities to store milk and cream were primitive.

Markets for butter and milk were local. Although some butter was being exported from the state in the 1860s, "the lack of a dairy market held back the industry until after 1870, or even later, and the local store remained the main market for any surplus a farmer might have," according to Jarchow (Jarchow 1949: 208, 211).

As dairy farming was getting established, a few entrepreneurs started cheese and butter factories. Minnesota's first two cheese plants began in the late 1860s, and by 1880, the state had 49 cheese factories – most privately-owned and all in the eastern part of the state (Jarchow 1949: 214; Blegen 1975: 393; Wayne 1977: 38).

In the late 1870s, the state's first butter factories – also called creameries – were established. Most early creameries were privately owned. Farmers brought milk to the creamery once or twice a day in cans, which were emptied and then refilled with sour milk. The sour or skim milk was taken back to the farm where it was mixed with grain and usually fed to hogs or calves. In some territories where the journey to the creamery was far, skimming or collecting stations were established at intermediate locations. In the 1880s, some plants started pick-up routes, sending teams around to farms to collect the cream (Jarchow 1949: 211-221).

The need to efficiently haul milk to the local creamery every day was one of the factors that led Minnesota farmers to become advocates of the "good roads" movement at the turn of the century. Transportation historian Arthur J. Larsen explained, "The influence of the creamery as a factor in bringing about good roads can scarcely be overestimated. Many a farmer, after he arrived at the creamery and found his cream churned to butter by the bumpy, rutty roads, learned to curse such roads fluently. . . . there can be no staying at home until the road dries" (Larsen 1966: 367).

By 1885, dairying was becoming a significant Minnesota industry, and the state had 63 creameries and 46 cheese factories (Jarchow 1949: 221). Commercial cheese production led butter until about

1885, when butter processing became more important. Historians cite several reasons for this: New York and Wisconsin were by this time already well-established in the cheese market but the butter market was still open. Minnesota farmers were enlarging their livestock herds, and they wanted the skim milk – a by-product of butter-making – for calf and hog feed. Early leaders at the University of Minnesota also promoted butter over cheese, in part to foster livestock production. The mechanical cream separator, which farmers began using in the late 1880s, also favored butter-making (Jarchow 1949: 211-214, 220-221; Wayne 1977: 38; Tweton 1989: 272).

State government began regulating dairy processing and marketing in the 1880s, in part to protect farmers from competition from vegetable-based oleomargarine – "the bugbear of the dairyman" (Jarchow 1949: 220). In 1881, the legislature passed a law requiring that all packages of "counterfeit butter" be marked with the word "oleomargarine." The law proved ineffective, so in 1885 the legislature banned the sale of oleomargarine altogether, prohibited the sale of diluted or otherwise adulterated milk, and established the Minnesota State Dairy Commission to oversee the rules. Eventually the Dairy Commission's mission was expanded to the regulation of all processed foods. Soon individual Minnesota cities were also passing their own milk laws to protect milk quality, and eventually state and local dairy laws regulated the design and operation of milk houses and other dairy facilities on Minnesota farms. (Minnesota was one of seven states to ban the manufacture and sale of oleomargarine and, after the ban was lifted, Minnesota one of more than 30 states to mandate that margarine be sold without color so that it couldn't be mistaken for butter. Colored oleomargarine was illegal in Minnesota until 1963.)

As dairying moved forward in the 1890s, it became a consequential force in the Minnesota economy. By 1900, Minnesota farmers owned about 754,000 dairy cows and produced milk and butter valued at over $16 million. Ten years later, the state's dairy output had increased to $30 million, and only wheat and oats brought in more cash. By 1910, according to Tweton, "Minnesota had joined Wisconsin, New York, and California as a premier dairy state" (Tweton 1989: 270-271; Blegen 1975: 393).

Cooperative Creameries. Cooperative creameries created the essential marketing infrastructure for Minnesota's dairy industry by spreading out the financial risk of bringing expensive butter processing equipment into a local area. The movement began in 1889 and 1890 when farmers in Dodge, Olmsted, McLeod, and Freeborn counties organized cooperative creameries along the lines of successful operations in Denmark and Iowa. In most cooperative operations, member farmers delivered their cream or milk to the plant and then shared in the profits based on how much butterfat they contributed.

The Clark's Grove Cooperative in Freeborn County, formed in 1890 by Danish immigrant farmers, became the prototype of a successful cooperative creamery. In 1894, Professor Haecker wrote an influential Extension bulletin about organizing a cooperative creamery using Clark's Grove as a model. Haecker was a tireless promoter of cooperatives and trained more than 2,000 butter-makers and creamery operators. Minnesota butter-makers were soon winning top honors at national buttermaking contests, further promoting the state's dairy industry (Edwards 1938: 149, 155; Blegen 1975: 398; Wayne 1977: 38, 51; Flaten 1898: 29).

Cooperative creameries played a significant role in the development of the industry. Neighbors took turns hauling milk or cream to the cooperative, so each farmer visited his creamery several times a month, monitored operations, and conferred with fellow farmers. Professional and social activities

were organized at the local creamery level, and statewide dairy marketing and supply cooperatives were organized by coalitions of creameries. According Wayne, "The members of a cooperative creamery took great interest and pride in their organization. . . . They knew that their cooperative provided a real service to them" (Wayne 1977: 19). By 1898, Minnesota had 664 creameries – 84 percent of them cooperatives. Twenty years later, Minnesota had 671 cooperative creameries. This total was just under half of all cooperative creameries in the nation (Blegen 1975: 398; Tweton 1989: 272; Wayne 1977: 18-19, 41).

Until the 1920s, Minnesota cooperative creameries sold milk and butter mainly in their local area, although some butter was shipped out of state. Federal antitrust laws prevented groups of independent creameries from marketing collectively, and individual creameries had little bargaining power because of their low volume. In 1921, the Minnesota Cooperative Creameries Association formed and began to establish and implement butter quality standards for member creameries. In 1922 Congress passed the Capper-Volstead Act, the cornerstone law which allowed farmers' cooperatives to price and sell their products. The following year the Minnesota Cooperative Creameries Association began formulating a national sales strategy. In 1924, the Land O' Lakes brand was launched, and soon after, the association changed its name to Land O' Lakes Creameries (Wayne 1977: 19; Brinkman 1988: 27; Tweton 1989: 272).

Other state marketing cooperatives formed including North Star Dairies, the Rochester Dairy Cooperative, and the Twin Cities Milk Producers Association. Land O' Lakes was the best known of these and soon became the largest butter marketing company in the world. By 1929 it was handling more than 91 million pounds of butter (Blegen 1975: 398; Wayne 1977: 41; Tweton 1989: 272-273).

MINNESOTA DAIRY PIONEERS

The National Dairy Shrine was founded in 1949 to recognize important developments in the U.S. dairy industry. Among approximately 260 individuals who have been honored with the Shrine's "Pioneer Award" are 14 Minnesotans, listed below:

- Appleman, Robert D. (1931-1991), Extension Service educator and researcher
- Astroth, Frank B. (1893-1956), Jersey breeder, dairy association leader
- Brandt, John (1885-1953), organizer of Land 'O Lakes Creameries
- Eckles, Clarence H. (1875-1933), professor of dairying at University of Minnesota
- Fitch, James B. (1888-1962), professor of dairying at University of Minnesota
- Graham, Christopher (1856-1952), Holstein breeder, co-founder of Mayo Clinic
- Haecker, Theophilus L. (1846-1931), professor of dairying at University of Minnesota
- Hansen, Axel (1887-1964), Holstein breeder, agriculture director at Femco Farms
- Lilly, A.A. (1862-1937), Brown Swiss breeder, founder of Lilly Swiss Farm
- McGuire, A.J. (1874-1933), cooperative creameries organizer
- Moscrip, W.S. (1878-1959), Holstein breeder, dairy assoc. president (1942-1947)
- Munn, Marcus D. (1858-1946), Jersey breeder, Dairy Council leader
- Wayne, Ralph W. (1907-1995), Extension dairy specialist (1945-1972), program director, author of dairy industry history
- Wilson, Leslie V. (1893-1977), manager of Boulder Bridge Farm (National Dairy 2003).

CHARACTERISTICS OF FARMS FROM DIVERSIFICATION AND THE RISE OF DAIRYING, 1875-1900

- new farms, especially in western Minnesota
- farms using horses for power, fewer oxen
- farms with more improved acres
- farms with lots of fencing
- beginning to see evenly-sized fields for crop rotation
- early drainage systems
- windbreaks, woodlots, and shelterbelts planted in prairie areas
- early model or demonstration farms
- farms associated with colonization
- stock breeding farms
- stockyards
- pastures
- poultry houses
- early hog barns
- early silos
- corncribs
- granaries
- springhouses
- icehouses
- general purpose or combination barns
- early dairy barns
- barns with hay mows
- raised three-bay barns, other basement barns
- early nonorthogonal barns
- timber frame buildings
- buildings of dimensional lumber and other materials from trackside lumberyards
- early gambrel roofs
- designs influenced by local carpenters
- designs influenced by technical bulletins
- designs influenced by agricultural publications and agricultural societies

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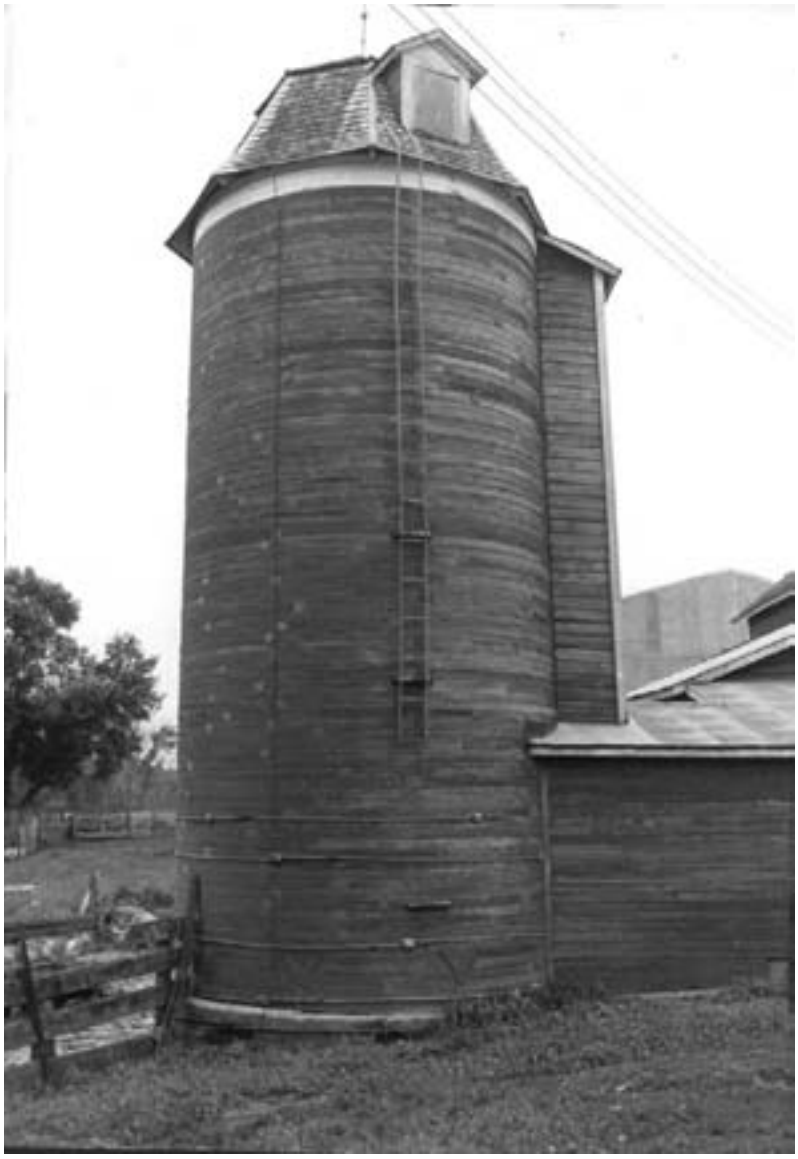
Outside the barn in this 1903 photo are more than two dozen lambs and ewes, about eight cows and calves, two horses, and at least two pigs. Crippens Farm, location unknown, 1903. (MHS photo by Frank T. Wilson)

Raising livestock provided valuable manure that was absorbed in a barn's straw bedding. The straw-manure mixture was removed from the barn and spread on the fields to improve soil texture and fertility. Location unknown, circa 1920. (MHS photo by Harry Darius Ayer)



Silos made dairy farming more profitable. Introduced to Minnesota around 1890, they became common around 1910. Wooden tower silos like this one were often made of horizontal boards. Robert Farmstead, Judson Township, Blue Earth County, 1979. (MHS photo)

Minnesota's dairy industry grew gradually, in part because it required a large capital investment in buildings and livestock. Warner Farm, Rockford Township, Wright County, circa 1973. (MHS photo)

Most farms that milked cows also raised pigs which were fed the skim milk, crop residue, and table scraps. This farm had several fenced pastures and yards close to the buildings. Note the rail fence. Obscured by the trees are a log barn, a house, and another barn or granary. Location unknown, circa 1910. (MHS photo by Charles J. Hibbard)

PERIOD 4: INDUSTRIALIZATION AND PROSPERITY, 1900-1920

The years from 1897 to 1919 were a period of farm prosperity. Farmers adopted new technology, machinery, and science-based methods to raise farm productivity, just as a similar process of industrialization was going on in other sectors of society. Scientists at the experiment stations and agricultural schools, working in cooperation with private industry, developed and disseminated improvements in plant and livestock breeding, mechanical technology, building designs and materials, and farm methods and management. At the same time, farmers were diversifying from wheat into new crops and livestock. Gravel roads, automobiles, and Rural Free Delivery helped relieve farm isolation. The Country Life Movement called attention to lagging rural living standards and the social and economic problems that were contributing to a farm exodus. In 1920, the bubble of prosperity burst and farmers entered a 20-year period of economic depression.

Milestones of this Period

1903 – Minnesota Valley Canning Co. (makers of Green Giant brand) founded in Le Sueur
1904 – Cokato Canning Co., the state's second canning factory, started
1905 – Minnesota Highway Commission organized
1905 – Cement staves introduced; soon very popular for silos
1907 – Rural mail routes in Minnesota reached 1500, up from 134 in 1901
1907 – American Society of Agricultural Engineers (ASAE) established
1907 – Butler Manufacturing sold its first steel grain bins
1907 – Minnesota Sugar (later American Crystal Sugar) began recruiting Mexican farm laborers to tend Minnesota beet fields
1908 – Model-T Ford automobile introduced
1908 – First structural clay tile silo built
1909 – President Roosevelt's Country Life Commission issued its report
1909 – Legislature created what became known as the Minnesota Extension Service in the University's department of agriculture
1909 – The University's Division of Agricultural Engineering formed
1910 – Minnesota's first dairy herd testing association formed in Albert Lea
1910s – Peak of public drainage ditch construction in Minnesota
1910-14 – Apogee of farm prices compared to the cost of living; provided the benchmark for later farm subsidy programs
1911 – J. J. Hill's Great Northern RR established an Agricultural Extension Department
1912 – State ag experiment stations founded 1910-1912 in Morris, Waseca, and Duluth
1913 – "Farm Motors" class added to the University of Minnesota curriculum
1913 – Concrete demonstration barn built in Illinois
1914 – World War I began
1914 – Smith-Lever Act established Cooperative Extension Service between USDA and land grant colleges

See also

Farms
Farmsteads
Poultry Houses
Implement or Machine Sheds
Appendix: Focus on Mechan Techno
Appendix: Focus on U of M Programs

1914 – Stoney Run Light and Power Co., one of the nation's first electric cooperatives, established in Granite Falls
1915 – Grimm alfalfa acreage doubled over the previous year
1916 – Federal Land Banks created to offer farmers long-term credit with land as security
1916 – Minnesota Country Life Conference held at the College of Agriculture in St. Paul
1916 – Rural Road Post Act began regular federal funding of rural road building
1917 – Food Production Act provided federal funds to place county extension agents in counties where agents were not operating
1917 – U.S. entered World War I; serious farm labor shortage
1917 – Smith-Hughes Act enabled federally-funded high school ag and vocational classes
1917 – Ford Motor Co. introduced the Fordson tractor, the first mass-produced tractor
1918 – World War I ended
1918 – Minnesota Extension Service issued a bulletin entitled *Shall I Buy a Tractor?*
1919 – The USDA began a national campaign to increase milk consumption
1920 – More than 30% of American farmers owned at least one auto
1920 – Agricultural prices collapsed
1920 – Census showed for the first time most Americans lived in urban, not rural areas
1920 – Babcock Amendment created Minnesota's trunk highway system
1920 – Radio began broadcasting in the U.S., with farm programming as the mainstay
1920 – Almost 40 percent of American farms had a telephone
1924 – The Farmall tractor introduced; widespread tractor use began

As the 20th century dawned, Minnesota farmers entered "the Golden Age of Agriculture," as the period from 1900 to 1919 is often known. Farming increasingly became a business, rather than a self-sufficient enterprise. By 1929, for example, 86 percent of the value of Minnesota farm products was being sold on the market and only 14 percent was being used directly by the farm family (Engene and Pond 1940: 13).

Farm income rose during the period as high crop yields accompanied high commodity prices, as land values increased, and as mortgage indebtedness fell. In 1910-1914 farmers achieved a position of economic parity, in which the prices they received for their products were favorable compared to the prices they had to pay for manufactured goods. This 1910-1914 parity level became the benchmark goal for later farm subsidy programs.

As immigration swelled the cities, demand for food surged. Farmers bought modern machinery and tractors, and began using scientific farming methods to increase their output. They diversified, planting more productive crops and expanding into dairy and livestock. Cars, trucks, and rural mail delivery eased their isolation. According to economist and historian Willard Cochrane, "Farm people came to believe that the good life could be achieved on the farm" through "hard work, thrift, savings, and investment" (Cochrane 1993: 99).

During World War I, Minnesota farmers continued to thrive. Worldwide demand for food soared and market prices shot up in 1916. After the U.S. entered the war in 1917, the government urged farmers to plant "fence to fence" to produce more food. They responded by planting 30 million additional acres. In 1918, Minnesota farmers increased the wheat crop by 70 percent, harvested the state's largest-ever corn crop, and bumped up hog production 15 percent. Foreign demand for American farm products stayed strong through 1919, fueled by postwar reconstruction. By 1919,

farm prices had skyrocketed to double the prewar levels (Cochrane 1993: 100-111; Wilson 1918: 221; Tweton 1988: 21, 262; Saloutos 1982: 3).

But in the summer of 1920, the bubble of prosperity burst. Food exports and farm prices fell sharply, and a 20-year agricultural depression began that would not end until World War II.

Some historians see the first two decades of the 20th century as a watershed in agricultural development (Cochrane 1993: 371; Danbom 1979: 137-142). It was during this period that Minnesota farmers began to shift to intensive production, employing technology and scientific methods to increase the output of their land and labor – a process some call industrialization. Like other maturing industries, intensive farming required capital, modern efficient equipment and buildings, innovation and best practices, and a high level of management skill.

Historian David Danbom explained:

> Often beginning his career as an average man with few special talents, the farmer was increasingly 'forced to make adjustments to the demands of the new industrial order, involving progressive mechanization, scientific technique, adequate capital, available credit and dependable markets.' . . . Perhaps most important, the increasing business demands of successful farming effectively closed it as an occupation readily open to the average man. When the century opened farming was the only major occupation in which the citizen without special skills or large capital could achieve the status of an independent businessman. By 1930 farming had been industrialized to the point where the man entering it without expertise or capital faced a marginal existence at best (Danbom 1979: 142).

This period marked a social watershed, too. In the words of dairy historian Ralph Wayne, Minnesota farmers of 1900-1920 were "the last to know the isolated frontier." The decade preceding 1920 was a "turning point in farm family living and in most farm operations. . . . The outside world was brought closer. It was a new dawn in rural family living" (Wayne 1977: 23).

DIVERSIFICATION

Between 1900 and 1920, Minnesota farmers steadily diversified. They switched from wheat – the frontier cash crop – to a broader mix including oats, corn, potatoes, barley, flax, rye, vegetables, fruits, dairying, and livestock. The shift was gradual, beginning about 1875 in the southeastern sections of the state where rising population and land values pushed farmers to alternative farming methods. During the next 50 years, diversification spread across the state as farmers determined which crops and animals were most profitable in their circumstances. Agricultural statistics show both the extent of diversification and the tremendous increase in overall productivity. For example,

- Oats jumped from 23 million bushels in 1880, to 74 million in 1900, to 126 million in 1930.
- Corn increased from 14 million bushels in 1880, to 47 million in 1900, to 104 million in 1930.
- Barley jumped from 2 million bushels in 1880, to 47 million in 1930.
- Potatoes went from 5 million bushels to 25 million in the same period.
- State butter production went from 19 million pounds in 1880, to 82 million in 1900, to 272 million in 1936.

