AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search
http://ageconsearch.umn.edu
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

Waite Memorial Book Collection
Division of Agricultural Economics

NO. 485. JUNE 1966 INSTITUTE OF AGRICULTURE, UNIVERSITY OF MINNESOTA

Minnesota Farm Business Notes

IN LIBRARY USE ONLY

Industrial and Geographic Changes in Minnesota Feed Manufacturing

R. Clyde Greer and Dale C. Dahl

This article outlines three major changes in the industrial and spatial organization of the Minnesota feed manufacturing industry from 1954 to 1964. Data and conclusions are part of a comprehensive study of the competitive forces shaping this industry. Most of the data presented were supplied by the Minnesota Department of Agriculture.

In recent years, Minnesota farmers spent from 15 to 20 percent of their total expenditures for production inputs on animal feeds. In 1964, over $207 million were spent for feed. Approximately two-thirds of that amount was spent for commercial feed (premixed feeds, millfeeds, and supplements.)[1] Commercial feed and feed ingredients supplied to Minnesota farmers exceeded 1.8 million tons in 1964, a 64-percent increase over 1954 tonnages.[2]

The industry manufacturing commercial feed and feed ingredients for Minnesota livestock, dairy, and poultry production is composed of three types of business enterprises: (1) the "small mill" or custom mixer, (2) the large commercial feed manufacturer, and (3) the ingredient manufacturer.

The small mill is a custom-mixing operation usually carried on in conjunction with a retail sales outlet for feed, seed, and fertilizer. These small mills usually manufacture (mix) less than 1,000 tons per year for sale. Nevertheless, they represent the greatest number of firms in the industry.

The large commercial feed manufacturer premixes and bags feed for distribution to retail outlets. This enterprise produces from 1,000 to over 100,000 tons annually.

The ingredient manufacturer supplies farmers, small mills, and large commercial feed manufacturers. Frequently, ingredient manufacturing is a secondary operation of the large commercial feed manufacturer.

In 1954 and 1964, about two-thirds of the commercial feeds and feed ingredients purchased by Minnesota farmers were supplied by Minnesota firms (see table 1). While non-Minnesota-based commercial feed manufacturers increased their share of the Minnesota mixed feed market between 1954-59,

(Continued on page 2)

[1] 1964 U.S. Census of Agriculture (Preliminary Report), Mar. 1966.

[2] Commercial feeds exclude unmixed feed grains, unground hay, whole or ground straw, stover, silage, cobs, and hulls. Feed ingredients are the constituent materials that make up commercial feed.

Table 1. State distribution of feed manufacturing firms by tonnage sold in Minnesota, 1954, 1959, and 1964

Area	1954				1959				1964			
	Firms		Tons manufactured		Firms		Tons manufactured		Firms		Tons manufactured	
	No.	%	thousands	%	No.	%	thousands	%	No.	%	thousands	%
Minnesota	746	75.4	762.4	68.3	599	75.7	930.6†	61.1	601	66.8	1252.6	68.4
Contingent states*	106	10.7	173.0	15.4	87	11.0	268.4	17.6	126	14.0	254.6	13.9
Other states	138	13.9	180.8	16.3	105	13.3	324.0	21.3	173	19.2	324.9	17.7
Total	990		1,116.2		791		1,523.0		900		1,832.1	

* Iowa, North Dakota, South Dakota, and Wisconsin.
† Includes a tonnage estimation for 48 of the 599 firms.

Minnesota "Hard-Core" Agribusiness Trends

Dale C. Dahl

This article presents trends in employment and plant numbers for a selected group of Minnesota agribusiness industries during 1949-64. The industry groups discussed are only a part of the total agribusiness sector of the state's economy.[1] Data for this article were supplied by the Minnesota Department of Employment Security.[2]

Minnesota agribusiness includes those firms located in the state that manufacture and distribute items or services used in agricultural production (input industries) and farming itself. It also includes firms that assemble, store, process, and distribute farm products (output industries).

In 1964, employment in this sector of the state's economy represented 32 percent of total state employment. Slightly more than half of that percentage (16.7) represented farm employment—hired and family workers. The remaining 15.3 percent represented nonfarm agribusiness employment.