- Wheat totaled 35 million bushels in 1880, rose to 95 million bushels in 1900, and then dropped to 19 million in 1930.
- A new crop, alfalfa, went from only 2,000 tons in 1900 to more than 1 million in 1930 (Blegen 1975: 391, 396).

Grain. Wheat was preeminent until 1900, accounting for about half the state's crop acreage. By 1910, wheat's share had shrunk to 25 percent of cropland, and in 1930 it was 10 percent. Economist Edward Robinson wrote, "King Wheat, after a reign of more than forty years in Minnesota, had finally been dethroned" (Robinson 1915: 174). The largest decrease in wheat acreage was in southwestern Minnesota, where by 1910 oats equaled wheat. However, wheat continued to be the mainstay crop in northwestern Minnesota and the Red River Valley. New varieties including the hard spring wheat called 'Haynes Bluestem' boosted yields after the turn of the century. (Also called Minnesota 169, 'Haynes Bluestem' was released in 1898 and was one of many important introductions by the Minnesota Agricultural Experiment Station.) Despite acreage declines, wheat from Minnesota and elsewhere continued to support an extensive flour milling industry in the state. Nearly 400 flour mills produced 30 million hundredweight of flour in 1900, led by two Minneapolis giants – Pillsbury-Washburn Flour Mills (later Pillsbury) and Washburn-Crosby Company (later General Mills). Both companies survived the depression of the 1930s and went on to become billion-dollar international corporations (Nass 1989: 131; Tweton 1989: 265-267).

Corn. In southern Minnesota, corn – the favored feed for cattle and hogs – became the most important crop after 1900. Farmers typically grew corn in a three-year rotation with cultivated hay and barley or oats. As faster-maturing varieties were developed in the 1930s, corn growing migrated northward from the southern edge of the state. In the 1940s, as tractors replaced horses on Minnesota farms, the need for oats declined and many farmers planted oil-seed and feed crops such as corn and soybeans instead.

Hay. Acres planted in cultivated hay increased rapidly after 1900. With the help of county extension agents, over 6,000 farmers seeded 12,000 acres of Grimm alfalfa in 1914, and some 25,000 acres in 1915. Grimm alfalfa seed producers' associations formed in North Dakota in 1916 and in Minnesota in 1924 to carry out seed testing and promote the use of certified alfalfa seed. Minnesota alfalfa production soared from a tiny amount to more than 1 million tons in 1930. The increased production of hay and corn reflected strong growth in dairy and livestock farming. Cattle numbers rose more than a quarter from 1900 to 1910. Hog and poultry production also increased significantly. The value of livestock on Minnesota farms jumped 81 percent during the decade (Robinson 1915: 214, 226; Nass 1989: 131).

Dairy. Dairy grew steadily after 1900, and by 1910 was the principal farm revenue source in southeastern Minnesota and counties west of the Twin Cities. Dairy cow numbers grew 44 percent in 1900-1910, while the value of dairy products jumped 84 percent to $30.6 million. Dairy farming became increasingly sophisticated with improvements in dairy housing, feeding, herd testing, and disease control. Commercial dairy processing kept pace. In 1909, the Minnesota Department of Agriculture reported 797 creameries (butter plants) in the state, plus 46 skimming stations and 69 cheese factories. Cheese-making became concentrated in three regions: Dodge and Goodhue counties, Otter Tail and Wadena counties, and Red Lake and Polk counties (Robinson 1915: 179, 216, 230-231).

Poultry. Minnesota's poultry industry in the 1900s and 1910s was still widely distributed on farms all around the state and, according Robinson in 1915, "only a few crops gave larger returns." Poultry saw big increases during this period. Bird numbers grew 31 percent during the decade of the 1900s, while the value of poultry products jumped 80 percent to $13.5 million. Egg production rose from 43 million dozen in 1900 to 107 million dozen in 1930 – a 150 percent increase. Poultry care and egg marketing continued to be dominated by women (Robinson 1915: 180, 231-232; Blegen 1975: 391).

Specialty Crops. Minnesota farmers began raising more specialty crops around 1900. In southeastern Minnesota, orchard products and small fruits like berries became important. The developing fruit industry was advanced by the University of Minnesota's fruit breeding research farm at Excelsior, established in 1907 (Blegen 1975: 403). The production of ornamental plants and cut flowers increased after the turn of the century. Ranges of greenhouses and small fields were located around the Twin Cities, in southern Minnesota, and even on the Iron Range.

Potatoes became a major cash crop in the northern half of Minnesota and on the sandy plains north of the Twin Cities. In the Red River Valley, farmers began raising potatoes as a cash alternative to wheat, and potato acreage there jumped from a few thousand acres in 1900 to 55,000 acres by World War I. Between 1915 and the early 1920s, Clay County was the second-largest producer of potatoes in the U.S., behind a county in Maine. Potato washing and processing plants were built in potato growing areas (Kenney 1995: 83; Tweton 1989: 284).

In 1900-1920 sugar beet production expanded southwest of the Twin Cities and then spread to the Red River Valley. Eastern European immigrants and, after about 1907, Mexican and Mexican-American workers helped thin and harvest this high-labor crop. In the early 20th century, farmers in south central Minnesota began growing canning vegetables including peas, beans, cucumbers, beets, sweet corn, asparagus, and pumpkins. There were 16 canneries operating in Minnesota in 1910. That number grew to 37 in 1947, and included companies with regional and national sales such as Green Giant and Gedney (Robinson 1915: 174-178, 210-211, 226; Baerwald 1989: 27-28; Tweton 1989: 282-288). Minnesota farmers also grew flax for fiber and linseed oil, and processing plants and paint factories were established. Minnesota and North Dakota led the nation in flaxseed production until the 1950s, when demand for linseed oil declined (Tweton 1989: 279-280).

FARM NUMBERS AND SIZE

In 1910, Minnesota farms ranged from an average of 57 acres in Ramsey County to 305 acres in Wilkin County. The statewide average size was 177 acres – four percent larger than in 1900 (Robinson 1915: 180, 216-218).

During this period, there was a statewide decline in the numbers of both small and large farms – those between 20 and 175 acres, and those over 1,000 acres (Robinson 1915: 219).

On average, Minnesota farms got slightly larger between 1900 and 1920, although there was considerable regional variation. In the northwestern and western parts of the state where grain farms predominated, the average farm size increased and the number of farms decreased after 1900. Minnesota's dairy farms also enlarged as advances like the silo, the Babcock butterfat test, the mechanical cream separator, and the use of factory methods became more widespread.

Farms adjacent to the Twin Cities were smaller and more numerous than those elsewhere. This was in part due to an increase in vegetable and fruit growing operations that supplied city markets. The number of small truck farms under 20 acres increased by 17 percent from 1900 to 1910 (Robinson 1915).

Between 1900 and 1920 farm numbers increased in northeastern Minnesota where additional land was coming under cultivation after being logged.

SCIENTIFIC AGRICULTURE

The turn of the century marked a new phase of agriculture, one based not on tradition but on proven scientific methods. "From the beginning, agriculture has been almost an art," wrote the superintendent of the West Central School of Agriculture in 1914. "Its practice has been handed down from father to son, and he is the best farmer who is the most proficient in carrying on the physical labor and manipulation. . . . Now the new phase of agricultural development may be called the scientific phase, for it involves the application of scientific principles to the practice of farming" (Higbie 1914: 9).

Science-based agriculture developed slowly during the first three decades of the 20th century and flowered after World War II. Progress was built on discoveries made during this period in plant and animal biology, disease and pest control, livestock nutrition, soil fertility, and a host of other topics. New scientific and academic fields such as agronomy, agricultural engineering, and farm management emerged, and industrial production and business accounting principles were applied to farming. New information and techniques were passed on to farmers through the extension service, other educational agencies, farm journalists, and private industry (Cochrane 1993: 101).

The United States Department of Agriculture led agricultural research in the late 19th and early 20th centuries. Around 1910, however, the bulk of research shifted to state experiment stations and land-grant colleges. The University of Minnesota's framework for a statewide system of six regional experiment stations and five associated agricultural high schools was developed during this period.

In 1909 the Minnesota Agricultural Extension Service was established, and in 1914 the agency became a federal-state cooperative effort with the introduction of federal money to help place an extension agent in each county seat. These agents became a primary channel for transferring scientific knowledge to working farmers. The food shortages of World War I intensified the push to make agriculture more productive and, with a wartime boost in funding, extension agents were working in nearly every Minnesota county by 1918. Extension agents taught farmers about new crops such as alfalfa, helped them combat livestock diseases and improve their herds, promoted the construction of silos, and eased the labor shortage by recruiting townspeople to help with the harvest. The extension service also educated farm boys and girls through the popular 4-H Club program, and supported initiatives passed in 1909 and 1914 to add agricultural instruction to Minnesota public schools (McNelly 1960: 47-50; Blegen 1975: 400; Nass 1989: 141-142; Cochrane 1993: 104-107).

Private industry also supported science-based agriculture. Land developers, equipment manufacturers, railroad companies, food processors, and the makers of building materials generated new ideas and disseminated information. In 1911, for example, James J. Hill established an agricultural extension department within the Great Northern Railway. Hill encouraged farmers to

diversify crops, raise livestock, use fertilizer, and install drainage. The Great Northern extension department, which operated until 1956, conducted research on soil fertility, tillage, and crop rotation. It performed soil testing, helped organize fertilizer buying cooperatives, set up demonstration plots on private farms, and "deployed a cadre of traveling agriculturalists and 'instruction trains' to help farmers with crop production, livestock breeding and marketing," according to historian Howard Dickman (Dickman 1977: 68).

Implement companies like International Harvester Company, John Deere, and J. I. Case established rural improvement programs. International Harvester began doing extension work in 1910. The company created a service bureau that answered farmers' questions, distributed literature through banks and seed merchants, and presented motion-picture and lantern-slide lectures. The service was so popular that International Harvester expanded it in 1912 and pledged to spend a million dollars on farm education. By 1913 the company had established five demonstration farms in the U.S. to show the benefits of diversified farming and livestock production. The company also carried out alfalfa growing campaigns that, in the words of historian Roy V. Scott, were "without doubt the most concentrated rural education programs ever undertaken by businessmen" (Scott 1970: 193). Anticipating later county extension methods, International Harvester educators traveled the countryside in automobiles doing alfalfa demonstrations in fields and holding meetings in farmers' homes. In 1913, the company put on 2,000 meetings in 16 states, speaking to thousands of farmers and distributing more than 1 million pieces of literature (Scott 1970: 190-199).

Salesmen for farm supply and equipment companies, and representatives of farmers' cooperatives, also became important sources of relevant technical information for farmers.

TECHNOLOGY

Mechanical technology improved steadily during the period, and the labor shortages of World War I encouraged farm mechanization. According to a 1939 estimate, Minnesota farmers increased their machinery use by 40 percent between 1910 and 1925. With the help of tractors and other machinery, farmers were able to plant and harvest larger fields and raise more livestock with less labor. As a result, farm output rose about nine percent between 1910 and 1920, even as farm labor decreased slightly (Robinson 1915: 208-209; Minnesota Institute 1939: 26; Schlebecker 1975: 211-212; Cochrane 1993: 110, 362, 377).

In 1900, the machinery on most Minnesota farms included walking or riding plows, harrows, a grain seeder, corn planter, mower, rake, grain binder, and a couple of wagons with racks for hay and livestock. After 1910, farmers added mechanical manure spreaders, corn binders, and hay loaders. Wide four-bottom plows pulled by a hitch of eight horses became common in grain-producing regions such as the Red River Valley. Steam-powered threshing machines came into use, operated by groups of cooperating farmers. Dairy farmers began using mechanical cream separators, hay loaders, feed carriers, litter carriers, and gas or battery-powered milking machines (Wayne 1977: 30-37).

About 1910, gas-engine tractors began replacing horses for pulling implements and for powering stationary equipment. The number of farm horses peaked nationwide around 1913, then slowly declined. The first tractors were heavy and inefficient, but the technology quickly improved. In 1917, the first mass-produced tractor, the Fordson, was introduced, and soon became a leading seller. U.S. tractor use grew from about 25,000 in 1915 to 246,000 in 1920. The tractor age truly

began in 1924 when International Harvester introduced the lightweight, maneuverable Farmall tractor. The nimble 13-horsepower Farmall was the first small, low-priced tractor built especially for row crops, and each of its 40"-tall rear wheels had its own brake, allowing sharp turns in small fields. Midwestern farmers lined up to buy them. By the late 1920s tractors had become common on Minnesota farms (Fite 1989: 280; Engene and Pond 1944: 28; Nass 1989: 140-141; Baerwald 1989: 29; Cochrane 1993: 377; Barlow 2003: 122).

Silos of wood, poured concrete, and masonry units were becoming common in Minnesota around 1910. During World War I, the Minnesota state committee on food production urged farmers in all corn areas to build silos "as one means of meeting the world's food shortage and of helping to win the war" ("Build" 1917).

Scientific agriculture promoted farm buildings that were more carefully designed to encourage efficiency and support new production methods. In the late 1890s, milk houses began appearing on Minnesota dairy farms, and by 1914, the Minnesota extension service urged any farmer with ten or more cows to install a milk house in order to improve the value of his product (Washburn 1914: 181). New materials such as poured concrete, cement block, cement staves, clay tiles, and sheet metal were employed. Dairy barns were built with factory-made stanchions and mangers, King ventilation systems, and manure gutters of optimal shape. Poultry and hog raisers began using "colonies" of individual housing units to reduce the spread of disease. New models of corncribs and grain bins were introduced, and expansive sheds were built to store the new tractors and other machines. Windmills, acetylene plants, gasoline generators, piped cistern water, and septic systems improved farm infrastructure. Even the layout of farms and the location of buildings, roads, fields, and pastures were reworked based on science. During World War I, silos and other modern farm buildings were considered so important to the war effort that they were exempted from a general U.S. ban on new building construction ("Building" 1918).

COMMUNICATION AND TRANSPORTATION

Isolation had always been a feature of rural Minnesota life, especially for women, who were often "largely confined to the farm" (Wayne 1977: 12). Farmers' clubs and other social groups sought to relieve this isolation, but the establishment of Rural Free Delivery (RFD) in 1896 was the first big step toward opening communication with the outside world. Before RFD, farmers went to the nearest town about once a week for mail, supplies, and news. When RFD started, farmers could receive and send mail every day by walking to the mailbox at the end of the driveway. Correspondence, newspaper, and periodical circulation rose, bringing the farm "within the daily range of the intellectual and commercial activities of the world," wrote historian David Nass, and giving farmers access to technical information and market reports (Nass 1989: 136). In 1899, Minnesota had just four experimental RFD routes, all near Farmington. Two years later there were 134 routes serving 67,000 people. By 1925, the state's 1,720 RFD routes covered 49,160 miles. In addition, by 1920 nearly 40 percent of American farms had a telephone. In 1921 the first farm radio broadcast was heard in Minnesota (Wayne 1977: 16; Nass 1989: 136).

Automobiles also helped relieve rural isolation. The Model T Ford was introduced in 1908 and by 1910 auto advertisements were appearing in farm magazines. Farmers eagerly embraced cars: in 1913 about half of the state's more than 40,000 automobiles were registered in rural areas. (Farm trucks came a bit later, with many purchased in the 1920s.) Farmers could buy kits to allow their Model T to pull a plow or, using a belt from the rear wheel, run a pump, churn, feed mill, saw,

washing machine, or electric generator. By 1939, 87 percent of Minnesota farms had an automobile (Nass 1989: 139; Barlow 2003: 122).

Most rural roads before 1920 were muddy, rutted, seasonal affairs built and maintained by townships. They were smoothed with a log or scraper pulled by horses. Many of these dirt roads were not much higher than the adjacent lands, so they drained poorly and flooded frequently. In wooded areas, roads were crowded by close-growing trees and brush. In winter, they blew full of snow. In open areas, repeated drifting caused the sleigh tracks to build up. Come spring, the thick, packed ice ridges melted slowly, turning the road into a muddy gumbo. In dairy farming areas, farm roads tended to be a little better because milk had to be delivered to the creamery daily. Dairy farmers, in fact, helped lobby for state road improvements. In other areas, farm-to-market roads were barely more than rutted tracks (Tweton 1988: 165; Vogeler 1995: 129; Wayne 1977: 22; Baerwald 1989: 20).

As public pressure for good roads coalesced, the Minnesota Highway Commission was organized in 1905 to work on road improvements. In 1906 a constitutional amendment allowed the state to levy taxes for road and bridge construction. In June 1913, Minnesota Good Roads Day was launched to help "pull Minnesota out of the mud." The road levy tax was increased in 1913, and in 1916 the federal government began providing regular funds for road construction (Borchert 1989: 61; Blegen 1975: 465).

In 1920 Minnesota voters approved the Babcock Amendment, allowing the state to issue bonds to finance road building and establishing a modern trunk highway system. Better roads made district-wide public schools and school bus service feasible. Farm families gained better access to manufactured goods and services, medical care, churches, and community activities.

DRAINAGE

By the 1890s most of the desirable agricultural lands in Minnesota had been cultivated. One way to increase farm productivity was to drain wet land, and farmers began to install ditches and tiles that drained into a new system of public ditches built over several decades. In northwestern Minnesota, James J. Hill took the lead in drainage projects, sponsoring a topographical survey of the Red River Valley and helping found the Red River Board of Audit to oversee drainage in the region (Dickman 1977: 24-25).

Drainage projects were especially prevalent in the early 20th century and peaked in Minnesota in the 1910s and early 1920s. Between 1907 and 1913, the construction of state and county ditches enabled the drainage of six million acres of land. By the 1960s, drainage improvements had been made on about one-third of the state's cropland, and on about one-half of the land in the Minnesota and Red River valleys. Widespread drainage increased the size of fields and farms and contributed to increased profits. Drainage also became increasingly controversial in the mid-to-late 20th century for its effects on the ecosystem and on animal and plant habitat (Nass 1989: 130; Baerwald 1989: 30).

COUNTRY LIFE

Before World War I, living conditions on Minnesota farms were still quite difficult. Ordinary farms didn't have running water, central heat, indoor plumbing, electricity, or refrigeration. Although

mechanization was under way, much hard physical labor was still needed to raise crops and livestock and care for the family.

In 1908, President Theodore Roosevelt appointed the Country Life Commission to study farm living conditions. The Commission's report suggested that farm life failed to satisfy the social and intellectual aspirations of rural people – a significant segment of the U.S. population. Further, economic opportunities in agriculture lagged behind business opportunities in urban areas. These failures were contributing to the migration of rural people to cities (Nass 1989: 133). In Minnesota, this population shift became evident in the census of 1890 and again in 1900. According to Robinson, the trend "reappeared in 1910 on a greatly enlarged scale. In fact, a considerable number of counties, mostly in the southern part of the state, decreased in total population; a still larger number, extending in an almost continuous zone from southeast to northwest, declined in total rural [farm] population. . . . Only in the region of cut-over lands was there any considerable increase" (Robinson 1915: 180).

The Country Life movement aimed to counter the rural exodus by making farm life more appealing. In meetings across the country, reformers promoted modern housing and household appliances, electrification, and farmstead beautification. Farmers were urged to fix up their homes and install running water to ease the burdens of women who, in the opinion of many, were the most overworked people on the farm. Farm magazines, builders' journals, and government bulletins published plans for improved farm buildings. In 1913, the Minnesota State Art Society held a contest for model farmhouse designs (Nass 1989: 134-135; Beecher 1999: 257).

There were efforts to bring electricity to Minnesota farms. As early as 1914, for example, a group of farmers from Stony Run Township in Yellow Medicine County organized a company to distribute power from the Granite Falls municipal plant to 26 farms. In 1924, a five-year demonstration project to electrify a small group of farms near Red Wing began. In 1926, a group in Dawson built its own power lines and purchased electricity from Otter Tail Power Company in Fergus Falls. Most farmers, however, had to wait to get electricity until the New Deal's Rural Electrification Administration began in 1935, and many farms weren't electrified until the 1950s (Nass 1989: 137).

The Country Life movement's goals went beyond the farmstead. Reformers promoted rural social activities, literary clubs, extension education, and the revitalization of country schools and churches. In 1916, a Country Life Conference was held at the University's College of Agriculture in St. Paul. The event attracted political leaders, teachers, rural school administrators, clergy, journalists, and others interested in social reforms. "*The Farmer,* Minnesota's oldest and most influential farm magazine, praised the work of the conference but regretted that only a few farmers attended the meetings," according to Nass (Nass 1989: 133-135).