To arrive at meaningful nonfarm agribusiness employment estimates, it is necessary to *deflate* employment numbers of industries with only an *indirect* or *partial* relationship to agriculture in terms of their productive activities.

However, certain other industries are *closely and directly related* to agricultural production. They depend upon farmers (1) as customers for farm supplies and services and (2) as suppliers of their primary raw products. These industries are the "hard-core" of Minnesota agribusiness because of their close interdependency with agriculture.

Hard-core agribusiness employment fluctuated around a slightly decreasing trend in absolute numbers during 1949-64 (see table 1). Because other employment components of nonfarm agribusiness increased over this period, hard-core employment dropped from about 35 to 28 percent of nonfarm agribusiness employment and from 5.4 to 4.3 percent of total state employment. Total nonfarm agribusiness employment, as a percentage of total state employment, remained fairly stable at slightly over 15 percent during the study period.

(Continued on page 3)

[1] D. F. Fienup and D. C. Dahl, "Agribusiness in Minnesota," *Minnesota Farm Business Notes* No. 408, Aug. 1959; D. C. Dahl and D. F. Fienup, "Minnesota Agribusiness," *Minnesota Farm and Home Science* 17(3), May 1960; D. C. Dahl and D. F. Fienup, "Minnesota Agribusiness Employment," *Minnesota Farm Business Notes* No. 464, July 1964.

[2] Coverage of this data *excluded* firms (1) having less than four employees in towns of less than 10,000 population and (2) operating less than 20 consecutive weeks during a year.

Feed Manufacturing . . .

(Continued from page 1)

Minnesota firms recaptured this share by 1964. And compared to earlier years, in 1964 a greater proportion of the feed sold by non-Minnesota firms into Minnesota was feed ingredients rather than commercial feed.

Accompanying these changes were three major developments in industrial and spatial organization of the Minnesota-based feed industry:

- A sizable decrease in the number of "small mills" from 1954 to 1959, followed by a modest decrease from 1959 to 1964.
- A locational shift in commercial feed manufacturing *from* the Twin Cities area and northern Minnesota *to* areas of heavy livestock concentration.
- The development of "satellite" plants in heavy feed consumption areas by large feed manufacturers.

Changes in Small Mill Numbers

In 1954, there were 746 commercial feed manufacturing *firms* in Minnesota; 663 or 90 percent manufactured (mixed) less than 1,000 tons of commercial feed annually. By 1959, the number of Minnesota *firms* dropped to 599; 502 were of the small mill category (see table 2). This 161 decrease in the number of small custom-mixing operations was not confined to any specific state area but represented a rather general geographic decline.

The decline in local custom-milling operations can be associated with a concerted effort by large firms to "contract" feed sales *directly* with farmers during 1954-59. Most small firms were unable to compete with the credit arrangements and services offered by large firms.

From 1959 to 1964, the small mills continued to decline in number, leaving 482 such firms operating in 1964 (see table 2). This comparatively slower decrease in numbers probably was due to a discontinuance of the direct dealings with farmers by some large manufacturers.

Table 2. Numbers of small feed mills in Minnesota and their percent of state tonnage manufactured, 1954, 1959, and 1964

Year	Number of small feed mills	Percentage of state tonnage manufactured
1954	663	16.5
1959	502	9.6
1964	482	7.4

Geographic Shifts in Feed Manufacture

Spatial distributions of feed manufacturing firms and their tonnage shares in Minnesota in 1954, 1959, and 1964 are presented in the figure.

Area I (Twin Cities) firm numbers remained fairly stable. The relative decrease in Area I for 1959 resulted from a substantial reduction of firms in the 1,000-5,000 tonnage class. These firms also suffered from the direct-dealing expansion activities of large firms in 1954-59. The increase in firm numbers from 1959 to 1964 resulted from the influx of metropolitan-based ingredient manufacturers.

The particularly notable change over 1954-64 for the Twin Cities area was the decrease in commercial tonnage shares of state totals. Similar decreases in relative tonnage figures were recorded in Areas IV (Red River Valley) and V (the Northeast), despite a relative stability in firm numbers.