CREDIT AND MARKETING

In the economic realm, the Country Life Commission called national attention to farmers' credit problems, citing "a lack of any adequate system of agricultural credit whereby the farmer may readily receive loans on fair terms," according to economist and historian Willard Cochrane (Cochrane 1993: 112). Congress struggled to devise a remedy, and in 1916 passed the Farm Loan Act. The law authorized a cooperative system of 12 federal land banks, capitalized mainly by the government, which provided long-term agricultural credit at regulated interest rates. Farmland could be used as collateral. As farm labor became scarce and expensive during World War I, many farmers

borrowed money to buy labor-saving machinery. They also bought land, taking advantage of lenient, long-term credit offered by the new Federal Land Banks. Strong demand pushed up farmland prices by 70 percent between 1913 and 1920. In the best farming areas, land prices doubled. When the farm economy crashed in 1920, many farmers were unable to repay their loans and lost their farms (Tweton 1988: 21; Cochrane 1993: 100-101, 112).

Another economic problem that plagued farmers was the lack of market power, including unpredictable access to markets and little influence over marketing costs (Cochrane 1993: 111). Farmers in the 1870s had tried to organize politically and to form cooperatives, often sponsored by the Grange chapter or another farm group. But these early marketing attempts usually failed. According to Cochrane, "Lack of capital, inability to work together, farmers' lack of business experience, and the competition provided by private businesses, some fair and some unfair, drove most of these cooperative ventures out of business by 1880" (Cochrane 1993: 113).

The first successful farm marketing cooperatives began forming around 1890, when Minnesota's cooperative creamery movement began, and continued through the 1920s. These were local associations organized to ship and sell grain and livestock, and to manufacture and sell dairy products, especially butter. Nearly 10,000 farmers' cooperatives were organized between 1900 and 1920, most of them in Iowa, Wisconsin, and Minnesota, and Minnesota became a leader in the cooperative movement nationwide. By 1920 Minnesota had about 670 cooperative creameries, or just under half of all cooperative creameries in the U.S. Some Minnesota cooperatives became very large. On the grain front, Equity Cooperative Exchange entered the grain marketing business in 1908, competing with giants Cargill and Peavey, which controlled the lion's share of the Minnesota grain trade in the two decades before World War I. By 1921, the Exchange had more than 17,000 farmer-members and 417 elevators. The cooperative ran into financial trouble in the 1920s and fell into receivership. In 1926, its grain terminal operations were taken over by another cooperative, the Farmers' Union (Blegen 1975: 398; Tweton 1989: 267-269; Nass 1989: 143; Cochrane 1993: 114).

CHARACTERISTICS OF FARMS FROM THE ERA OF INDUSTRIALIZATION AND PROSPERITY, 1900-1920

- farms supplementing horse power with gasoline engines
- model or demonstration farms
- farms associated with colonization
- improved infrastructure (e.g., water systems, electricity generators)
- farms with lots of fencing
- improved farm layout
- field drainage structures
- evenly-sized fields for crop rotation
- windbreaks, woodlots, and shelterbelts planted in prairie areas
- ornamental plantings
- pastures
- dairy barns
- silos
- milk houses
- general purpose or combination barns
- dairy barns including "Wisconsin" style

- barns with hay mows
- basement barns
- barns with windows; structures oriented or sunlight and wind
- barns with gravity ventilation systems
- nonorthogonal barns
- hog barns
- corncribs
- poultry houses
- beef barns
- stockyards
- automobile garages
- implement sheds
- springhouses
- icehouses
- farmhouse improvements
- structures of poured concrete, concrete block, cement staves, sheet steel, sheet iron
- buildings of dimensional lumber and other purchased materials
- plank and balloon frames
- fewer new timber frame buildings
- gambrel roofs
- pre-cut "kit" or mail-order buildings
- designs influenced by science, engineering, management principles
- designs influenced by materials manufacturers, agricultural engineers
- designs influenced by technical bulletins

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A diversified farm in Minnesota during the "Golden Age" of agriculture (1900-1919). The house was brick, the barns had vertical siding, and the fence rails were made of both logs and boards. Location unknown, circa 1905. (MHS photo)

This farm invested in a large barn and hay loading equipment. Bradley Farm near Marietta, Lac qui Parle County, circa 1909. (MHS photo by Carl Graff)

A western Minnesota farmhouse built in 1908. Farm incomes were relatively high from 1897-1919. Tryggeseth Farm near Dawson, Lac qui Parle County, circa 1910. (MHS photo)

This farm's windmill likely furnished power for pumping water, sawing wood, and grinding feed. There are dairy cows, pigs, and horses in the stockyard, and stacks of firewood and hay nearby. In the background is an early car, possibly a Model T. Location unknown, circa 1910. (MHS photo by Harry Darius Ayer)

During World War I, the state committee on food production urged farmers in all corn areas to build silos as a means of meeting the world's food shortage and helping win the war. Silos and other farm buildings were considered so important to the war effort that they were exempted from a general wartime ban on new building construction. University of Minnesota poster, circa 1917. (MHS photo collection)

PERIOD 5: DEVELOPING THE CUTOVER, 1900-1940

Most of the farms on northern Minnesota's logged "cutover" land were established between 1900 and 1940 amid difficult environmental, economic, and social conditions. The number of farms in the cutover reached its peak in 1925, a time when the logging industry was winding down and agriculture nationwide had just completed two decades of relative prosperity. Cutover farming is associated with significant organized recruiting and resettlement efforts by corporate interests and government agencies.

Milestones of this Period

1900 – There were 9,300 farms in 16 logged or "cutover" counties
1905 – Peak of logging in the cutover
1909 – Meadowlands colony established by the Duluth and Iron Range Railroad; Meadowlands demonstration farm created by the railroad and the University of Minnesota
1910 – Decade of widespread farmland drainage began
1919 – Nationwide farm economic depression began
1921 – Minnesota's first radio station started broadcasting
1925 – Number of farms in 16 cutover counties peaked at 32,700
1926 – Minnesota Extension Service distributed 7.7 million pounds of tree stump explosives to farmers over previous five years
1929 – Stock market crashed
1932 – Committee on Land Utilization convened by Minnesota Governor Floyd B. Olson to study cutover conditions
1934 – New Deal's Beltrami Island resettlement project began; most settlers moved away by 1936
1934 – Lands in part of the cutover were withdrawn from homestead entry to discourage settlement on submarginal land
1936 – First settlers moved to New Deal's farming settlement at Hermantown

Northeastern Minnesota's cutover, a region that encompassed about 16 counties, was a difficult landscape to farm. The cutover's soils were thin, rocky, and sandy with low fertility; the growing season was short; and the land was covered by dense second-growth trees and brush, impenetrable bogs and "muck" lands, and millions of acres of stumps left from logging. There was the constant threat of fire, roads were few, and markets far away. Many settlers had little farming experience and capital, few neighbors, and a heavy property tax burden. On the other hand, the cutover was a compelling landscape of great beauty. The timber could be harvested for building materials, fence posts, firewood, and logs to sell, and the forests and lakes were rich with wild game, fish, berries, and sap for maple syrup. Many families survived on very small farms, albeit at a nearly subsistence level.

See also

Farms
Root Cellars
Woodlots
Hay Barns or Sheds
Sugarhouses
Field Rock Piles

One source wrote in 1924, "To the uninitiated, the job of creating a farm in the cutover country seems a hopeless task" (Thompson and Schwantes 1924). Another wrote, "After the buildings are up and well sunk, the settler in the cutover country is ready to start clearing land, and that is when he is most likely to lose courage" (Ashby 1924: 28). Clearing the land of stumps, brush, and stones was a major obstacle to agricultural development, and experts in Minnesota and other Great Lakes states devoted considerable attention to overcoming it. In 1918 the University of Minnesota reported that cutover farmers were only able to clear an average of 3.8 acres per year. Because of the difficulty of clearing, fields were small and irregularly shaped and the ratio of tillable land to total farm size was low. By 1930, many cutover farmers were trying to make a living on 20 to 50 acres of tillable land (Peck 1918: 6; Cavert and Pond 1931). (See also Henning et al 1999 on cutover land clearing.)

Much of the cutover's landscape was also wet: "It is said before the ditches were dug the farmers cut their hay in hip boots and spread it on the stumps to cure" (Ashby 1924: 28). Farmers worked with government agencies to plan and construct public ditches and farm drainage systems that would turn soggy land into productive fields and pastures. Most land was drained in the 1910s, a decade of widespread farm drainage elsewhere in the state. Most cutover drainage projects were funded with local property tax assessments, a burden that many local farmers couldn't repay.

Minnesota's cutover region as defined by the University of Minnesota's Engene and Pond in 1940.

Cutover farmers had difficulty competing with farms elsewhere in the state where the growing season was longer and where there were fewer land clearing problems, better soil, and transportation systems suited to hauling farm products to market. For many cutover farmers, marketing their farm products required driving slow wagons or trucks over unimproved, often impassible, back roads or paying high rail shipping costs to a declining network of logging railroads.

In 1933 the University of Minnesota's Pond and Crickman explained the region's major markets:

> Practically all the surplus livestock from the [cutover] area is marketed at South St. Paul. Private or cooperative creameries are located wherever the dairy production within a community is sufficiently heavy to provide enough butterfat for their successful operation. Otherwise, dairy products are marketed as cream to centralized creameries in Duluth. Potatoes are shipped to the Twin City markets. Rutabagas find a market principally in the southern states. . . . In most parts of the northeast cutover area there is a market in local cities for dairy products, eggs, vegetables and fruits. However, there are comparatively

few large cities or towns in the area – Duluth and the iron range towns are the best local markets. In the past, lumber companies have furnished an outlet for hay and vegetables but with the decline in lumbering operations this has largely disappeared. The summer tourist trade affords a market for whole milk, eggs, fruits, and vegetables that as yet has not been supplied locally to its fullest possibilities (Pond and Crickman 1933: 18-19).

FIRST PHASE OF CUTOVER FARMING, CIRCA 1890-CIRCA 1905

The first phase of cutover farming occurred in a roughly 15-year period from about 1890-1905. This was a time of small, subsistence-level farms, many operated by laborers in logging camps or iron ore mines who also farmed to make ends meet and earn income during the off-season. Some early settlers were drawn to the area by advertisements from railroad or logging companies trying to sell their excess land. As early as 1894, for example, the St. Paul and Duluth Railroad was advertising its cutover lands to prospective settlers.

Timber and mining companies also operated farms during this period to supply food for their workers and feed for draft animals. Such farms began to disappear as logging camps closed in the 1910s, although a few "company" farms were still operating in 1930 (Henning et al 1999: 6).

In 1880 there were only about 545 farms in 16 cutover counties. By 1890 the number was increasing but still small at 2,200 farms. In 1904 cutover farmers were producing potatoes, vegetables, small fruits, butter, poultry, oats, and hay, some of which was marketed to the growing towns in the region (Committee 1934: 10-11; Maguire 1904: 57).

The first phase of cutover farming ended around 1905 when northern Minnesota logging reached its peak and began to move toward decline.

SECOND PHASE OF CUTOVER FARMING, CIRCA 1905-CIRCA 1930

The second phase of cutover farming lasted from circa 1900 through the 1920s as the region's primary land use shifted from logging to agriculture. The phase ended around 1930, which was also the end of the logging boom in northeastern Minnesota. As lumber camp jobs disappeared, some former woodsmen became farmers so they could remain living in the area. Timber companies abandoned logged property, leaving thousands of acres available for new uses.

During this period the number of farms in 16 cutover counties grew from 9,300 in 1900, to 16,500 in 1910, and then to 25,800 in 1920. Southerly cutover counties such as Aitkin, Carlton, Crow Wing, Kanebec, Mille Lacs, and Pine were developed first, followed by those near Lake Superior including Cook, Lake, and St. Louis (Pond and Crickman 1933: 19).

During much of this phase of cutover farming, agriculture nationwide was in a period of relative prosperity which encouraged new would-be farmers to look for opportunities. Productivity was high and commodity prices and farm incomes were strong. Most of the best land in the state had been developed, however. Farmers in prairie areas could find little land to buy or rent and were instead draining wetlands to increase acreage. Some farmers were pushing west into the Dakotas where land was still available. Others were looking at the cutover's abundant, inexpensive acreage. Cutover farms were also established by industrial workers trying to escape from the high cost of living in urban areas (Pond and Crickman 1933: 19; Robinson 1915: 208). A 1924 Extension

bulletin noted that, because land was cheap, those who might "otherwise be renters or laborers through life" could become the owners of small farms in the cutover (Thompson and Schwantes 1924).

Prospective settlers were actively recruited by timber companies trying to dispense of logged-over land, and railroads trying to sell their excess acreage and increase traffic along their lines. Both timber and rail companies often worked through land developers or real estate agents. In many cases the sellers were unscrupulous, exaggerating the assets of the area, selling land not fit for farming, and enticing would-be farmers who had little experience and even less capital (Committee 1934: 58-59; Alanen 2000: 2.15; Henning et al 1999: 8-15).

Corporate interests often allied with churches or other organizations to find groups of prospective settlers. In Mille Lacs County, for example, the Foley-Bean Lumber Company worked through its agent, the Johnston Land Company, to collaborate with a Dutch Catholic monastic order called the Crosier Fathers. The partners formed the Minnesota Catholic Colonization Society and in 1909-1911 successfully recruited Catholic families from Holland to immigrate to land near Onamia. Similar arrangements occurred throughout the cutover. (For more information on colonization and the immigrant farmers who settled the cutover, see Henning et al 1999.)

Government agencies also recruited immigrants, veterans, and other settlers to the cutover, spurred in part by the goal of improve statewide agricultural productivity by increasing total farm acreage. Government also worked to reduce the challenges of cutover farming. The Minnesota Agricultural Experiment Station, the University of Minnesota's Department of Agricultural Engineering, and the Federal-State Cooperative Extension Service (also called the Minnesota Extension Service) all operated programs in the cutover.

The number of farms in the cutover peaked in 1925 when there were about 32,700 farms in 16 counties. After that point, farm depression in the 1920s began to erode some of the gains of the previous decades. By 1930 the number of cutover farms had dropped to 29,500 (Schantz-Hansen 1934: 5-6; Committee 1934: 10-11).

A State of Minnesota report from 1934 described events of the period:

> [There] was the attempt by the state, the lumber companies, the railroads, and various land speculators to induce settlers to take up the cut-over lands and turn them into farms. Extensive advertising and sales campaigns were conducted, but there was no serious or systematic effort to classify the lands and to get settlers only upon the most suitable tracts. Public encouragement was given to drainage and land-clearing projects and to the building of roads and schools throughout the region. For a time the drive for settlers was fairly successful. High war-time prices for farm products, and for the [utility] poles and [railroad] ties that could be cut upon much of the land, helped to maintain the movement until about 1920 or a little later (Committee 1934: 10-11).

Between 1900 and 1930 University experts and others studied the difficulties of cutover farming, assisted with programs to construct drainage ditches and build roads, distributed seed and purebred breeding stock, and helped establish demonstration farms. Experts wrote technical bulletins to predict costs and potential income; describe methods, labor requirements, and marketing; and help farmers choose crops, livestock, and buildings. A 1922 Extension bulletin, for example, was aimed

at cutover farms of 40 acres or less and based much of its advice on the experiences of 395 farmers in Beltrami and Itasca counties (Cavert 1922). One bulletin recommended, "A large family is frequently the best asset a settler possesses" and "The first buildings should be small but serviceable" (Worsham 1920: 16-18). Another recommended, "Sheep are better than cattle for subduing brush," but cautioned that the sheep should be enclosed near the house each night because the woods harbored dogs and wolves (Cavert 1920: 115). It was recommended that all farms raise dairy cows and feed the skim milk to calves and a few pigs. Octagonal silos of rough-sawn native timber, built with cribbed construction, were advised (Smith 1923). Because the farms were small, the ratio of building costs to the number of tillable acres was higher than elsewhere in the state. Experts suggested that building small structures and sharing or renting machinery could minimize costs. Cutover farmers were advised to farm with horses, which were more cost-effective than tractors for very small farms, and to keep the horses for longer periods in the pasture (rather than in the barn) to reduce the need to cut and store hay (Cavert and Pond 1931).

County extension agents and others also taught land clearing methods, especially ways to remove trees, stumps, and large rocks. After World War I, county extension agents and others distributed large quantities of surplus explosives made available by the military for land clearing (McNelly 1960: 92; Nass 1989: 130).

Off-farm Work. According to St. Croix Valley historians Eileen McMahon and Theodore Karamanski, "It was rare for a cutover farmer, American born or immigrant, not to resort to work as a lumberjack at some point in the process of establishing a homestead" (McMahon and Karamanski 2002: chpt. 2). Many cutover farmers augmented their income by working in iron mines or for timber companies or by selling forest products from their farm. Many catered to tourists as hunting or fishing guides, by selling roadside produce, or by building small rental cabins or resorts on their farm property. According to a 1920 study, cutover farmers were moonlighting as road workers, harvest hands, loggers, blacksmiths, section hands, miners, carpenters, bricklayers, assessors, postmasters, butter makers, lumber camp cooks, school bus drivers, barbers, saw mill operators, janitors, and paper mill workers (Worsham 1920: 24). One pitfall of having a second job, some experts explained, was that it delayed land clearing and kept farmers from giving their crops and livestock sufficient attention.

Meadowlands Settlement and Demonstration Farm. One of the period's most well-known settlement colonies was Meadowlands, located in St. Louis County on railroad-owned land about 40 miles northwest of Duluth. It was started in 1909 by the Duluth and Iron Range Railroad (D&IR) to convince settlers to buy D&IR land and establish farms. As part of the work, in 1909 the railroad's land office joined forces with the University of Minnesota's Northeast Experiment Station in Grand Rapids to develop a 280-acre demonstration farm at Meadowlands. The project had two goals: to experiment with cutover farming methods and to assist cutover settlers "by furnishing them with purebred seed, stock, and poultry, and by keeping them in touch with the farm's operations that they may avoid serious mistakes in handling their farms" (Dickinson 1913: 198).

Within a few years, the duties of the D&IR land staff at Meadowlands had "broadened to include all sorts of work with the settlers, until now we are operating almost as a regular colonization organization," according to staff member Wallace Ashby writing in 1924. The railroad carved 40-acre farms from the woods in advance of settlement, built roads and drainage structures, provided loans, distributed explosives, advised on crops, etc. When settlers arrived, the company

furnished each family with "a movable bunk house that they can live in until their house is built" (Ashby 1924: 27-29).

Meadowlands organizers provided settlers with building plans for houses and outbuildings. Ashby described one house design as being a three-room, 20' x 24' structure "built of shiplap covered with heavy composition roofing on sides and roof." Materials for the house cost about $450 (about $4,800 in 2003 dollars). For barns, Ashby explained, "We recommend a shed type of barn 18 feet wide and as long as may be needed, to which a hay barn is added later on. It is important to keep building costs as low as possible because the average settler is not a rich man" (Ashby 1924: 27-29). The nearby town of Meadowlands, established in 1907, had stores, banks, and, by 1940, a cheese factory (Alanen 2000: 2.15-2.38).

Additional demonstration farms in the cutover were created by land developers and others interested in promoting settlement. Among the model farms were those located in St. Louis, Beltrami, and Itasca counties (Henning et al 1999: 11-13).

Veterans' Settlements. In 1918, a policy of encouraging farming in the cutover was suggested as a method of easing the country back into peacetime status after the upheaval of World War I. It was suggested that millions of returning soldiers and laid-off urban industrial workers would need peacetime employment and could become cutover farmers. One proponent wrote in 1918, "The vacant lands of the United States must and will be developed. There has never been a better opportunity for bringing about this development than by giving the returning soldier and the industrial worker who is out of a job at the end of the war the chance to acquire land. The more people we can place on the land in the next two years, the better off this country will be" (Wallace 1918: 213-214). Minnesota and five other states formed individual Committees on Land Settlement for Returning Soldiers and Industrial Workers, and participated in federal-state partnerships to provide farm training and settlement programs for veterans in the 1920s (Reid 1965: 241-242).

Part of this effort was aimed at disabled veterans. According to historian Bill Reid, agricultural rehabilitation of wounded veterans occurred in all parts of the country, but District 10 – encompassing Minnesota, North and South Dakota, and Montana – "had by far the largest number of farm trainees," with Minnesota leading the group (Reid 1965: 243). In 1922 colonies of wounded veterans were established in Aitkin, Mille Lacs, and Carlton counties in the cutover and in one location south of Minneapolis. The veterans were settled on small farms, given some equipment and training, and extended credit so they could make payments on their land over many years. Overall the program was a disaster. By 1930 the rigors of cutover farming, the veterans' poor health, and a widespread lack of farming experience, cash flow, and technical support contributed to financial failure and abandonment of the farms (Reid 1965: 243-250).

THE THIRD PHASE OF CUTOVER FARMING, THE 1930s

Another phase of cutover farming occurred during the Depression of the 1930s. It was encouraged by large-scale government programs and by the movement of unemployed Minnesotans to cheap land to escape urban poverty. It happened during a period of overall stress in the farm economy.

During the 1930s the population of the cutover region was dwindling as timber plants continued to close. Farming was proving to be marginal at best, and farmers were staggering under increasing tax burdens. During the 1910s and 1920s the settlers had lobbied for roads, schools, and

large-scale drainage projects – all financed with local property taxes. As the bills for this public infrastructure came due, however, the tax base was shrinking as logging companies closed local operations, abandoned their cutover land, and refused to pay their property taxes.

A State of Minnesota report from 1934 explained:

> Agriculture, recreational industries, and small-scale lumbering operations, the principal sources of income, proved to be quite inadequate to support the burden of local taxation. Much property fell into tax delinquency [in the 1920s]. As logging companies, settlers, and other property owners stopped paying taxes, the burden that was placed upon those who continued to pay steadily increased. . . . More and more of the non-delinquent lands were sucked into the vortex and forced into delinquency. At the present time taxes are paid on less than half the land in the 16 cutover counties (Committee 1934: 58-59).

A "back to the land" movement that had emerged during earlier decades continued during the Depression as city dwellers who had lost their jobs moved onto self-sufficient farms in the cutover. The farms were very small, however, and their operators often inexperienced. In 1940 the University reported that on most of these farms people lived "on a subsistence basis with a very low standard of living" (Engene and Pond 1940: 68). By one estimate a farm needed at least 40 acres of improved land to support a family. But according to the 1935 census, farms in cutover counties averaged less than 36 cleared acres per farm. In some counties, the average was as low as 16.5 improved acres (Schwantes and Thompson 1940).

University staff and other experts assisted cutover farmers as they could, suggesting operational strategies to help farms survive. In 1931, for example, Cavert wrote:

> . . . 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. . . . In general, one should be very cautious about borrowing money with which to construct new buildings. . . . 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. . . . 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 [cash] to recover anything beyond a very modest investment in buildings (Cavert 1931: 13).

By the early 1930s it was increasingly clear that agriculture had a dim future in the cutover and that many farmers were in serious trouble. A group of Finnish farms near the town of Finland on the North Shore of Lake Superior, for example, was in high tax delinquency in 1932 with taxes overdue on 62 percent of the land. Between 1905 and 1934, many of the 48 farms in the Finland area ceased active cultivation, 8 were abandoned entirely, and most residents lived in poverty and isolation. One University of Minnesota observer noted, "The poverty of existence in the Finland Community is evident even in . . . the cemetery on the Little Marais Road. Its unkempt condition suggests that life is much too hard to give much thought or time to the dead" (Davis 1935: 393).

In 1932, Governor Floyd B. Olson convened a state Committee on Land Utilization to study the problems of the cutover and recommend solutions. The Committee concluded that agriculture in the cutover was generally a failed experiment, and suggested that farming was viable in only a few small portions of the region. The Committee recommended that further settlement efforts avoid placing settlers on poor land and "that conditions be made as favorable as possible to the success of the enterprise" (Committee 1934: 110).

Settlement and Resettlement Projects. During the New Deal of the 1930s, the Roosevelt administration worked to alleviate the poverty faced by the nation's cutover farmers. To discourage further settlement in submarginal areas, for example, in 1934 the government withdrew many cutover parcels from the pool of land available to potential homesteaders. Federal programs also converted submarginal farmland to other uses such as parks and wildlife preserves, moved farmers from failing farms to better land, and settled the urban poor onto small cutover farms (Murchie and Wasson 1937: 6).

Minnesota's Beltrami Island Project, a program that began in 1934, was created by the New Deal's Agricultural Adjustment Administration (AAA). Located south of Lake of the Woods, the Beltrami Island project was designed to serve as a model for similar AAA work in other cutover states. It was also the first submarginal resettlement project of its type nationwide to actually move settlers. From 1934-1936, about 1,000 people living on 300 farms in Lake of the Woods and Roseau counties were physically moved to better farmland nearby. In many cases, houses, barns and other outbuildings were literally moved along with the families. Some participants worked with project officials to design and build new farm structures. Schools and houses for retirees were also built, and settlers were given loans and technical assistance (Murchie and Wasson 1937: 4; Henning et al 1999: 33).

Another New Deal program settled poor families from cities onto farms in rural and suburban areas. Nationwide, the program operated at about 100 sites. Two were located in Minnesota – one near Hermantown (close to Duluth) and the other near Austin in southern Minnesota. The Hermantown project, also known as the Jackson Project, was launched by the federal Division of Subsistence Homesteads and, in 1935, was assumed by the newly-established federal Resettlement Administration. It sought to place settlers on subsistence farms located close enough to the city of Duluth so that participants could work at seasonal or part-time jobs while they farmed. (Placing settlers on the edges of cities was one of the national program's strategies.) Land clearing and well-digging at Hermantown began in 1935, and in 1936 the first settlers moved onto small plots of land. By 1938 about 84 homesteads were occupied. The government-built houses had electricity and indoor plumbing. About half of the homesteads also had a government-built barn. The community formed a homestead association and organized cooperative projects and social activities. Many families succeeded in moving out of poverty and, decades later in 1976, 22 of the original settlers were still living in their homes. The Duluth project was "among the most enduring and successful" of the New Deal experiments of its type nationwide (Garvey 1978: 2-16; Henning et al 1999: 29-33).

CUTOVER FARM CHARACTERISTICS

In 1939 farms in the cutover averaged 103 acres – considerably smaller than the 1939 state average of 165 acres. Acreage actually cleared was even smaller, with cutover farms averaging less than 36 cleared acres in 1935. Most fields were small, irregularly shaped, and surrounded by woods

and bogs. Rocky and forested areas were often used as permanent pasture (Engene and Pond 1944: 24; Schwantes and Thompson 1940).

Around 1930, more than half of all tillable land was used solely for hay and forage crops, a situation unique to the cutover. While this cropping system supported dairy cows, it meant that concentrated feed like corn and small grains had to be imported if hogs or other livestock were raised. In 1930 the principal crops were oats (the state's leading small grain crop at the time), barley, some corn, and potatoes. In 1929 the proportion of tillable land devoted to potatoes was third-highest in the state (Engene and Pond 1940: 65-66).

In 1930 only 14 percent of cutover farmers raised pigs. Eighty percent of cutover farmers milked cows (an average of five cows per farm) and some also raised sheep. In 1939, chicken flocks averaged 43 chickens per farm, which was the smallest average flock size in the state (Engene and Pond 1944: 18, 65, 67).

In 1935 the University of Minnesota's Darrell H. Davis described farmsteads and buildings near Finland on the North Shore where farmers were producing small amounts of oats, potatoes, barley, wild hay, and cream. Davis wrote, "Occupied farms and clearings are concentrated on or near the main roads, particularly the east-west highway. Of clearings more than a quarter of a mile off such roads, nearly half are now abandoned" (Davis 1935: 389). He also wrote:

> Some of the houses are of frame construction, but many are of logs, squared on four sides, with corners dovetailed and without projections. Barns and other outbuildings are also frequently of logs. Houses are without basements, storage being provided by root cellars. Although stone is abundant, it has not up to very recently been used in building construction, not even for chimneys. There is a multiplicity of sheds and other outbuildings, including the ubiquitous Finnish bathhouse, all widely separated [to prevent the spread of fire]. In peripheral portions of the community, where Scandinavian elements of the population predominate, the characteristic buildings of the Finnish farmsteads disappear, to be replaced by frame buildings or log houses of more conventional construction (Davis 1935: 390-391).

Davis noted, "Barns and other outbuildings are also frequently of logs" and "The ever present fire hazard is suggested by the ladders often attached to the roofs of the farmhouses and barns as an aid in fire fighting" (Davis 1935: 385). He also reported, "Modern conveniences are few. There are no telephones except in the stores; there are few lighting systems; and labor-saving household devices are also lacking to a large extent. . . . On the upland farms, and even on others, [the] shallow wells go dry during prolonged droughts" (Davis 1935: 391).

A 1999 study of cutover farming by Henning, Henning, and Roberts described the cutover's modest farmhouses, usually built of logs or boards sawn locally. Farmers also saved costs by using inexpensive sheathing materials like tarpaper and rolled asphalt roofing. Both the Henning group and landscape historian Arnold Alanen (who wrote a 2000 study) described the cutover's ethnically-influenced farm buildings. Both sources indicated that dairy barns on cutover farms tended to be smaller than those in other parts of the state. Henning reported that – among ancillary structures such as privies, icehouses, and granaries – "the root cellar was by far the most common in the cutover region" (Henning et al 1999: 54; Alanen 2000).

CHARACTERISTICS OF FARMS FROM DEVELOPING THE CUTOVER, 1900-1940

- new farms
- farms with stony, thin soil
- farms with small number of cleared acres
- small irregularly-shaped fields surrounded by woods and wetlands
- subsistence-level farms of 40 acres or less
- farms with lots of fencing
- drainage structures
- pastures
- small buildings
- general purpose barns or combination with mows
- small hog barns
- potato warehouses
- hay sheds
- poultry houses
- small implement sheds
- low-cost silos such as crib silos or half-buried silos
- sugarhouses
- on-farm sawmills
- on-farm rental or resort cabins
- structures widely-spaced to avoid spreading fire
- structures displaying ethnic influences
- buildings sided with tarpaper or asphalt roofing
- structures built of home-cut logs or boards
- plank and balloon frames
- gambrel, gothic arch, and rounded arch roofs
- farms supplementing horse power with gasoline engines
- model or demonstration farms
- farms associated with colonization or resettlement
- farms associated with the "back to the land" movement
- designs influenced by science, engineering, management principles
- designs influenced by materials manufacturers, agricultural engineers
- designs influenced by technical bulletins

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This long, one-story hay barn was apparently located near Aitkin in Crow Wing County. Judging by the size of the barn and the number of workers and horse-drawn hay wagons loading it, this was likely a farm operated by a timber company to supply logging camps with feed for draft horses and perhaps food for workers. The barn had plank siding and corrugated metal roofing. The hay was being moved in bundles, with no hay-moving equipment evident. Probably located near Aitkin, circa 1915. (MHS photo by *Aitkin Independent Age*)

A log barn on the Juneau Farm near Rollins, St. Louis County, circa 1900. (MHS photo)

This barn in a cutover region is faced with vertical boards that were probably cut on or near the farm. (The shed-roof addition is faced with shiplap, likely purchased.) At right, the three girls are sitting on a large stack of thick, newly-cut boards. Morrison County, circa 1900. (MHS photo by Brooks)

A farmhouse and outbuilding covered with tar paper, a common sheathing material that was inexpensive and readily available. The paper easily came loose with conventional nails, so it was secured with wide-headed tacks or strips of lath. It lasted longer in wooded areas where the trees offered some protection from the wind. Asphalt roofing material, available in shingles or rolls, was a more durable alternative. Cass County, circa 1910. (MHS photo)

PERIOD 6: DEVELOPMENT OF LIVESTOCK INDUSTRIES, 1900-1940

During the 40-year period from 1900-1940, livestock farming moved from mostly a small-scale enterprise to become a rising star in the state's farm economy. Among the contributing factors were the creation of the South St. Paul Stockyards and the Minnesota meatpacking industry, increased food demand from rising urban populations, the introduction of new feed crops such as Grimm alfalfa, hybrid corn, and soybeans, and other technological advances like truck refrigeration. The patterns of this period formed the basis for the tremendous growth in livestock farming that occurred several years later in the post-World War II era.

Milestones of this Period

1886 – St. Paul Union Stockyards established in South St. Paul
1887 – Fowler Brothers of Chicago built First Minnesota Provision and Packing Co. in South St. Paul
1897 – Swift and Co. opened in South St. Paul
1906 – Congress passed Meat Inspection Act
1908 – Minnesota's first livestock shipping association formed in Litchfield
1915 – Minnesota ranked fifth nationwide in beef cattle
1919 – Armour and Co. built in South St. Paul
1920 – Hormel and Co. in Austin emerged as the state's leading meatpacker
1921 – Central Cooperative Commission Association founded in South St. Paul
1925 – Chicago's Cudahy bought Farmers Terminal Packing Co. in South St. Paul
1931 – University of Minnesota released its first corn hybrids
1932 – Poultry raising doubled in Minnesota between about 1932 and 1948
1935 – F. M. Jones of Minneapolis created the world's first mechanical refrigeration system for trucks
1940s – Meatpacking became Minnesota's largest employer
1949 – Soybeans were Minnesota's third-largest cash crop, rising from only a few acres in 1930

LIVESTOCK PRODUCTION BEFORE 1900

During the early settlement period, most farm animals were raised for home consumption. Extra livestock that was sold was usually marketed locally: eggs and butter were sold or exchanged at a neighborhood store, and cattle and hogs were sold to the local butcher. In the 1860s and 1870s, a few wealthy farmers began raising sheep and hogs on a larger scale, as well as raising and breeding cattle. Most of these stockmen made use of open grazing land and abundant wild hay – both low-cost resources that diminished as new settlers established farms across the state. From this beginning, livestock gradually increased but still remained a comparatively small part of Minnesota's farm economy through most of the period.

See also

Farms
Beef Barns
Hog Barns and Hog Cots
Sheep Barns
Appendix: Focus on Minn Livestock
Appendix: Focus on Biotech and Agrichem

Beef Cattle. Cattlemen formed a Minnesota stockbreeders' association in 1877. Beef cattle numbers rose from about 1,400 in 1850 to about 383,000 in 1880. The most common breed in those years was the Shorthorn, also called the Durham. Raising cattle on local grasslands and wild hay was inexpensive but, as a University bulletin explained, "With the rapid increase in settlement of the prairies during the late eighties and the nineties . . . the possibilities of raising cattle on cheap prairie grass . . . came to an end in Minnesota" (Crickman et al 1934: 6-7). Feeding grain to cattle was rare, and it took three or four years to raise a market-weight steer.

During the early period some Minnesota cattle were exported to Chicago and Eastern cities. According to historian Jerome Tweton, "Large-scale cattle raisers might drive a herd to St. Paul or other railroad centers for shipment to Chicago's Union Stockyards, the terminal market that served the major packinghouses" (Tweton 1989: 275-276).

Hogs. Pig numbers rose from 734 in 1850 to about 381,000 in 1880. Popular swine breeds at the turn of the century included Chester White and Berkshire. Some slaughtered hogs were shipped, frozen, to Chicago in the winter.

Sheep. Sheep numbers spiked in Minnesota in the 1860s. This early interest was encouraged by strong demand for wool during the Civil War, a time when the Union army needed woolen uniforms, and when Southern cotton was in short supply. From a mere 80 sheep in all of Minnesota Territory in 1850, numbers jumped to 193,000 in 1866, but then declined after the war. The sheep population rose slowly again in the 1870s, reaching 268,000 in 1880. Popular breeds included Leicester, Southdown, Sussex, Silesian, Saxon, and Merino. Minnesota wool was marketed in New York and Boston.

Poultry and Eggs. Poultry numbers rose from a few thousand in the 1840s to 2.26 million in 1880. Poultry was raised on nearly all Minnesota farms. Popular breeds were Brahmas and White and Spanish Leghorns. The Minnesota State Poultry Association was organized in 1874 (Crickman et al 1934: 6-9; Jarchow 1949; Tweton 1989: 271).

EARLY 20TH CENTURY DEVELOPMENT

Livestock raising in Minnesota increased considerably in the early 20th century and hogs, beef cattle, sheep, poultry, eggs, milk, and butter became major farm products. Farm diversification was a leading reason for the increase: in an effort to vary their sources of income, farmers began raising a broader range of crops such as corn, oats, and alfalfa (in addition to wheat) and adding livestock to their farms which could be fed the homegrown crops. (The new livestock were often called "feeder-" lambs, pigs, or calves since they were bought young, fed (or "fattened"), and then sold at market weight for slaughter.) The creation of major marketing outlets for livestock, and innovations like the refrigerated railcar (invented in the 1890s) encouraged this production.

Minnesotans began growing better feed crops after 1900. One of the first was Grimm alfalfa, the first alfalfa that was hardy in Minnesota. It was widely grown throughout the state beginning around 1910, and by 1930 more than 1 million acres were planted. Concentrate feed crops – especially corn and soybeans – also became important. Minnesota's corn crop was at first limited to the southern edge of the state where summers were longest, but when improved hybrids were

introduced beginning in 1926, corn culture spread northward. Soybeans were almost unheard-of in Minnesota before 1930, but by 1949 were Minnesota's third-largest cash crop.

As the livestock industry grew, production became concentrated in distinct regions of the state. Southwestern Minnesota, which had the highest yields of corn and soybeans, became a chief area for cattle and hogs. Southeastern Minnesota also developed strong beef cattle and hog industries, as well as dairy, egg, and poultry operations. Central Minnesota north of the Minnesota River became a strong turkey-growing region. The prairie region of central and west central Minnesota developed diverse livestock enterprises including dairy, poultry, eggs, and hogs (Blegen 1975: 565-568).

The Red River Valley also saw increased livestock as farmers sought to diversify from wheat. Historian Howard Dickman explained:

> The [Great Northern] railroad also promoted the feeder lamb, sheep, and cattle business in the Red River Valley counties of Minnesota and North Dakota. The feeder business was a dividend of the increased planting of alfalfa and sweet clover, and of sugar beets (lambs feed off the waste by-product beet tops). Very little feeding or finishing was done in these two states prior to the 1920s. Around 1925 or 1926 railroad agricultural development agents achieved success in arranging for large livestock dealers in Montana to park their stock with farmers in northern Minnesota and North Dakota in transit on the way to the terminal markets, for feeding and finishing. The numbers of sheep and cattle on feed grew very large after 1929, and even the drouth of the 1930s did not demolish this business (Dickman 1977: 225).

Scientific research, changing technology, and new methods of animal husbandry also encouraged the state's livestock industry. Silos, for example, provided a way to preserve corn fodder for winter feeding. Around World War I, the fight against hog cholera made great strides, allowing farmers to expand their swine herds with less risk of being wiped out by disease. Bovine tuberculosis eventually came under control, as did troublesome poultry diseases. Livestock breeders introduced superior stock that gained weight faster and were more fertile. Improved housing for beef, hogs, and poultry boosted efficiency. Mechanization, improved feeding rations, and sophisticated record keeping also spurred productivity (Cochrane 1993: 109, 128-129, 158).

Rising U.S. population and changes in food consumption were also factors in livestock development. Between 1900 and 1950, Minnesota's population rose from 1.8 million to 3.2 million, creating a growing, urban market for food. Consumer preferences also changed: in the 1920s, for example, Hormel Company, a Minnesota pork processor, introduced canned ham which, explains Tweton, "took the market by storm" and spurred pork sales. By 1940 the company's revolutionary canned ham called "Spam" was being consumed by 70 percent of the urban American public (Tweton 1989: 277).

Beef Cattle. In the early 20th century, the market for younger, grain-fattened yearling or baby-beef steers increased, allowing Minnesota farmers to market their cattle after one year instead of three. This change brought about "the establishment of an increasing number of small herds on medium-sized farms," according to University experts (Crickman et al 1934: 8-9). Dual-purpose cattle, raised for both milk and meat, dwindled in number as producers focused instead on beef

breeds. Cattle were fed pasturage, high quality fodder such as alfalfa, roughage such as cornstalks, and grain, including corn (Crickman et al 1934: 8-9).

By 1915, Minnesota ranked fifth nationwide in the number of beef cattle. In 1940 beef cattle were being raised in nearly every county, although production was concentrated in the southwest, the southeast, and in west central Minnesota and the Red River Valley (Crickman et al 1934: 9). Some farmers raised cattle from calves to market weight, but others specialized in one of four specific beef cattle operations:

- Cow-calf farms raised large crops of calves that were sold to other farmers who fattened them to market weight.
- Pasture feeding operations fed cattle on range or pasture. As land values increased, pasture operations became less common in Minnesota.
- Feedlot operations, which fed cattle in confinement, were common in the Corn Belt counties of southern Minnesota. Often cattle were first raised on pasture, then hauled to feedlots for a final few months of grain feeding, which produced the marbled meat that consumers wanted.
- Breeding stock production. The farms raised specialized breeds for herd improvement. The most common Minnesota cattle breeds were Angus (black), Hereford (red and white), and Polled Hereford (without horns).