These losses in shares of the state's total manufacturing tonnage became relative gains in southern Minnesota, Areas II and III. Since these are the Areas of heaviest livestock and dairy production, a reason for the direction of geographic decentralization is suggested. Feed manufacturing is locating increasingly within areas of heavy feed consumption.

Another major reason for the geographic shifts is the development of "satellite" plants by large firms having headquarters in the Twin Cities area.

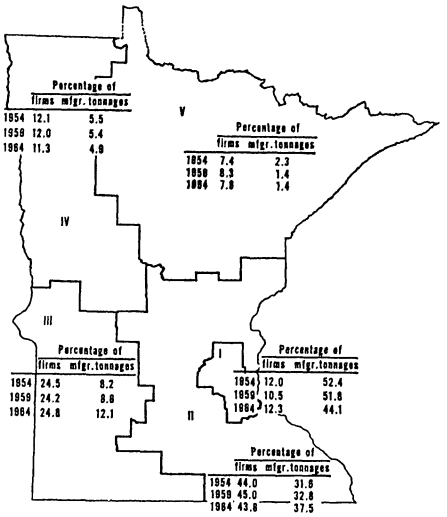
Development of Decentralized and Large Firm Satellite Plants

The decreasing number of small feed mills was counterbalanced by an *increasing* number of large commercial feed manufacturing firms during 1954-64. While small mill firm numbers continually decreased, the number of large firms increased from 83 in 1954 to 119 in 1964.

Table 3 data indicate the changing spatial distribution of large commercial feed manufacturing *plants* (rather than firms). Two conclusions can be drawn from these figures.

First, the number of large manufacturing *plants* recorded increasingly exceeded the number of *firms* recorded in the 3 years studied. Some large feed manufacturers are building "satellite" plants in areas of heavy feed consumption. Moreover, new, independent, large feed manufacturing plants are locating in areas of heavy livestock and dairy production.

Patterns of large firm movement to southern Minnesota paralleled shifts in



Percent of firms and manufacturing tonnage by area, Minnesota, 1954, 1959, and 1964

manufacturing tonnage shares (see the figure). However, the increase in large plant numbers in the Twin Cities area from 1959 to 1964 requires explanation. These new plants were mostly "ingredient" manufacturers rather than commercial feed manufacturers. Therefore, they fell outside the same competitive patterns suggested by the other figures.

Conclusions

These recorded changes in the industrial and spatial organization of the Minnesota manufactured feed industry have implications for the feed industry and Minnesota's economy. New plant development may be more closely associated with livestock production and feeding today than in the past.

The future for custom-mixing or small mill operation is in question. Contract feeding may be on its way out as a competitive practice in the feed industry. However, further intensive study is required to justify these statements.

In addition, it appears reasonable to raise new hope for the location of large-scale feed manufacturing activity in rural areas of Minnesota.

Table 3. Spatial distribution of Minnesota plants manufacturing more than 1,000 tons of commercial feed and feed ingredients, 1954, 1959, and 1964

Year	Area I	Area II	Area III	Area IV	Area V	State total
	number of plants					
1954	28	34	14	6	4	86
1959	18	37	21	12	5	93
1964	24	48	37	11	5	125

Agribusiness Trends . . .

(Continued from page 1)

Table 1. "Hard-core" and total nonfarm agribusiness employment, 1949, 1954, 1959, and 1964

Year	Total hard-core employment	Total nonfarm agribusiness employment	Hard-core as percent of nonfarm agribusiness
	number		percent
1949	63,118	180,636	34.94
1954	61,800	184,234	33.54
1959	62,366	207,940	29.99
1964	61,777	220,413	28.03

The component industry groups in the hard-core are identified in table 2. The industry group titles refer to specific industrial classifications that are used commonly by agencies recording and reporting data by industry.[3]

Agricultural Service industries include contract shellers, packers, crop dusters, veterinarians, poultry hatcheries, and firms providing horticultural services to farmers. The sharp increase in establishment and employment numbers in these firm types was consistent with the increased farm expenditures for their services.

Agricultural Chemical plants manufacture fertilizer, pesticides, herbicides, and other agricultural chemicals. While rising plant numbers leveled off from 1959 to 1964 due to an increased number of small local blending plants, employment rose along with increased fertilizer and chemical usage by farmers.

Farm Machinery industries include manufacturers of farm tractors and equipment. The number of plants, after remaining stable during the 1949-54 period, increased in later years. Increases in plant numbers and capacity did not positively offset employment decreases due to automation until 1959-64.

Meat Product firms slaughter and process red meats and poultry. The number of plants decreased over the study period. But establishments, by introducing "streamlined" procedures and equipment and maintaining employment numbers, handled the increased volume of livestock and poultry processed during 1949-64.

Dairy Product firms process fluid milk and manufacture dairy products derived from fluid milk and cream. A consistent series of establishment numbers was unavailable for 1949-59. However, the decrease recorded from 1959 to 1964 was consistent with other studies that showed plant declines in the earlier years. Due to technological innovation and severe competitive pressures, employment declined modestly.

Canning and Preserving firms can, freeze, and preserve fruits, vegetables, and seafoods. The number of establishments decreased from 1959 to 1964, but employment fluctuated around a stable trend. Decreases recorded were mostly small canning operations due to the increased volume of fruits and vegetables being frozen rather than canned.

Grain Mill Product firms handle grains for preparation of flours, animal feeds, cereal products, and other milling operations. The 1949-54 decline, the 1954-59 increase, and the 1959-64 decrease in establishment numbers represent conflicting trends in food grain and feed grain milling activities. Animal feed manufacturing plants increased in number while flour milling establishments became fewer in number and larger in size.

Bakery Product firms include manufacturers of breads, biscuits, crackers, and other bakery products. Baking establishments decreased in number and increased in size due to automated baking processes. Employment generally declined over the data period.

Sugar and Confectionary Product establishments include sugar beet processors and confectionary product producers. The decrease in plant numbers was recorded primarily for confectionary product producers; the increased employment over the period was associated with an increased volume of sugar beet processing.

Beverage establishments include manufacturers of malt and distilled liquors and bottled and canned soft drinks. The decline in establishment numbers reflects a decrease in number and an increase in size of soft drink establishments. The employment stability was associated with an increased volume of malt liquor manufacturing.

Miscellaneous Food firms, a "catch-all" category for food processing industries, include soybean oil mills, shortening and margarine manufacturers, and preparators of various multi-ingredient food products. Plant and employment fluctuations reflect varied trends in these firm types. In general, increases in establishments and employment resulted from increased soybean production volumes and margarine consumption.

Stockyards and Commodity Exchanges changed as follows over the period: the number of small "concentration" points and auctions for livestock increased while large stockyards decreased in number and employment.

Plant number and employment trends of the 12 groups within Minnesota hard-core agribusiness are diverse and incompletely explained here. Nevertheless, two major trends apparently are evident:

- Input industries had increases in establishments and employment.
- Output industries had decreases in plant numbers but increases in plant size. These industries registered a modest decrease in employment.

These general trends suggest plant and employment growth in the input industries and concentration and employment decline in the output industries.

Table 2. Annual average establishment and employment numbers for selected agribusiness industries, Minnesota, 1949, 1954, 1959, and 1964

Years	Establishments	Employment	Establishments	Employment	Establishments	Employment	Establishments	Employment
	Agricultural services		Agricultural chemicals		Farm machinery		Meat products	
1949	*	593	15	161	67	7,099	68	16,545
1954	46	555	22	309	67	5,718	69	17,860
1959	67	722	24	640	77	5,018	61	16,930
1964	93	883	24	735	83	5,510	60	17,846
	Dairy products		Canning and preserving		Grain mill products		Bakery products	
1949	*	11,414	*	5,468	91	7,602	90	4,588
1954	*	11,415	*	5,382	85	7,195	80	4,240
1959	566	11,271	79	5,913	96	7,088	78	4,112
1964	499	10,143	67	5,600	92	6,943	55	3,551
	Sugar and confectionary products		Beverages		Miscellaneous food		Stockyards and commodity exchanges	
1949	38	1,493	*	4,679	61	2,838	9	638
1954	29	1,480	*	4,652	50	2,365	8	629
1959	24	1,573	106	4,673	65	3,901	6	525
1964	18	2,172	88	4,654	62	3,284	6	456

* Changes in standard industrial classification between 1954 and 1959 do not permit a consistent establishment series. Consistent employment estimates were possible, however.