Specialization in beef production continued to increase after 1940 (Blegen 1975: 395-396; Britton 1983: 18-20; Tweton 1989: 270-271).

Hogs. Minnesota hog production developed even faster than beef. Between 1880 and 1900, pig numbers rose almost 400 percent to 1.4 million. At first most hogs were raised on dairy farms where they were fed the skim milk. After 1900, however, hog production was linked with increasing corn yields, and southern Minnesota farmers began to raise more hogs than those in any other part of the state. The experience of Fillmore County demonstrates the trend: "Fillmore County, which for many years had led Minnesota in wheat, became the leading corn county. . . . Used almost entirely as hog feed, corn soared from 14.8 million bushels produced in 1880 to 67.9 in 1910" (Tweton 1989: 271).

With hybrid improvements in the 1930s and the 1960s, corn production moved northward as did hog raising. By the 1980s, Minnesota swine numbers reached 5 million, and the state ranked third nationally in hog production.

Like beef cattle producers, hog farmers made rapid gains in productivity thanks in part to improved technology. Litter sizes increased, more hogs survived the piglet stage, and feeder pigs gained weight faster as farmers employed selective breeding, better housing including portable cots (small, movable houses for a sow and litter), sophisticated feed mixes, and improved veterinary techniques.

Sheep. In 1910, Minnesota farmers raised about 600,000 sheep and produced 3 million pounds of wool. Beginning about 1925, feeder lambs became important in the Red River Valley, where they were fed the tops of sugar beets, a new crop in the area. In the 1930s South St. Paul was the country's seventh-largest sheep marketing center, with Denver and Chicago ranking first and second (Anderson 1943: 511-514).

After World War II, sheep, lambs, and wool declined in importance in Minnesota. Falling lamb consumption and competition from western growers (who had the advantage of low-cost grasslands) pushed Minnesota sheep numbers down to 275,000 by the 1980s. Production shifted from northern to southwestern Minnesota, although small flocks could be found throughout the state (Tweton 1989: 272).

Poultry and Eggs. Between 1900 and the 1940s, poultry raising remained widely distributed across Minnesota. Nearly all farms raised poultry on a small scale and some larger egg producers were concentrated around the Twin Cities. Eggs were the most salable product; the market for poultry meat remained limited by traditional consumption patterns, with many Americans eating chicken only on Sunday and turkey only at Thanksgiving (Tweton 1989: 277).

Poultry raising fit well into diversified family farm operations, and poultry raising increased steadily during the first decades of the 20th century. The University of Minnesota reported that between the early 1930s and 1948 there was "a virtual doubling of egg production per [Minnesota] farm" due to increased flock size and improvements in breeding and technology. Compared to other types of livestock, egg production gained faster than either hog production or the production of butterfat during the years those years (Hady and Nodland 1951: 3).

LIVESTOCK MARKETING

In 1935 Minneapolis engineer Frederick M. Jones developed the world's first refrigeration unit for a truck, an invention that revolutionized the transport of meat, poultry, and other farm products. In 1938 Jones and partner Joseph Numero formed the U.S. Thermo Control Company, later known as Thermo King. The company is still in existence.

By the 1940s, Midwestern farmers were using several methods to market livestock. Among them:

- shipping livestock to a central market where a commission company sold the animals on behalf of the farmer
- selling at smaller, usually seasonal, regional auction barns
- selling for slaughter on consignment
- selling directly to meatpackers
- selling in local markets to other farmers, local butchers, or local livestock buyers
- directly marketing meat to consumers (Anderson 1943: 53).

Terminal Markets and Meatpacking. The establishment of Minnesota stockyards and meatpacking plants created more demand for livestock, and the Twin Cities' importance as a railroad center helped it become one of the nation's leading livestock markets competing with Chicago, Omaha, and others. The centerpiece, the St. Paul Union Stockyards, opened in South St. Paul in 1886. Stockyard investors hoped to attract cattle and hogs from Minnesota and states farther west, and also lure the big Chicago meatpacking companies to town. The yards created a venue for commission sellers to meet livestock buyers, while the Stockyards supplied the infrastructure and services necessary to facilitate the exchange. The Stockyards were immediately successful, and by the 1940s, they were among the world's largest (Jeffrey 1989: 252).

The success of the South St. Paul Stockyards was directly tied to the development of meatpacking in the state. Within a year of the Stockyards' opening, Fowler Brothers of Chicago built a

meatpacking plant in South St. Paul, and in 1897 Swift and Company of Chicago built another. Armour and Company, also of Chicago, built a $14 million plant in 1919, and in 1925, another Chicago meat giant, Cudahy, arrived to take over the failed Farmers Terminal Packing Company.

Meanwhile, George A. Hormel and Company, which originated in 1887 as a small butcher shop in Austin, was building a successful meatpacking business, still in that city. By 1917, Hormel was slaughtering over 450,000 hogs per year and had opened distribution centers in Minneapolis, Duluth, Chicago, and other cities nationwide. Hormel's innovative pork products – including canned hams and the famous Spam – gained a national following (Tweton 1989: 276).

Meat processing grew faster than any other Minnesota manufacturing sector in the first two decades of the 20th century. In 1900, meatpacking was Minnesota's fourth-ranking industry by value of products, and by 1919, it ranked second, behind milling. After the decline of the flour industry in the 1940s, meatpacking became the state's largest employer (Jeffrey 1989: 225; Tweton 1989: 276).

After decades of success, volume at the St. Paul Union Stockyards declined in the 1960s. Meat processors began to buy livestock directly from feedlot farmers, and smaller, regional auction barns appeared. The Chicago giants closed their outmoded Twin Cities plants and left town. Other packers built smaller, highly automated plants in rural areas, closer to the supply of animals and to cheaper labor. But Minnesota's homegrown meatpacking giants, Hormel and Jennie-O Foods, a turkey processor established in 1949 in Willmar, invested heavily in advertising, new products, and distribution, becoming two of Minnesota's leading food companies (Jeffrey 1989: 224-225, 232; Tweton 1989: 275-278).

Cooperative Shipping and Marketing. The stockyards and meatpacking industries created strong demand for Minnesota cattle and hogs. Still, most small Minnesota farmers weren't in a position to sell their animals in South St. Paul – mainly because they didn't have enough animals to secure competitive railroad shipping rates to the terminal market. Consequently, "their main market remained the local buyer who dealt with them individually, leaving the sellers little bargaining power," explains Tweton (Tweton 1989: 276).

Like dairy farmers before them, livestock farmers formed cooperatives to gain market power. In 1908, farmers around Litchfield organized Minnesota's first cooperative livestock shipping association, and within a few years, nearly 600 similar associations were sending cattle, hogs, and sheep to the South St. Paul stockyards. Cooperative marketing associations were successful at allowing farmers to pool their animals and thereby reduce rail costs. The associations flourished in the 1910s and 1920s, and then started to decline in the 1930s, when gasoline trucks (which had no minimum car lots) began to replace railcars as the main method of shipment (Dowell and Warrington 1938; Tweton 1989: 276).

In a related marketing venture, Minnesota farmers in 1921 organized a cooperative livestock commission sales service, the Central Cooperative Commission Association, to increase farmers' bargaining power by handling large volumes of animals. Based in South St. Paul and now called the Central Livestock Association, the cooperative is still one of the nation's highest-volume livestock commission sellers (Tweton 1989: 276).

CHARACTERISTICS OF FARMS FROM DEVELOPMENT OF LIVESTOCK INDUSTRIES, 1900-1940

- farms mixing horse power with gasoline engines
- improved infrastructure (e.g., water systems, electricity generators)
- farms with lots of fencing
- improved farm layout
- drainage structures
- windbreaks, woodlots, and shelterbelts planted in prairie areas
- stockyards
- stock chutes, hog wallows, stock tanks
- pastures
- silos
- general purpose or combination barns
- barns with hay mows
- dairy barns
- barns with windows; structures oriented or sunlight and wind
- milk houses
- pole-framed beef barns
- bull barns
- hog barns with concrete floors and yards
- colonies of hog cots
- corncribs
- grain bins
- sheep barns
- automobile garages
- implement sheds
- farmhouse improvements
- structures of poured concrete, concrete block, cement staves, sheet steel, sheet iron
- buildings of dimensional lumber and other purchased materials
- plank and balloon frames
- automated equipment for feeding and barn cleaning
- gambrel, gothic arch, and rounded arch roofs
- pre-cut "kit" or mail-order buildings
- designs influenced by science, engineering, management principles
- designs influenced by materials manufacturers, agricultural engineers
- designs influenced by technical bulletins

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The diversification of Minnesota farms in the late 19th and early 20th centuries created the basis for later growth in livestock. Many farms raised pigs which were fed farm byproducts like skim milk, as well as some grain. Ear corn was stored in wooden corncribs like this one. They were generally filled and emptied with a shovel. Graff Farm near Marietta, circa 1910. (MHS photo by Carl Graff)

Feeder cattle. Dakota County, circa 1930. (MHS photo)

This pig barn had windows in the side walls and in the monitor to light two rows of stalls. The pigs ate at low, wooden troughs. The yard was surrounded by steel woven wire fencing (also called "hog wire" fencing). The brick structure with a stovepipe (at left edge) was probably a feed cooker. Farm possibly near Stillwater, 1940. (MHS photo by *Minneapolis Star Journal*)

A sheep farm. The wooden feeding structures, sometimes called "grain self-feeders," display a typical keystone shape. Location unknown, circa 1930. (MHS photo by Harry Darius Ayer)

PERIOD 7: DEPRESSION AND THE INTERWAR PERIOD, 1920-1940

An agricultural depression began in 1920 after two decades of farm prosperity. Then, in 1929, the Great Depression hit, bringing sharp drops in already-depressed agricultural exports and crop and livestock prices. Many government farm support programs that exist today originated as Depression-recovery efforts. Despite farmers' hardships, innovation and agricultural productivity continued.

Milestones of this Period

1920-21 – Sharp postwar recession
1922 – Capper-Volstead Act gave cooperatives legal standing
1923 – Minnesota Agricultural Experiment Station and several partners erected the nation's first experimental rural electrical line near Red Wing; this farm electrification project ran 1923-1928
1923 – Meeker County became first in state to test all cows for tuberculosis
1924 – Great Northern Railroad helped establish the Agriculture Credit Corporation to help offset a crisis in agricultural credit
1926 – Hybrid seed corn introduced commercially
1929 – University of Minnesota established a master's degree in Agricultural Engineering; PhD added in 1947
1929 – Stock market crashed
1930 – Minnesota had 23,342 farmhouses using electricity, ranking 29th among states
1930 – Congress authorized a 9'-deep Mississippi River channel with locks and dams
1930 – Statewide dairy testing and record keeping service established; housed at the University
1932 – Low pressure pneumatic tires introduced
1932 – Farm prices and income reached Depression low point
1932-33 – Farmers' Holiday movement fought farm mortgage foreclosures
1933 – First New Deal farm programs established in March; first Agricultural Adjustment Act passed
1935 – Number of Minnesota farms peaked in the mid-1930s
1935 – Rural Electrification Administration established; the first REA pole was erected in Minnesota the same year
1935 – Farm tenancy was 33%, up from 25% in 1920
1938 – Second Agricultural Adjustment Act passed
1940 – 35% of Minnesota's population lived on farms
1941 – 35% of U.S. farms had electricity compared to 10% in 1936

See also

Farms
Corncribs
Granaries, Elevators, Bins, Dryers
Erosion Control Structures
Shelterbelts
Appendix: Focus on Farm Electrification

AGRICULTURE IN THE 1920s

For much of America, the middle and late 1920s were years of prosperity, technological innovation, and business expansion. But for farmers, the "Roaring Twenties" were a time of economic hardship and financial setback (Blegen 1975: 480; Plank 2003: 6).

The farm depression that began in 1920 had been preceded by two decades of sustained economic growth in American agriculture. From 1897 to 1910, crop prices rose steadily, outpacing non-farm prices. These 13 years of prosperity were followed by "the parity era" – the period of 1910-1914, when farm prices reached their apogee compared to the cost of living. (Parity goals for later farm subsidy programs used this era as a benchmark level.) Farm prices were high and stable, trade terms were favorable, and per capita farm income rose.

The good times for farmers had continued through World War I. Worldwide demand for food shot up, triggering a sharp rise in farm prices in 1916. The government urged farmers to produce more food to supply soaring need. Historian Jerome Tweton explains, "To the slogans, 'Food Will Win the War' and 'Plow to the Fence for Defense,' farmers planted 30 million additional acres and took whatever measures were necessary to increase output" (Tweton 1988: 21). Foreign demand for American farm products stayed strong through 1919, fueled by the war and reconstruction. In 1918 and 1919, farm prices reached new heights, double the pre-war levels (Cochrane 1993: 100-111).

High commodity prices led to strong demand for good cropland. Farmers bid against each other for land, taking advantage of lenient, long-term credit offered by the Federal Land Banks, which had been established in 1916. Land prices rose 70 percent between 1913 and 1920 and, in the best farming areas, doubled. Farmers borrowed money to buy labor-saving machinery during the labor shortages caused by the war. In 1925, farmers were using roughly 40 percent more machinery than in 1910 (Cochrane 1993: 100-111; Minnesota Institute 1939: 26; Tweton 1988: 21).

In late 1918, World War I ended. As postwar relief efforts tapered off in the summer of 1920 and long-dormant European agriculture resumed, foreign demand for American farm goods slackened. Food exports fell by more than half, from a high of $4 billion in 1919 to $1.8 billion in 1922. In addition, according to one source, "The nations of the world entered a period of nationalistic policy in which self-sufficiency was the goal. Tariffs, quota restrictions and other forms of trade barriers were adopted both here and abroad to encourage home production and to stifle importation of competitive products" (Minnesota Institute 1939: 24). Consequently, American farmers lost much of their foreign market. Even at home, markets were soft as average Americans, used to wartime restrictions and seeking fashionably slim 1920s figures, were not buying grain, beef, eggs, poultry, and other foods at high levels. While demand decreased, production remained high. Tweton explains that farmers "could not adjust to the smaller market. Armed with new technology and scientific advances in breeding and seed development, farmers easily maintained or increased production" (Tweton 1988: 21-22).

The overproduction, unfavorable tariffs, and soft markets caused big crop surpluses, which drove down prices. In July 1920, for example, wheat sold in Minneapolis for $2.96 a bushel. A year and a half later, it was 92 cents. In the three years after the war, 1919-1922, wheat prices fell 57 percent, corn tumbled 52 percent, hog prices dropped 58 percent, beef cattle 43 percent, milk 36 percent, and chickens 22 percent. Although prices rebounded slightly between 1923 and 1930, they never approached the highs of 1918-1919 (Tweton 1981: 9; Tweton 1988: 22).

National farm income plunged. From almost $17 billion in 1919, it was less than $12 billion in 1929. In Minnesota, where the value of crops dropped more than one-third, farm income fell from $506 million in 1919 to $310 million in 1929, despite big increases in acreage under production (Tweton 1988: 22; Blegen 1975: 480-481).

Meanwhile, the prices that farmers had to pay for goods did not decline as much as crop prices. This severely eroded farmers' purchasing power. Few farmers could afford the comforts that city folk were getting in the 1920s like running water, indoor plumbing, lights, and electricity. In the Midwest, three-fourths of farm homes had no modern household equipment whatsoever during the 1920s (Nass 1989: 144-146; Jellison 1993: 39, 55). One observer wrote, "Through the decade from 1920 to 1930 farmers in general let their buildings go, making only minor repairs and hoping against hope that times would become better" (Ekblaw 1935: 268). Adding to farmers' burdens, rural property taxes nearly doubled during the decade.

Low income and skidding land values made it hard for farmers to repay their loans. Many Minnesotans mortgaged or remortgaged their farms and lost them to foreclosure. Banks that had overextended their farm loan portfolios during the prosperous war years went bust. Nearly 400 Minnesota banks closed in the 1920s, and Minnesota became "one of seven western grain states that suffered nearly half of all the bank failures in the United States from 1921 to 1929," according to historian Theodore Blegen (Blegen 1975: 481). To help alleviate the crisis, the Great Northern Railroad in 1924 set up the Agriculture Credit Corporation, which loaned money to farmers to buy foundation livestock such as dairy or dual-purpose cows and purebred bulls, or breeding ewes and purebred rams (Dickman 1977: 220; Tweton 1988: 22).

In spite of hard times, there were positive developments in Minnesota agriculture. Milk production increased and diversification continued, partly blunting the effects of the farm depression. Farm cooperatives won legal status in 1922 with the federal Capper-Volstead Act, cosponsored by Minnesota Congressman Andrew Volstead. As the Minnesota cooperative movement gained strength, farmers formed mutual associations to cooperatively purchase insurance, telephone service, farm supplies, and fuel. The Minnesota Farmers' Union entered the grain terminal and wholesale farm supply markets, doing business as the Farmers' Union Grain Terminal Association (GTA) and the Farmers' Union Central Exchange (Cenex), which became two of the country's leading cooperatives.

Technological advances continued. In 1924 International Harvester introduced the first lightweight gas-powered tractor, the Farmall. In 1929 one farm expert wrote of the gasoline tractor, "A one-man machine that takes the place of eight men and sixteen mules at plowing, ten men and twenty mules at cultivation, and cuts a harvest and threshing job from $5 to 50 cents an acre, creates nothing short of a revolution" (Doane 1929: 27). In 1932 low pressure pneumatic tires were introduced, soon proving to be a big improvement over plain steel tractor wheels. However, the adoption of tractors and other new implements was slowed by hard times and most farms still relied on draft animals. According to a 1929 University study, 100 percent of the Minnesota farms sampled were using work horses, 17 percent were using tractors, 10 percent were using trucks, and only 4 percent were using electricity (Cavert 1930).

Combine harvesters were first used in Minnesota in 1927, and by 1931, about 250 tractor-drawn combines had been sold in the state. Owners usually did custom work for other farmers to help offset the expense of the new equipment. In 1935, a smaller, lighter, one-man combine powered

by a smaller tractor became available. These "baby" combines cut a 5' to 8' swath, making them practical for average Minnesota farmers (Anderson 2002: 672, 686).

Transportation also improved. Heavy freight traffic on the Mississippi River had declined during previous decades, losing ground to railroads and thereby offering farmers no alternative to paying railroad freight rates. In 1930 the federal government began a ten-year, multi-state project to revive river shipping by building a consistent 9'-deep channel with 23 locks and dams between Red Wing and Alton, Illinois. Rural road building – also critical for getting farm crops to market – increased considerably in the 1920s and 1930s after the creation of the state trunk highway system in 1920 and a large infusion of state and federal money (Blegen 1975: 481-485).

The Minnesota Agricultural Experiment Station continued its research and outreach in the 1920s, helping to stimulate productivity gains. The federal-state Cooperative Extension Service, which had been created in 1914 and placed agents in every Minnesota county during World War I, brought the fruits of the research to farmers. In the 1920s, Minnesota county agents:

- encouraged farm diversification
- promoted new crops like alfalfa, soybeans, and hybrid corn which spurred growth of the state's livestock and dairy industries
- promoted efficient land clearing methods
- taught new methods to control devastating poultry and livestock diseases such as bovine tuberculosis and brucellosis
- helped organize cooperatives and farm bureaus
- advanced programs for women and farm youth

But in the late 1920s, as the farm depression continued, about one-third of Minnesota counties had to drop their extension agents because they could no longer afford to pay them. "During these years the counties that had dropped county agent work made little progress in organization or technical development," an extension historian wrote (McNelly 1960: 87-88).

AGRICULTURE IN THE 1930s

The economic depression that began for farmers in 1920 spread to the rest of the nation in October 1929, with the collapse of the stock market. A four-year plunge in industrial production followed, accompanied by crushing unemployment. Between 1929 and 1932, industrial production declined by 80 percent and the unemployment rate was nearly 25 percent (Cochrane 1993: 101, 120). Blegen wrote:

> Minnesota had experienced bank failures and acute agricultural distress in the 1920s, but these bore little comparison with the slump after 1929. The 'great depression' affected not banks and farmers alone, but the gamut of the economy of state and nation. The country was paying the price for the vast and swift expansion of its industry and agriculture, the spread of credit, the inflation of capital surpluses, the very efficiency of new machines. . . . Troubles were deepened by tariff policies that impinged upon America's foreign trade (Blegen 1975: 522).

U.S. agricultural exports dropped by two-thirds from 1929 to 1932. Farm prices fell even more sharply than they had after World War I – corn dropped from 80 cents to 32 cents, wheat from

$1.04 to 38 cents, beef cattle from $9.47 to $4.25, and eggs from 30 to 14 cents per dozen. Farm income dropped 60 percent between 1929 and 1932 (Tweton 1981: 9; Tweton 1988: 22-23).