[3] See: *Standard Industries Classification Manual*, Bureau of the Budgets, Wash., D.C., 1957.

the outlook corner

Rural Development and Agribusiness Trends

Dale C. Dahl and John S. Hoyt

The articles in this *Minnesota Farm Business Notes* both suggest and deny the likelihood of agribusiness industries locating in rural parts of the state. In terms of local agribusiness activity, plant location trends suggest two generalizations:

- That the **output industries** (those that process, store, and distribute agricultural products) tend to be composed of a few large firms which are in cities of over 25,000 population.

- That the **input industries** (those that manufacture and distribute supplies and services for farm production) tend to be composed of *more* both large and small firms which are in small rural communities throughout Minnesota.

These generalizations are not completely tested. In fact, some recent evidence suggests that certain food and kindred product industries (output industries) now may be locating in areas of heavily specialized agricultural production.

These trends and their likely effects upon future agribusiness geographic organization are presently being studied. This study concerns the locational characteristics of nonmetropolitan industries, primarily agribusiness. This study's importance is characterized as follows:

Dramatic employment declines in agriculture and other resource sectors of Minnesota's economy have caused serious adjustment problems throughout the state. The adjustment problem has similarities in both the agricultural and resource areas; underemployment has contributed significantly to declines in per capita income. Because of these adjustments, economic activity has decreased in Minnesota and the tax base has been reduced.

In response to these adjustments, economic development committees have formed in many local communities and areas. Each committee attempts to assess the area's resource structure in the hope of reversing the outmigration and slowdown in economic activity. State and national programs have been, or are being, developed to encourage "self-help" programs.

While searching for solutions to these problems, local communities frequently have focused on expanding existing industry and/or attracting new industry. Only a few communities have been successful. Perhaps part of the reason why many nonmetropolitan communities have been unsuccessful is the inadequate knowledge regarding the basis for locational guidelines in seeking new industry.

Locational patterns of manufacturing and other industrial sectors locating in rural areas are undefined for Minnesota. Although some data are available for particular industrial and geographic sectors, this information has not been aggregated and analyzed. Information and analysis regarding the locational characteristics of nonmetropolitan industries in Minnesota are necessary for rational decision-making by local economic planners. Such analysis is also important to state and national program leaders concerned with rural area development programs.

The study underway is in its early phases of data collection and collation. Examination of data on changes in employment distribution by county for 1940, 1950, and 1960 revealed two apparent characteristics. One, referred to above, is the employment growth in the food and kindred products manufacturing sector in counties having **both** a large percentage of total employment in agriculture and a high level of absolute output in the farm sector.

Another characteristic concerns employment distribution pattern changes over time. Employment distribution for Minnesota in 1960 was roughly similar to the U.S. distribution in 1940. Similarly, for many Minnesota counties, employment distribution in 1960 was similar to the state's average pattern for 1940. Furthermore, radial movement outward from the Twin Cities metropolitan area shows pattern distribution changes that seem to interrelate spatial distance and temporal "lags."

Refined analysis of apparent relationships is required before rational recommendations for future development patterns can be made. Nevertheless, evidence to date suggests that such rationale does exist and can be utilized appropriately.

Minnesota Farm Business Notes

Prepared by the Department of Agricultural Economics and the Agricultural Extension Service.

Published by the University of Minnesota, Agricultural Extension Service, Institute of Agriculture, St. Paul, Minnesota 55101.

Agricultural Extension Service
Institute of Agriculture
University of Minnesota
St. Paul, Minnesota 55101
Luther J. Pickrel, Director
Cooperative Agricultural Extension Work
Acts of May 8 and June 30, 1914
OFFICIAL BUSINESS
5-66 2,995

PENALTY FOR PRIVATE USE TO AVOID PAYMENT OF POSTAGE, $300