In Minnesota, dairy farmers' income fell by three-fourths in 1931 alone. Farmers sold pigs for three cents a pound and milk for two cents a quart. Droughts and grasshopper plagues added to their miseries. Severe feed shortages forced many farmers to sell the livestock herds they had painstakingly built. By 1932, farm mortgage foreclosures were common in Minnesota. In 1933 – the depth of the Depression – 60 of every 1,000 farmers went bankrupt or lost their farms through foreclosures (Blegen 1975: 524-526; Tweton 1981: 9; Brinkman 1988: 21; Tweton 1988: 119).

Minnesota prices hit bottom in 1932. Between 1933 and 1937 they inched upward, but then slipped again in 1938 and 1939. Net farm income averaged just $454 a year from 1930 to 1934, and didn't climb to $1,000 a year until 1941.

Capital investments in new buildings and equipment were down during the Depression. Between 1930 to 1935, for example, there was significant negative investment in U.S. agriculture as depreciation of farm buildings and equipment exceeded new investments by over $300 million a year.

Although most farmers were in serious financial trouble during the Great Depression, some regions of the state suffered more than others. Farmers in the southern counties and the Red River Valley generally fared better than those in other parts of Minnesota. Faribault, Houston, Mower, Nicollet, Jackson, Scott, Wabasha, and Goodhue counties in southern Minnesota got enough moisture to grow crops and hay for the livestock. Many farms in this region – which was the first in the state to be settled – had low debt and were well diversified, producing hogs, poultry, cattle, dairy herds, corn, hay, and mixed grains. According to Tweton, "The southern Minnesota farmer had long ago abandoned his dependence upon one crop. . . . This diversification played an instrumental role in the economic condition of the area" (Tweton 1981: 13).

The Red River Valley, still largely dependent on wheat in the 1930s, was more distressed than southern Minnesota. Still, counties "north from Wilkin salvaged reasonable crops due to rainfalls which were less than normal but adequate," writes Tweton (Tweton 1981: 13). But counties south of Wilkin in west central Minnesota were ravaged by drought and grasshoppers, and hundreds of farmers in Big Stone, Stevens, Pope, and Swift counties were wiped out. In Big Stone, the hardest hit of Minnesota's counties, "60 percent of its residents struggled to survive on relief" (Tweton 1981: 13). Farmers in central Minnesota, including Stearns, Kandiyohi, and Meeker counties, did a little better because they were more diversified than those in west central Minnesota (Tweton 1981: 13).

As the Depression deepened, the Farm Holiday movement (one of a series of agrarian reform movements) gained strength in Minnesota. Minnesota farmers launched a 30-day strike in September 1932 to demand farm mortgage moratoriums, congressional action to lower the cost of farm credit, and a state guarantee of minimum prices for farm products. The Minnesota Legislature offered some relief in 1933 by passing a farm mortgage moratorium law. Minnesota's Farmer-Labor coalition of 1918-1944, considered to be the most successful third-party movement in U.S. history, succeeded in winning several major political offices including the governorship (Blegen 1975: 524-526; Tweton 1988: 31; Jellison 1993: 69).

Despite low commodity prices, farm incomes, and levels of capital investment, agricultural productivity increased in the 1930s, just as it had in the previous decade. Farmers continued to adopt new technology, increasing their total output by 11 percent in the 1930s. This came on the heels of a 15 percent increase in productivity in the 1920s (Cochrane 1993: 108-110, 137). The benefits of labor-saving machines were considerable and "The Great Depression seems not to have slowed down the innovation and adoption of new devices very much," observed historian John T. Schlebecker (Schlebecker 1975: 254). Tractors were a prime example. Tractor use quadrupled between 1920 and 1930 to nearly 1 million, or about one out of every six farms nationally. In Minnesota, 25 percent of farmers had a tractor by 1930 and by 1940, half did (Minnesota Institute 1939; Engene and Pond 1944: 28; Jellison 1993: 54; Cochrane 1993: 108-110, 137, 198).

Although thousands of farmers lost their farms every year during the 1930s, the number of farms did not decrease. Bankrupt farm families often remained on the land as renters, or other tenant families moved in. Farm tenancy in Minnesota increased from 25 percent in 1920 to 33 percent in 1935, in line with national trends (Minnesota Institute 1939: 23).

The number of U.S. farms held fairly steady during the Great Depression at about 6.5 million. The total number of Americans living on farms also remained even, averaging about 31 million for the decade. This happened despite a sharp decline in the number of man-hours employed in farming (Cochrane 1993: 122). Economist and historian Willard Cochrane explained that most farmers and their families,

> . . . did not leave the land, or at least did not leave the rural areas. They did not because they could not. Unemployment and lack of economic opportunities in urban areas kept them dammed up as underemployed farm labor in rural areas. What we had then in the 1930s was a large, redundant, or underemployed labor force in the farm sector which did not appear unemployed because the individuals involved shared the forced leisure and the low returns from farming with other members of the immediate families with which they lived. This is the way that farm people survived in the 1930s. A large but underemployed labor force in combination with limited capital . . . produced to the maximum year after year during the depression years, shared the meager returns in accordance with family modes of living, and waited for an economic miracle to happen (Cochrane 1993: 123-124).

In 1935 there were 928,487 Minnesotans living on farms. Minnesota farms were being operated by 317,401 family member-workers and 38,846 hired workers.

Minnesota farm population had risen about four percent between 1930 and 1935, with fewer young people leaving the farm in these years and an influx of unemployed city people moving to rural areas. There were also active resettlement efforts in the northeastern cutover regions. As a result of this migration, the number of Minnesota farms rose almost ten percent, from 185,000 in 1930 to 203,000 in 1935 – the all-time high. But about a quarter of the additional farms were less than 20 acres. Many were worked by former urban residents who had left the city for small subsistence-level farms after they became unemployed (Minnesota Institute 1939: 28, 30; Engene and Pond 1940).

GOVERNMENT FARM PROGRAMS OF THE 1930s

The long slump of the 1920s, the hardships of the early 1930s, and the drama of rural protests focused the nation's attention on the farm problem and the need to take remedial action. In 1929, the Hoover administration passed the Agricultural Marketing Act, which encouraged farmers to form national marketing cooperatives. A Federal Farm Board was established to bolster sagging prices by making crop loans. But the program was overwhelmed by the scope of the nationwide depression, and in 1931, after accumulating huge stocks of surplus commodities, it ran out of money (Tweton 1988: 114).

In 1932, Franklin D. Roosevelt was elected president, promising a "New Deal" for farmers and the American people. In June 1933, Congress passed the Agricultural Adjustment Act – one of the first pieces of New Deal legislation. The AAA tried to raise farm prices by reducing the supply of commodities. The program used "acreage allotments" to restrict the number of acres of cropland under cultivation. In return for voluntarily cutting their production, farmers received a "benefit check," which was funded by an excise tax on millers and meatpackers. Under the AAA, the government paid out more than one billion dollars to farmers in 1934 and 1935. But crop surpluses and low prices persisted, despite acreage controls and droughts in 1934 and 1936, because farmers steadily increased their yields with new seeds, fertilizers, and machinery (Cochrane 1993: 141; Minnesota Institute 1939: 17).

In 1936, the Supreme Court ruled the AAA unconstitutional because of its method of funding (the tax on millers and meatpackers) and the program abruptly ended. Congress immediately passed the Soil Conservation and Domestic Allotment Act, which paid farmers to reduce the acreage of soil-depleting crops and rebuild the land. But this approach did not work well to reduce total crops either. Surpluses increased in 1937-1938 and prices declined again. So Congress supplemented the soil conservation program with the Agricultural Adjustment Act of 1938, known as "the second AAA." This seminal legislation shaped all future farm policies, and forms the basis for farm support programs that continue today. The 1938 AAA continued acreage restrictions and added direct support payments to farmers, marketing controls, crop storage loans, and surplus disposal plans. All these schemes tried to limit the flow of farm products into the market in order to lift prices to "parity" levels, which were more in line with the prices farmers had to pay for goods. In 1938, 5.25 million farmers received AAA payments (Saloutos 1982: 265; Tweton 1981: 17-19; Tweton 1988: 121-124; Cochrane 1993: 142-144, 317).

One of the ways the 1938 AAA supported crop prices was through the "Ever-Normal Granary," which attempted to control the volume of commodities reaching commercial markets. Under this plan, the Commodity Credit Corporation made nonrecourse loans to farmers on their surplus crops at a level slightly below parity. This created a price floor. The crops under loan were to be stored on the farm, and sold later when market prices presumably would rise above parity. The farmer would then repay the government loan. If prices did not rise, the grain was forfeited to the government which stored or destroyed it, thus removing it from trade channels (Cochrane 1993: 143; Tweton 1981: 18-19; Tweton 1988: 121-124). The Ever-Normal Granary program spawned a great wave of grain bin construction as Minnesota farms stored grain under loan (Minnesota Institute 1939: 17). By 1940, the nation's supply of stored surplus crops was, as one report put it, "exceptionally strong" (Saloutos 1982: 259).

In addition to AAA farm support payments and crop loans, there were many other New Deal programs designed to help farmers weather the Great Depression. Among them:

The Emergency Farm Mortgage Act (1933) helped farmers refinance their mortgages at lower interest rates. By the end of 1935, about 14 percent of the nation's mortgaged farms had been refinanced, saving thousands of farms from foreclosure (Tweton 1988: 125; Cochrane 1993: 113).

The Farm Credit Administration (1933) reorganized farm credit programs and established Production Credit Associations to make loans to farmers. The law also established a system of banks to make loans to cooperatives. As private credit dried up during the Depression, the Federal Land Banks greatly increased lending activities. Long term loans secured by "normal" land values could be used for buying cropland, machinery, and livestock. Land Bank real estate loans reached a peak of $2.85 billion in 1936 and then declined to $2.4 billion in 1940 (Saloutos 1982: 269; Tweton 1988: 125-126; Cochrane 1993: 113).

Feed and Livestock Programs. The droughts of 1933, 1934, and 1936 left many farmers with little or no livestock feed. Both the federal government and the State of Minnesota established emergency feed-loan programs that saved many drought-stricken farmers, especially in west central and central Minnesota (Tweton 1988: 126-127).

During the drought years, the government also bought cattle that farmers couldn't afford to feed. In Otter Tail County, for example, farmers sold 23,000 head of cattle in 1934 through the federal government's emergency livestock purchasing program, thereby reducing county herds by about 20 percent (Tweton 1988: 119).

The Federal Emergency Relief Administration (FERA) provided "work off" loans for seed and animal feed. Rather than repaying the loans in cash, farmers worked on FERA projects, usually building local roads (McNelly 1960: 123; Cochrane 1993: 224). The road projects were a particular boon to farmers since, according to Jerome Tweton, "Except for the main highways, before the New Deal most farm-to-market roads were little more than wagon ruts" (Tweton 1988: 165).

The Civilian Conservation Corps (1933) employed young men to do conservation work, such as erosion control, drainage projects, forest and park improvements, tree planting, and road and trail construction. The CCC employed an average of 13,000 Minnesota men a month (Tweton 1981: 23; Cochrane 1993: 293).

The Shelterbelt Program (1934) was created after the drought and dust storms of 1934 to alleviate soil erosion. Millions of trees were planted on private land by CCC and WPA workers to save soil in prairie states.

The Soil Conservation Service (1935) was established to promote conservation through contour plowing, strip-cropping, field terracing, and other preservation methods and land use practices. The SCS worked with the CCC to build farm erosion control systems in Minnesota, especially in the southeast. Today the agency is called the Natural Resources Conservation Service.

The Resettlement Administration (1935) found new homes for destitute rural and urban families. In Minnesota, the Resettlement Administration relocated 300 families living near Lake of the Woods from submarginal lands to better farms nearby.

The Rural Electrification Administration (1935) made loans to rural cooperatives to build power lines and distribute electricity to farms. Electricity made farmers more efficient, allowed the use of new machinery like milking machines, decreased farm labor costs, and improved living conditions. According to Tweton, "No New Deal program was more popular with farmers than the REA" (Tweton 1988: 145).

The Federal Crop Insurance Act (1938) offered federal insurance to protect wheat growers against crop losses. Federal insurance was later offered on other crops.

The New Deal also poured enormous funds into work relief programs, beginning with the Federal Emergency Relief Administration (FERA) and continuing with the Works Progress Administration (WPA) and other agencies. These programs put unemployed people to work on an array of civic projects – for example, building streets and roads, water and sewer systems, libraries, hospitals, playgrounds, schools, and bridges – and many other types of work. In addition, the federal government in the 1930s began comprehensive road construction programs and water resource development projects that included navigation, flood control, drainage, irrigation, and water power. All of these improvements supported agriculture (Cochrane 1993: 224-226).

Many New Deal farm programs were run through the Minnesota Extension Service in each county. County agents administered myriad aid programs, led efforts to combat grasshoppers, and helped organize Rural Electric cooperatives – to name a few. Public dollars for agricultural research and extension jumped almost 40 percent during the 1930s (McNelly 1960: 72-75, 93-129; Cochrane 1993: 247).

The start of World War II in Europe in 1939 created, once again, huge demand for food and fiber. Again, farm prices rose rapidly and American farmers responded to the demand, producing record crops during the war. Blegen explained, "An extraordinary chapter in the history of World War II is that of the American miracle of production. It has been characterized as a 'joint effort by managers of industry, engineers, technicians, scientists, laborers of all categories of skill, and farmers.' . . . There was an exuberant, but purposeful, release of energy after the sagging years of the depression" (Blegen 1975: 545).

CHARACTERISTICS OF FARMS FROM THE DEPRESSION AND INTERWAR PERIOD, 1920-1940

- farms mixing horse power with gasoline engines
- newly-electrified farms
- farms that were rented rather than owned
- farms on which lenders foreclosed
- farms associated with resettlement efforts
- farms associated with the "back to the land" movement
- larger fields to accommodate new machinery
- conservation techniques and erosion control structures
- drainage structures
- windbreaks, woodlots, and shelterbelts planted in prairie areas
- farms with lots of fencing
- pastures
- minimal new construction
- remodeled and reused buildings

- silos
- general purpose or combination barns
- barns with hay mows
- dairy barns
- early examples of one-story dairy barns with separate milking parlors
- milk houses
- pole-framed beef barns
- bull barns
- hog barns, hog cots
- corncribs
- new grain bins
- sheep barns
- automobile garages
- implement sheds
- structures of poured concrete, concrete block, cement staves, sheet steel, sheet iron
- buildings of dimensional lumber and other purchased materials
- plank and balloon frames
- gambrel, gothic arch, and rounded arch roofs
- pre-cut "kit" or mail-order buildings
- designs influenced by science, engineering, management principles
- designs influenced by materials manufacturers, agricultural engineers
- designs influenced by technical bulletins

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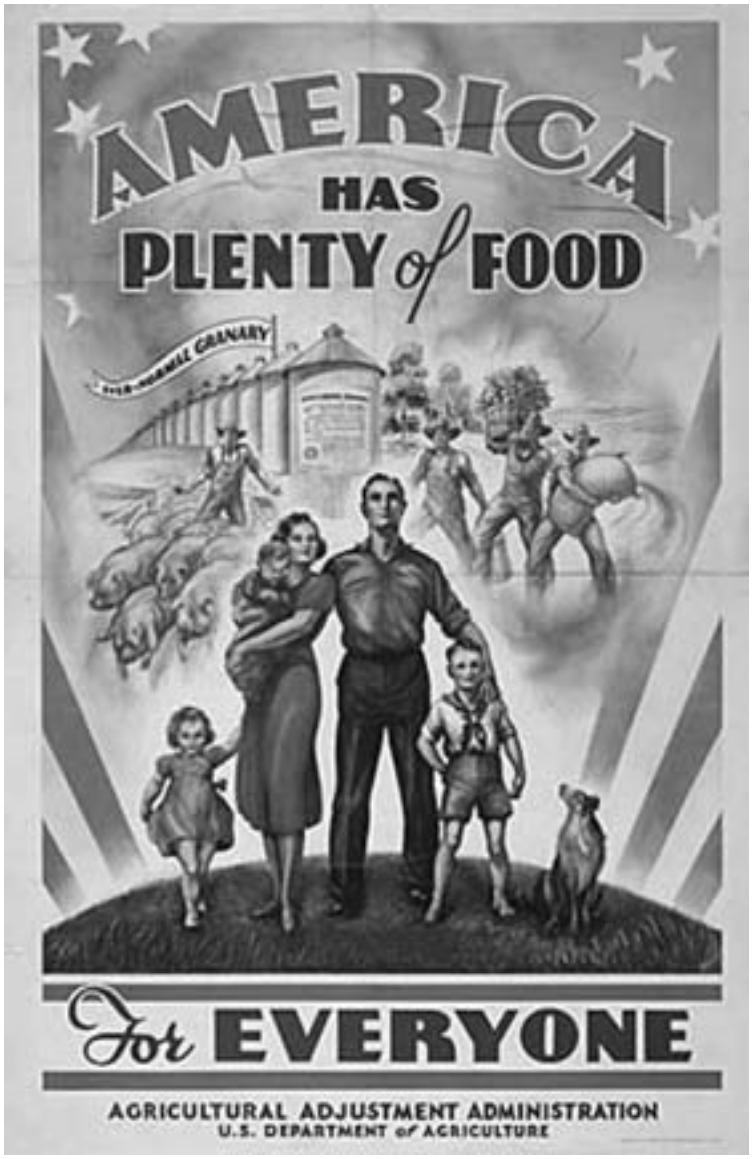
Feeding pigs during the Depression. To the left of the large farmhouse are three very modest buildings, one of which may be the preceding farmhouse. Location unknown, 1932. (MHS photo)

At the beginning of the Depression, nearly 100 percent of Minnesota farms used work horses. About 17 percent also had a tractor and about 10 percent had a truck. These farmers are harvesting oats with two four-horse teams. Bangard Farm, near Holloway, Swift County, circa 1938. (MHS photo)



A poster for the Ever-Normal Granary, a New Deal program of the Agricultural Adjustment Administration of the USDA. Its purpose was to stabilize farm prices by controlling the flow of grain into the market. A secondary goal was to insure a national crop reserve against drought or other unforeseen conditions. Farmers were given loans on grain placed in storage, spurring a wave of grain bin construction in the U.S. The policy continued into the early 1970s. USDA poster, 1940. (MHS photo collection)

This farm has a concrete block barn and attached milk house. The silo appears to be wood or brick. St. Louis County, circa 1930. (MHS photo)

A new perforated steel corncrib ready for the crop. Location unknown, 1938. (MHS photo by Norton and Peel)

PERIOD 8: WORLD WAR II AND THE POSTWAR PERIOD, 1940-1960

With the start of World War II, the farm economy recovered from the Great Depression and entered a period of prosperity that lasted until 1959. Farm productivity and yield increased dramatically in the postwar period, boosted by technological advances. As a result of mechanization and the cost of capitalization, farms increased in size and decreased in number. After decades of diversification, Minnesota farmers began to specialize in the 1950s. There was a boom in farm building construction and repair after many years of Depression and war. New types of farm buildings and building materials appeared, and farmhouses and living standards improved dramatically.

Milestones of this Period

1930s	–	Pole-framed buildings originated in the early 1930s, credited to H. Howard Doane
1939	–	Insecticide DDT introduced
1939	–	USDA issued a bulletin on glue-laminated arches; Rilco Laminated Products founded in St. Paul
1940	–	Almost seven of eight Minnesota farmhouses had a radio, placing Minnesota ninth nationally in the number of rural radios
1940	–	9,763 Minnesota farms generated electricity with on-farm electric plants
1940	–	Minnesota ranked 27th among states in farmhouses with electricity
1940s	–	Fiberglass introduced
1941	–	Pearl Harbor bombed, U.S. entered World War II
1941	–	Quonset-type buildings introduced to U.S.
1941	–	University of Wisconsin built experimental steel dairy barn, milk house, and silo, and began loose housing study
1941	–	Minnesota Extension issued a bulletin on straw buildings
1943	–	Prefabricated grain bins, hog cots, and brooder houses becoming common
1943	–	Per-person consumption of meat passed previous high points
1945	–	Grade A milk program established
1945	–	Herbicide 2,4-D introduced
1945	–	World War II ended
1946	–	University of Minnesota began a soybean breeding program
1946-59	–	Postwar boom
1948-50	–	Bulk tanks replacing milk cans
1950-53	–	Korean Conflict
1954	–	Minnesota ranked 4th nationwide in hog production
1955	–	Most Minnesota farms had phased out draft horses
1956	–	Minnesota ranked 4th nationwide in beef cattle production
1956	–	Minnesota ranked 2nd nationwide in chicken production and 4th in turkeys
1957-58	–	Recession

See also

Farms
Milking Barns
Farm Shops
Irrigation Structures
Appendix: Focus on Mechan Techno
Appendix: Focus on Biotech and Agrichem

After the collapse of the farm economy in 1920 and the hardships of the Great Depression, agriculture boomed again during World War II. "Good rains, bumper crops, and worldwide demand pulled farmers out of the depression and pushed them into a new era of prosperity," according to historian Jerome Tweton (Tweton 1989: 263). Crop and livestock prices rose during the war years, increasing 138 percent between 1940 and 1946. Net farm income rose nearly 250 percent (Cochrane 1993: 124).

A united country geared up for World War II, and farmers played their part. "The job of the United States farmer is to produce more food than has ever been produced before in this country," wrote one farm expert in 1942 (Zink 1942: 77). Farmers were urged to think of their farms as factories, and themselves as production managers, wringing the maximum food possible from land, labor, buildings, and machinery. Farmers rose to the challenge. In 1942, agricultural production reached new peaks that were, in the words of another expert, "well above previous records for grain crops, hay crops, oil-seed production, sugar crops, fruits, and vegetables. Livestock, dairy, and poultry products reached unparalleled levels. Good weather and high yields contributed to the 1942 farm victory" (Hamilton "Wartime Farm Building" 1943: 43). While Minnesota farmers produced record crops, thousands of city people grew "Victory" or "war" gardens.

FARM PRICES

When World War II ended, there were fears of a farm depression like the one that had followed World War I. In the early 1940s, like in the 1910s, "American farmers produced more than Americans could possibly consume" and it was feared the surpluses would dash prices (Schlebecker 1975: 277-278). Agriculture was rescued by the Marshall Plan, an immense relief program for Europe that began in 1947 and by 1953 had provided $13 billion in economic aid to the continent. According to historian John Schlebecker, "The Marshall Plan amounted to an export subsidy on a grand scale. . . . The program helped to restore the ailing European economies; it gave farmers subsidized prices; and it fed millions" (Schlebecker 1975: 277-278).

After the war, farm prices jumped and remained near or above immediate postwar levels for a decade. Both land values and the rate of farm ownership increased. Government price supports and fairly strong domestic and world demand kept farmers in a favorable economic position until the late 1950s. Good times lasted until about 1959, when the farm economy slumped, suffering from high production costs and sluggish markets. Farm profitability then sagged from 1959 to 1973, when another period of prosperity began (Blegen 1975: 545; Tweton 1989: 263; Cochrane 1993: 124; Roberts et al 1956: 513).

Although its relative importance in the state's economy began to shrink after World War II, agriculture remained one of Minnesota's foremost enterprises. During the 1950s, manufacturing officially surpassed agriculture as the state's leading industry (although, according to Blegen, the manufacturing industries included many processors of agricultural products). The number of people employed in farming continued to drop, while other sectors of the economy gained workers (Blegen 1975: 556-557; Tweton 1989: 289-290).

FARMS AND FARM LABOR

World War II created millions of jobs, accomplishing what the New Deal could not. During the war, "Young men and women literally flowed out of the rural areas in torrents . . . eager to leave farming

for higher paying, more productive jobs in the city," according to economist and historian Willard Cochrane (Cochrane 1993: 125). The farm population nationwide fell by one-third between 1939 and 1953. In Minnesota, wrote historian David Nass, "Farmers on marginal land, tenants without a future in agriculture, and young people seeking careers in urban centers moved from the farms" (Nass 1989: 146). By 1950, more than half of Minnesotans lived in cities, and just eight percent farmed. In the following decades, the farm population continued to decline – Minnesota lost nearly 16 percent of its farm population between 1950 and 1960, for example. In 1981, farmers made up less than three percent of the U.S. population, and by 1990, less than two percent (Blegen 1975: 554-557; Danbom 1995: 266).

As the postwar farm population slid, the number of farms fell, too, while their average size rose. Minnesota farm numbers dropped by one-third between 1945 and 1964, falling from 189,000 farms to 131,000. During the same period, the average farm size increased 40 percent, from 165 acres in 1940 to 235 acres in 1964 (Cavert 1956: 26; Nass 1989: 147). According to one Midwest historian, "Farmers who managed well and had capital for land and machines operated larger and larger acreages. The gap between bigger, more prosperous farmers and those who were just getting by widen[ed]" (Fite 1989: 297-298). Farm tenancy, which had been common in Minnesota, increased considerably as farmers chose to rent new land to expand their acreage without an overly large capital outlay.

Unable to compete, many small-scale farmers called it quits. The University of Minnesota's William Cavert explained in 1956, "The shift is frequently made by the departure of most of the youth for town jobs, while the old folks continue to live on the farm. . . . When the old folks are no longer able to farm, the land is combined with that of a neighbor either by sale or rental" (Cavert 1956: 26). Many farmsteads were subsequently abandoned. By the 1960s, relatively few large Minnesota farms were producing most of the state's agricultural products.

PRODUCTIVITY

In June 1948, near the beginning of the postwar period, only 56 percent of Minnesota farms had electricity. Yet the most important development in agriculture in the 1940s and 1950s, according to historian David Danbom, was the "revolution in productivity spurred by machines, chemicals, and improved plant and animal breeds." Hybrid seeds, tractors, combines, gasoline engines, electric milking machines, powerful electric water pumps, DDT, 2,4-D, anhydrous ammonia – these were just some of the technological marvels that spurred the tremendous productivity gains of the postwar era (Danbom 1995: 233-238). Rising farm prices and incomes finally enabled farmers to buy these new technologies, which the Extension Service and the farm press had been urging them to adopt since the early 1930s. "And this they did with a vengeance. They jammed these new technologies into practice, reduced their unit costs, and expanded their farm output," according to Cochrane (Cochrane 1993: 125). Total agricultural output in 1954 was 42 percent higher than in the prewar period, and it was produced with 3.5 million fewer workers. In 1960 farm income totaled $1 billion in 1960, placing Minnesota fifth among the states in farm receipts (Shaw 1956: 423; Blegen 1975: 564).

Surging farm productivity stimulated the construction of new granaries, corncribs, implement sheds, and beef barns – sometimes built of alternative materials developed during the war. It also generated what historian Theodore Blegen called "an appalling surplus" of farm products – "a crisis of abundance" (Blegen 1975: 556). Jerome Tweton explains:

> Overproduction was the number-one enemy of farmers after World War II. Technology and science worked a revolution on Minnesota farms. Chickens laid many more eggs, cows gave much more milk, each head of livestock produced substantially more meat, and acres yielded abundantly more crops. . . . Hybrid corn seed doubled and even tripled yields. . . . Chemical fertilizer replaced barnyard manure. . . . Greater production demanded larger, more sophisticated machinery. On the eve of World War II only one in three corn-belt farmers owned a tractor. By 1949 almost all had at least one. Vastly greater investment in machinery tended to increase farm size, as farmers sought the most efficient use of their equipment. . . . The post-World War II agricultural revolution considerably altered Minnesota's rural landscape and forever changed the nature of farming (Tweton 1989: 264-265).

In the three decades following the war, American agriculture completed the shift from a labor-intensive industry to a capital-intensive one. Farmers substituted new machinery, chemicals, feed, and seed – all of which had to be purchased – for labor. From 1933 to 1970, the input of labor in American farm businesses declined more than 70 percent, while chemical inputs rose 1,800 percent, and purchased feed, seed, and livestock rose 270 percent (Cochrane 1993: 132). When farmers adopted the new technology, their costs of production rose. Profit margins per unit narrowed, forcing them to produce more units. The catchword of the Corn Belt, for example, became "Get Bigger or Go Under" (Hart 1986: 55; Hart 1998: 289).

As farmers substituted capital for labor, they had to improve their management and technical skills. Good farm management had always been important. But it gained new urgency after World War II, when a poor manager could "also lose money faster than could his father" (Cavert 1956: 24). More than ever, successful farming in the postwar era required brainpower and a good education. It was these demands that led one observer to predict in 1956, "twenty years hence most of the farmers in good farming areas will have had formal training in agriculture, in school or college" (Cavert 1956: 24).

By the late 1950s after decades of diversified farming, Minnesota farmers were forced by competitive economic pressures to specialize. Cattle producers enlarged their herds and raised animals in feedlots, using machinery to bring the feed to the stock instead of taking the animals to the pasture. Hog and poultry farmers shifted to high-volume confinement production in automated, climate-controlled buildings. Specialized crop farmers enlarged and lengthened their fields and removed fences for more efficient machinery operation. They also eliminated their traditional crop rotations, concentrating on the most profitable ones (Cavert 1956: 24; Tweton 1989: 264-265; Hart 1998: 373-375).

In a bulletin on poultry raising in 1951, the Agricultural Experiment Station summarized a dilemma facing Minnesota farmers that would become increasingly relevant during the next decades:

> With increased efficiency have come increased poultry numbers and greatly increased production since 1940. Consumers have responded by eating more eggs per capita, but only at lower prices relative to pork and dairy products. Hence, a part of the advantage of increased efficiency was quickly passed on to the consumer and not retained by the farmers. The upward trend in efficiency is likely to continue regardless of price changes. Farmers cannot retrogress in efficiency without sacrificing income (Hady and Nodland 1951: 16).

FARM BUILDINGS

Just as they did during World War I, farmers during World War II had to cope with labor and materials shortages. "Farmers . . . must produce required food with minimum labor, materials, and equipment," wrote a farm expert during the war in February 1943. "New machinery and equipment will be hard to get. There will also be shortages of labor, insecticides, fertilizers, nails, fence, lumber, and rubber" (Hamilton "Building" 1943: 43). To help offset the wartime shortages, Minnesota county agents promoted labor-saving tools and methods. Among the structures farmers were encouraged to adopt were portable hog houses, grain self-feeders for livestock, hay feeding racks, and portable grain elevators. The extension service continued to distribute plans for farmers who wanted to build their own structures and equipment. The result, wrote one Minnesota historian, was "one of the biggest 'do-it-yourself' programs in history" (McNelly 1960: 139).

Farmers were encouraged to repair machinery and buildings, rather than getting new ones. One method recommended for repairing wooden barns was to replace the deteriorating lower walls with hollow tile, an unrestricted building material, leaving intact the upper walls and roof (Anderson 1942: 326; Hamilton "Building" 1943: 43; Hamilton "Lumber" 1943: 268). Building trade groups such as the Portland Cement Association promoted the role of good farm facilities – and their products – in the war effort: "Farm structures, like war factories, are fighting equipment. Every improvement which helps the farmer increase production makes gains on the fighting front that much easier. . . . Such necessary improvements as sanitary milk houses, concrete dairy barn floors, paved barnyards and feeding floors or firesafe, ratproof storehouses are more important than ever before" (Portland 1944: 66).

However, new construction was limited during wartime to conserve resources. Farm structures were adapted to minimize the use of restricted materials such as steel, large timbers, electric wiring, and metal pipes. Farmers used cement, brick, and tile to save on nails and new lumber. Other common lumber substitutes included fiber, gypsum, plywood, composition roofing and siding, and cement-asbestos wallboards. Farmers were also urged to use straw sheds, pit and trench silos, and buildings constructed of adobe, rammed earth, sod, and logs (Hamilton "Building" 1943: 43-44; Matthews 1944: 91).

After World War II, American farmers embarked on long-overdue building improvements that had been delayed, in some cases, for 20 years during depression and war (Pond and Nodland 1958: 20; Ashby 1949). According to a Wisconsin agricultural engineer in 1944, growers were faced with "perhaps the largest single program of capital investment that the American farmers have ever before undertaken" (Clark quoted in Giese 1957).

Among the immediate postwar work was the widespread repairing, remodeling, and modernizing of farmhouses. Next in priority, wrote one USDA expert, was "improvement of dairy barns and milkhouses to meet Grade A requirements. Old dairy barns are being improved and ventilated and some new two-story barns are being built, though with smaller mows than the older barns. In other cases old buildings not suitable for stanchion barns are being remodeled for loose housing and many new milking stables [barns or parlors] and milkhouses are being built" (Ashby 1949: 236).

Not only did farmsteads need reconstruction, but buildings needed to be modified for the new machinery and methods that were fast coming into practice. "Profound changes in agriculture have forced a departure from conventional practices in virtually every phase of agriculture," an agricultural

engineer wrote in 1956. "Now a distinctly different type of building need coincides with the time when a great deal of the farm plant must be rebuilt" (Carter 1956: 259). Those changes included "mechanization, the high value placed on labor efficiency, the shift from general-purpose farming to specialization, the consumer demand for clean, high-quality products, the need to prevent loss, and provision for a versatile farm establishment that can change with the times" (Carter 1956: 259). Among the results were dairy barns that were one story rather than two because hay came in huge machine-made bales, pen barns that reduced dairy herd care, and multipurpose buildings that could serve many purposes depending on the season.

To meet new demands, agriculture called on many of the industrial production techniques that had helped win the war including new materials, standardization, and prefabrication. A Wisconsin expert later recalled, "There were exciting new construction materials, new architectural designs, new and better methods and equipment for heating, ventilating, electrical conveniences and all the other features that would make buildings better meet the needs and desires of farm people" (Clark quoted in Giese 1957). As part of the effort, the Midwest Plan Service (a cooperative farm building plan service of which the University of Minnesota was a founding member) was revitalized in 1949 and issued a new series of farm building plans – the first since 1937 (Midwest Plan 1949).

After the war, a construction boom, combined with shortages in both construction labor and farm labor, stimulated further interest in low-cost materials and labor-saving methods. In describing the postwar construction the USDA's Wallace Ashby wrote:

> Home-sawed lumber has generally been used where available but shortage and cost of shipped-in lumber have favored the use of masonry blocks, especially those made with cinder or other lightweight aggregates. . . . Metal roofs are in great demand and aluminum and aluminum-painted roofs are becoming a prominent feature of the countryside. In barns for loose housing of dairy cows as well as beef cattle there is demand for trussed roofs or steel beams to eliminate close-spaced posts and girders that interfere with tractor loading of manure. There is also growing use of paved lots and lanes to keep the animals out of the mud. In areas of heavy poultry and egg production a good many new broiler and laying houses have been built and many older buildings have been repaired and improved. In the corn and wheat belts the number of new permanent cribs and granaries of conventional type is about average, but fabricated metal buildings for these purposes are being introduced. Some buildings used for corn storage have tight walls and are equipped with blowers and ventilating ducts. . . . In the corn belt a large number of new semipermanent and temporary corncribs have been built to handle the tremendous 1948 crop. Also, in the corn and wheat belts many new machine sheds and shops have been built. Arch-roof, metal-covered buildings, with either steel or laminated wood ribs, are coming into general use for these purposes (Ashby 1949:236).

Aluminum tubing made irrigation less expensive for average Minnesota farmers. Farmers also used more wood-glue-laminated timbers, which had been advanced as a substitute for steel. In 1950, Minnesota's Rilco Laminated Products was advertising rafters "for every type of farm building from small hog and poultry houses to large post-free machine sheds, granaries, and barns" (Rilco 1950: 91). Plywood became common for both structural and finishing uses. Other new materials included fiberboard, asbestos-cement, and corrugated fiberglass panels (Aldrich and Boyd 1959: 336; Crow 1941: 15; Lauber 2000: 19; Kaiser 1955: 440; Neubauer and Walker 1961: 569, 574-577; Tomlinson 1958: 25).

In the 1950s, farm buildings were configured to be more flexible and serve a variety of purposes – a principle of modern efficiency adopted by farmers. One agricultural engineer wrote of dairy barn design, "It must be constantly borne in mind that flexibility of the entire system is of utmost importance because of rapidly changing technology. A good solution last year may not be a good solution now and very likely will not be the best solution next year. It must be possible to change the facility with changing production requirements and farming methods" (Clayton 1960: 603).

One of the most versatile forms was the pole-framed building, made of timber wall posts, lightweight, prefabricated steel trusses and metal siding and roofing. Pole-framed buildings could serve many purposes including livestock barns, implement sheds, garages, and grain dryers and storehouses. Quonset-type buildings also became common on American farms after World War II. The familiar arched, corrugated-metal buildings were, like pole-framed buildings, versatile and quick to construct. The use of prefabricated farm buildings of all types spread rapidly after the war, in response to the high cost of construction labor. In Minnesota they included sectional and prefabricated poultry buildings, hog cots, grain bins, corncribs, implement sheds, and others (Carter 1956: 259; Stran-Steel 1948; Stran-Steel 1957; Neetzel and Otis 1959).

A study conducted by the Illinois Agricultural Experiment Station in the 1950s identified several trends in Illinois farm buildings for the period 1945-1955. They are listed below. The same trends may apply to Minnesota farms over the ten-year period:

- no change in the total number of buildings per farm over the ten years
- buildings were getting gradually larger
- buildings were getting gradually older
- fewer general-purpose barns, poultry houses, and "miscellaneous" buildings
- more silos, dairy buildings, implement sheds, and factory-built corncribs and grain bins
- most common structural features on new buildings were gabled roofs, metal roofs, wood framing and siding, and concrete foundations
- greater proportion of buildings with masonry walls, pole frames, and steel and aluminum exterior sheathing over the ten years (Carter 1956: 260).

According to USDA figures, in 1949 American farmers built 840,000 new outbuildings. The most numerous type were poultry houses, which accounted for about 23 percent of the new structures. The next category, accounting for about 18 percent of the new outbuildings, were machine sheds, shops, and garages. Next were general purpose barns, which comprised about 12 percent of the new outbuildings, and corncribs, which accounted for about 9 percent. American farmers also built 83,000 new farmhouses in 1949 (Neubauer and Walker 1961: 9).

CROPS

Minnesota agriculture as a whole continued to diversify in the 1940s and 1950s, producing record crops of all types. By 1961, for example, the state was producing 325 million bushels of corn, 160 million bushels of wheat, 54 million bushels of soybeans, 6.4 million bushels of flaxseed, 14 million hundredweight potatoes, 1.3 million tons of sugar beets, and 370,000 bushels of apples (Blegen 1975: 564).

After the war, farmers in southeastern and southwestern Minnesota concentrated on cattle, hogs, corn, and soybeans. Southeastern Minnesota, which raised about a quarter of the state's farm products, also produced poultry, dairy products, eggs, cheese, vegetables, and apples.

The Red River Valley produced spring wheat, sugar beets, and about two-thirds of the state's potato crop. The potato industry attracted large-scale growers who farmed extensive tracts of land. Potato and sugar processing became major industries in the region. Farmers in the southern Red River Valley also grew soybeans, but cattle feeding and dairy farming did not become prevalent in the Valley.

Central Minnesota, extending from the Minnesota River north as far as Otter Tail, Wadena, Cass, and Crow Wing counties, developed a concentration of turkey farms. As late as the 1970s, however, no single crop dominated this region, which had a thriving tourist industry but was still primarily agricultural. The region became strong in livestock – especially dairy, hogs, poultry, and. Central Minnesota farmers also raised corn, oats, soybeans, and vegetables.

Farmers in the east central counties bordering Wisconsin specialized in truck farming and growing potatoes and vegetables for canning. Rutabagas were important in Pine County, and apples in Washington County. The forest cutover in northern and northeastern Minnesota remained poorly suited to farming. According to Blegen, cutover agriculture "has been minor and unduly laborious. Some farmers have remained long on their rugged lands. Many have combined farming with work in mines or woods. But the number of farms has declined, farm profits have been modest, and farm living standards have been meager" (Blegen 1975: 563-568).

Corn, which became Minnesota's leading crop, helped fuel expansion of the state's livestock industry. During World War II, Minnesota farmers embraced hybrid seed corn after the University issued its first corn hybrid in 1930. Corn yields, which had been below 40 bushels an acre until 1940, rose to about 50 bushels an acre during the war, and then soared in the postwar period (Hart 1986: 52). In the early 1960s a new type of corn hybrid was introduced, and yields surged again.

Wheat crops in the Midwest were devastated by stem rust in the 1950s and yields dropped by 70 percent. Flax, which had been an important Minnesota crop early in the 20th century, declined after World War II. So did oats, which were no longer needed to feed draft horses. In 1975 Minnesota was third nationwide in rye and flax seed produced, fifth in barley, and eighth in wheat (Wayne 1977: 9).

Soybeans, used for cooking oil, livestock feed, and industrial products, became a major Minnesota crop in the 1940s. Before the war, soybeans had been grown on a small scale and harvested green as forage. The war had disrupted trade and created a new domestic demand for soy oil, so farmers in south central Minnesota began growing soybeans for the food industry. After World War II, soybean acreage "shot up as miraculously as Jack's beanstalk," according to Blegen (Blegen 1975: 564). The University of Minnesota began a soybean breeding program in 1946. By 1949, about 20 percent of Minnesota farms were growing soybeans, and "the wonder crop of the Corn Belt" had become the state's third-ranking cash crop (Hart 1986: 62). The same year, the U.S. became a net exporter of oils and protein meal, mainly because of soybeans.

Soybean processing mushroomed along with soybean fields, especially in southern Minnesota. Soybean meal became a mainstay of the Minnesota livestock feeding industry, and by 1951 the

state had eight crushing plants. During the 1950s, soybean production and value increased dramatically. Minnesota was the nation's third-largest soybean producer in 1957. "The soybean changed the face of southern Minnesota agriculture," says Tweton. "By the 1980s it had become Minnesota's second cash crop," worth more than $900 million (Tweton 1989: 281; Roberts et al 1956: 148; Blegen 1975: 564).

Sparked by the boom in vegetable oil demand, sunflowers also became an important Minnesota oil crop during and after World War II. Farmers in the southern Red River Valley, particularly in Wilkin and Traverse counties, grew most of the state's sunflowers, rotating them with grains (Tweton 1989: 281, 290).

Minnesota sugar beet production expanded after World War II when sugar demand rose and labor-saving technology reduced the need for expensive hand labor. By 1960 nearly all sugar beets were harvested mechanically. American Crystal Sugar built sugar refineries in Moorhead in 1948 and Crookston in 1954. In 1957, Minnesota was eighth among states in the value of sugar beets produced. Today, Minnesota is the nation's leading sugar beet growing state (Rasmussen 1967: 33, 35; Tweton 1989: 287-289).

By 1945, American farmers were growing more snap beans, green peas, sweet corn, and tomatoes than ever before. Vegetable production continued to increase after the war, spurred by strong consumer demand, improved processing and transportation, and the growing use of home refrigerators and freezers. By 1947 Minnesota had 37 vegetable processing factories. One author wrote in 1956, "The indications are that the frozen food market will provide the vegetable growers with new market outlets for increasing quantities of high-quality vegetables" (Roberts et al 1956: 226). In 1956, Minnesota was second nationally in sweet corn production and one of the top five potato growing states.

After the war, farmers began to preserve hay and clover as "haylage" (also known as grass silage) in new, glass-lined silos. These tall blue cylinders were were often known by their trade name, Harvestore. They cost much more than traditional silos and became the mark of a prosperous Minnesota livestock farmer. Trench and bunker silos also became popular after the war. These horizontal structures proved efficient for filling, unloading, and self-feeding. Like glass-lined silos, they were often used for grass silage (Noble 1984: 79; Blegen 1975: 391; Noble 1984: 78-79).

LIVESTOCK

After World War II, the U.S. population increased significantly. As Americans' incomes rose in the postwar period, meat consumption went up, prompting expansion of livestock farming. By 1960, livestock products accounted for three-fourths of farm receipts (Blegen 1975: 565-568).

Beef. Specialized beef operations grew in size and number after World War II. Some Minnesota farmers bred cows and sold feeder calves; others bought feeder calves and fattened them for market, or finished cattle in feedlots. Still other cattle producers raised breeding stock. Some groups of farmers formed consortiums that passed animals from farm to farm through the animals' life cycle. By 1956, Minnesota ranked fourth nationwide in beef cattle production (Roberts et al 1956: 335).

Hogs. The hog industry also grew rapidly after World War II, spurred by rising consumer demand for pork. Raising hogs in confinement – a practice rare before 1945 – became common. Eventually many pigs were raised entirely indoors from birth to marketing, allowing farmers greater control over feeding, manure handling, barn sanitation, climate, and animal health. Because of the large investment required for special buildings and equipment, confinement hog farms were usually larger in scale than traditional hog farms, often raising thousands of animals a year. Minnesota ranked fourth in hog production in 1956 (Britton 1983: 20-21; Tweton 1989: 271-272).

In the 1950s, feeding, barn cleaning, and other hog chores became increasingly automated. In 1958, for example, agricultural engineers were testing multi-step feeding systems that moved feed from steel bulk bins to feed mills, then mixed and ground the grain, conveyed it to the feeding area, and distributed it to the hogs. At the same time, pressure washers for barn cleaning became more sophisticated (Puckett et al 1958: 692).

Artificial insemination of hogs was commercialized in the early 1960s. Farmers timed breeding so that sows would farrow year-around in order to make full use of expensive buildings. Some hog farmers raised the animals through their entire life cycle, but others specialized. Some raised only piglets, for example, while others bought the piglets and fattened them to market weight. Piglet producers typically had little land or capital, but "plenty of time to give to this more labor-intensive end of production" (Britton 1983: 21).

Dairy. After World War II dairy farms changed rapidly. "They are no longer diversified with cows, hogs and a flock of chickens," a Minnesota dairy industry historian wrote, "but have become highly specialized" (Wayne 1977: 25). Fewer Minnesota farmers milked cows in the postwar period, but individual herds got larger, and each cow produced more milk. The number of Minnesota dairy herds dropped from 164,000 in 1945 to 67,000 in 1965, and the number of cows in the state fell from 1.6 million to 1.2 million (Wayne 1977: 29). Thanks to improvements in selective breeding, feeding, disease control, housing, and animal care, Minnesota's average annual milk production per cow rose steadily, increasing from 4,400 pounds of milk per cow in 1940 to 12,139 pounds in 1984. In 1975 Minnesota ranked first nationwide in creamery butter and nonfat dry milk produced, third in total number of milk cows, and fourth in total milk produced (Wayne 1977: 9; MAES ca. 1995).

In the 1940s, Midwestern dairy farmers became interested in loose housing after research, which began at the University of Wisconsin in 1941, found that cows in pen barns required less labor, produced well, and usually had longer productive lives, fewer injuries, less stiffness, and a better appetite. (The Wisconsin Dairy Barn Research Project also tested steel's suitability as a building material for one-story dairy barns, granaries, and silos.) In 1950, Minnesota's Clarence H. Eckles wrote that loose housing was "becoming increasingly popular" (Eckles 1950: 514).

Confinement housing – in which dairy cows spent their entire lives inside – was introduced to Midwestern dairymen in the late 1950s and early 1960s. Wisconsin dairy expert S. A. Witzel explained in 1960 that intensive cropping and mechanical harvesting were producing high crop yields per and farmers were finding it more profitable to grow feed crops and keep their animals inside than to use their land for pasture. As dairy herds got larger, confinement housing reduced labor costs and offered better control over all facets of milk production. Air conditioning for confinement barns, which held promise to alleviate the overheating inherent in confinement systems, was just beginning to be discussed in 1960 (Witzel 1960; Stewart 1960).

The first artificial insemination of a dairy cow was done at the University of Minnesota in 1936. The resulting calf is thought to be the first born in North America as a result of artificial insemination. Artificial insemination associations formed in Minnesota beginning in 1939. Many of these groups ran into financial trouble and failed. Two that survived and became prominent were Minnesota Valley Breeders Association and Southern Minnesota Breeding Federation. In 1946, Land O' Lakes Creameries also established an artificial insemination service, which later merged with Southern Minnesota Breeding Federation (Wayne 1977: 45-47).

Dairy herd improvement associations, which had nearly disappeared during the Great Depression, were revived after 1945. Association staff visited member farms to test, consult, and monitor improvements. By 1956, nearly 6,000 Minnesota herds owned by association members were being regularly tested and tracked for butterfat content, health, reproduction history, and response to feeding.

Disease control also improved. A statewide effort to reduce bovine tuberculosis was conducted along with a broad program to treat and eradicate tuberculosis in humans. Bovine tuberculosis was reduced in the 1930s and 1940s, and by 1976, Minnesota cattle were declared free of the disease. Brucellosis was another serious cattle disease that sometimes spread to humans. Anti-brucellosis campaigns in the 1930s and 1940s were successful in eliminating the disease from about half of the state. There was another targeted effort in 1952-1953, and by 1957 it was largely eradicated (Wayne 1977: 33-35, 44-45).

Minnesota's dry milk industry developed after 1940. Before then, some buttermilk was dried for animal feed, but most milk was skimmed on the farm and fed to calves and pigs while the butterfat or cream was sold for butter. During World War II there was a tremendous demand for food, especially protein. This created a market for dried milk, which was nutritious, could be shipped in concentrated form, and had a long shelf-life. Several milk drying plants were built in Minnesota in the early 1940s, and dry milk production rose from 11 million pounds in 1935 to 169 million pounds in 1945. In 1943 Minnesota ranked second nationwide in total dry milk output, and had 102 drying plants (some of which dried only for animal feed). By 1965 Minnesota was producing 606 million pounds of dry milk annually (Wayne 1977: 39-40).

In 1919, the USDA had begun a successful national campaign to increase milk consumption. State and national milk merchandising programs began in the late 1930s, and the American Dairy Association was formed in 1940 to promote dairy products (Wayne 1977: 42-43).

In 1945 the State of Minnesota established the "Grade A" milk program, one of many efforts through the decades to protect public health, promote food quality, and regulate the food and dairy industries. The law set minimum requirements for Grade A certification – including standards for dairy barn and milk house operation. The law required inspections of dairy farms and processors, as well as handlers and vendors of milk. Grade A milk, for which the farmers received top price, was meant for fluid consumption, while Grade B milk was made into cheese and other processed foods. In 1949 the State required pasteurization of all milk and milk bottles.

During World War II, the number of Minnesota cooperative creameries began to decline. Originally, creameries had to be located close to the farms they served to receive milk deliveries by horse, and some counties had 20 or 30 small plants. But as roads and transportation improved, small, low-volume creameries were no longer profitable and many merged or closed. Some added dry milk

processing equipment to stay in business. In the 1960s, creameries rapidly consolidated, and by 1970, three large cooperatives – Land O' Lakes, Mid-America Dairymen, and Associated Milk Producers – were marketing nearly all the milk produced in Minnesota (Wayne 1977: 41-42). According to one Minnesota historian, "the consolidation and merging of cooperative creameries was a painful process for many people" (Wayne 1977: 19, 42). Another wrote that their role "often compared to that of churches because of their importance and standing in the community" (Brinkman 1988: 15).

Poultry. No other Minnesota livestock sector experienced more sweeping changes after World War II than the poultry industry. Until the 1940s, most Minnesota farms raised chickens (and a few turkeys) and sold eggs. That changed after the war when poultry and egg production became concentrated on a few large-scale farms, mainly in central and west central Minnesota. A broiler industry developed as poultry meat became more popular, and a demand for dried egg powder grew. Between 1910 and 1990, per capita consumption of poultry rose 500 percent nationally, helping to fuel a tremendous expansion of the Minnesota turkey industry (Cochrane 1993: 394). According to Tweton, "A well-designed national campaign and a growing emphasis on low- or no-fat diets increased substantially the demand for poultry – especially turkey." In 1972, just 62 farms sold nearly two-thirds of Minnesota turkeys (Tweton 1989: 277).

At the same time, rapid improvements were made in poultry breeds, feeding efficiency, disease control, and husbandry methods. In the 1940s, for instance, more sophisticated brooding equipment dramatically reduced chick losses and the labor cost of raising poultry. A decade later, chickens had been bred that needed half as much feed as in 1940, and egg output per hen had risen 75 percent. By the mid-1950s, flocks of 500 to 1,000 chickens were common on Minnesota farms, and turkey flocks of 1,000 birds or more had become the rule. In 1956, Minnesota ranked second in chicken production and fourth in turkeys (Cavert 1956: 23; Shaw 1956: 423-424; Roberts et al 1956: 396).

In the 1950s and 1960s, the state's poultry industry expanded rapidly and was concentrated in central Minnesota, primarily in Kandiyohi, Swift, Meeker, and Stearns counties. Chicks, or poults, were produced in a small number of hatcheries. The poults were fattened to market weight on large farms handling thousands of birds. Poultry processing developed in the same region, close to where the flocks were raised. In 1949, for example, Earl B. Olson established the Farmer's Produce Company in Willmar, later renamed Jennie-O. The company became Minnesota's leading turkey processor. In addition to processing birds, Jennie-O operated farms, manufactured feed, distributed poultry-growing supplies, and marketed turkey products worldwide (Britton 1983: 21-22; Tweton 1989: 277-278).

TYPES OF MINNESOTA FARMS

Federal statistics provide basic information about postwar trends in Minnesota farming. In 1945 and 1964, for example, Minnesota farms represented the types listed below, based on which farming activity supplied at least 50 percent of a farm's annual income. The category "general" farming was used if no single activity exceeded 50 percent or more of income.

Minnesota Farms by Type, 1945 and 1964

Farm Type	Number of MN farms 1945	Number of MN farms 1964
Fruit and nut	306	100
Vegetable	990	274
Horticulture	241	not given
Field crops	17,716	26,809
Dairy	38,930	42,474
Poultry	9,967	1,974
Livestock	42,639	23,358
Forest products	1,162	not given
General	60,445	13,278
Subsistence	14,208	not given
Other	not given	21,426
Unaccounted		1,470
TOTAL	186,604	131,163

Source: *Statistical Abstracts*, various years.

In the list above, the decrease in the number of "general" or diversified farms between 1945 and 1964 is striking.

FARM LIVING STANDARDS

Farm living standards greatly improved in the 1940s and 1950s. At the start of the war, 40 percent of Minnesota farm families lived in homes built between 1900 and 1920, and more than 29,000 lived in houses built before 1890. Less than one-third of Minnesota farmhouses had electricity in 1940, and only 12 percent had running water. Minnesota ranked 33rd among the states in the number of flush toilets in farmhouses; 34th in running water, and 38th in number of refrigerators (Davies 1947). After the war ended, the Minnesota Extension Service began a major push to encourage farm home improvements such as running water and sewage disposal systems, central heating, kitchen modernization, and farmstead landscaping. By the mid-1950s, electrification had become nearly universal. At the same time that they electrified their barns, farmers installed home lighting, plumbing, refrigerators, modern cooking stoves, and other appliances.

Automobiles, telephones, radio, and television alleviated rural isolation. According to Blegen, by the late 1950s "radio was very nearly universal in farm as well as city and town homes," and about a third of farmhouses had television. He noted, "The total scene reveals a swift lessening of old disparities between living in town and living on the farm." The traditional distinctions were further blurred as people who worked in town began building homes in the countryside. He explained, "This has meant an increasing nonfarm population in farming country. Thanks to the automobile these urban-country families are within easy reach of the cities and towns" (Blegen 1975: 572, 575).

CHARACTERISTICS OF FARMS FROM THE WORLD WAR II AND POSTWAR PERIOD, 1940-1960

- farms phasing out horses, using more tractors and trucks
- improved farm layout
- farms of increased size
- fields enlarged for mechanized equipment, fences being removed
- decreasing diversification, more specialization
- long-delayed building and infrastructure improvements
- early confinement, specialized, and large-scale livestock and poultry operations
- feed bunks with mechanical feed carriers, stockyards, stock chutes, stock tanks
- hog barns with concrete floors and yards
- fewer poultry houses
- fewer bull barns
- one-story buildings with low-pitched gable and shed roofs
- general purpose or dairy barns with attached silos
- early milking parlors, barns with loose housing
- milk houses
- metal grain bins and corncribs
- early grain dryers
- glass-lined silos
- automobile garages
- larger implement sheds
- multipurpose buildings
- pole-framed buildings
- quonset-type buildings
- steel-sided buildings
- plank and balloon frames of dimensional lumber
- factory-made parts and materials
- prefabricated and sectional buildings and structures
- designs influenced by science, engineering, management principles
- designs influenced by materials manufacturers, agricultural engineers
- designs influenced by technical bulletins

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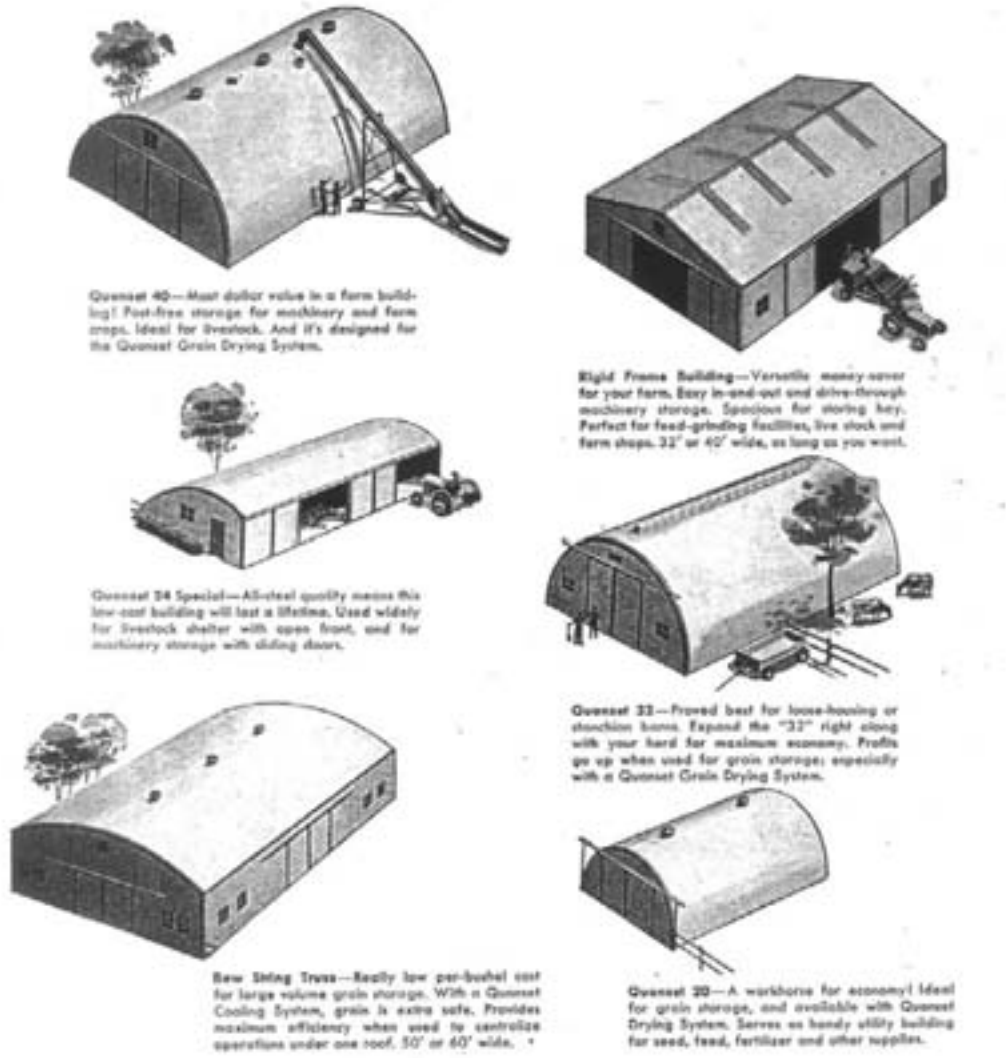
In 1940 less than one-third of Minnesota farmhouses had electricity, and only 12 percent had running water. That year Minnesota ranked 33rd among states in the number of farmhouses with flush toilets, 34th in farmhouses with running water, and 38th in farmhouses with refrigerators. After the war ended, the Minnesota Extension Service began a major push to encourage farm home improvements including indoor bathrooms, central heating, and kitchen modernization. Gramsey Farm, Dakota County, 1978. (MHS photo by Jack Kennelly)

Until the late 1940s, most poultry was distributed on diversified farms throughout the state. After World War II, poultry and egg production became increasingly concentrated on a few large-scale farms, mainly in central and west central Minnesota. By 1956 Minnesota ranked fourth nationwide in turkey production. Turkey barn, location unknown, circa 1947. (MHS photo)

The number of farms in Minnesota dropped by one-third between 1945 and 1964. During the same period, the average farm size increased 40 percent from 165 acres to 235 acres. Mechanization was expensive, and farmers needed to increase acreage to make the investment in machines pay off. Unable to compete, many small-scale farmers left the business, or their land was rented or sold to neighbors when they retired. Their farmsteads were often abandoned. Konopatski Farm, Dakota County, circa 1954. (MHS photo)



In 1957 Stran-Steel's line of buildings – including the "Quonset" brand – was marked for implement sheds, work shops, livestock barns, grain drying and storage, etc. Metal buildings tended to be cold and damp for livestock so were sometimes lined and insulated. The Stran-Steel Corporation had a regional office in Minneapolis. From *Agricultural Engineering* (Feb. 1957).

For much of the year this building is used as a granary, and after the grain is sold it stores vehicles and equipment until the next harvest. The steel's deep corrugation makes the structure strong and self-supporting. The building likely came in prefabricated sections that were bolted together. Retzlaff Farm, Framnas Township, Stevens County, 2004. (Gemini Research photo)