



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

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

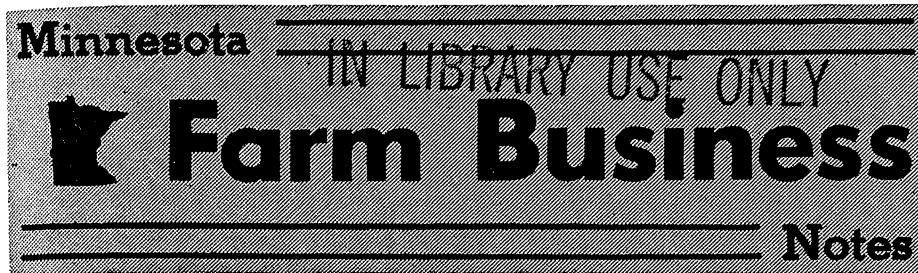
This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

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.*



Analyzing Spring Wheat Protein Premiums

John D. Hyslop and Reynold P. Dahl

Because quality is an important price determinant in wheat, wheat is traded according to standard grades. However, one important quality determinant—protein—lies outside the established grading system.

Protein may be a more important quality factor in hard wheat than any factor included in the standard grades. It is on a par, at least, with test weight which largely determines the flour yield from a given quantity of wheat.

Protein premiums can significantly contribute to growers' incomes. For example, in the 1958 crop year, the price of wheat containing 16 percent protein averaged 20 cents per bushel at Minneapolis over the price of wheat with only 11 percent protein. This amount was more than 10 percent of the value of 16 percent protein wheat. In 1953, the premium averaged 47 cents, more than 18 percent of the value of 16 percent protein wheat.

Since 1949, spring wheat protein premiums have tended to decline (see

(Continued on page 2)

Trends in Farm Receipts and Expenses

T. R. Nodland and S. A. Engene

Great changes have taken place in farming in southern Minnesota during the past 25 years. Farm records kept by members of the Southwestern and Southeastern Minnesota Farm Management Services provide detailed information about these changes. Although these farmers are better than average managers, their changes are fairly representative of those occurring on all farms. Their types of farms are also typical of the area.

Size of farm increased about 15 percent in both groups between 1940 and 1964 (see table 1). During this same period, capital used on these farms almost tripled.

The value of products produced, expenses, and labor earnings are shown in table 2 for the southwestern Minnesota farmers and in table 3 for the southeastern Minnesota farmers. The income shown is the "value added," not the cash income. Purchases of livestock, feed, fertilizer, and seed were subtracted from sales; increases in inventories of livestock and feeds were added and decreases were subtracted.

Similarly, expenses for power, machinery, and buildings do not represent cash outlays for the year. Rather, expenses include yearly depreciation plus annual outlays for repairs, maintenance, gas, oil, and other direct operating expenses.

Labor expenses include the value of

labor of unpaid family members other than the operator, plus wages and board for hired workers. The interest on capital managed is an estimated charge—5 percent for all capital managed.

The most striking change in livestock income was the large increase in cattle feeding in the southwestern area. Farmers in the southeastern group increased their emphasis on dairy. Poultry production dropped in both areas, although the value produced remained fairly constant.

The cost of feed rose more rapidly than the value produced by livestock. This situation was due in part to shifts in the kinds of livestock but more to changing margins of profit.

During this period, the value of crops produced became an increasingly large part of the total income on these farms, especially in the southwestern area. In that area, the value of crops produced was 59 percent of the total value produced in 1940-44 and 72 percent by 1960-64.

Horses were still an important power supply on these farms in 1940. The average number of horses per farm was more than four; only three farmers had no horses.

From 1940 to 1964, power cost increased more rapidly than income. Total power costs took about 10 per-

(Continued on page 2)

Table 1. Size of farms and capital managed, Southwestern and Southeastern Minnesota Farm Management Services, 1940-64

Item	1940-44	1945-49	1950-54	1955-59	1960-64
<i>Southwestern Minnesota</i>					
Number of farms per year	165	140	138	135	135
Acres per farm	282	254	265	293	335
Capital managed	\$36,133	\$40,590	\$57,692	\$75,246	\$99,907
<i>Southeastern Minnesota</i>					
Number of farms per year	177	169	162	165	158
Acres per farm	227	223	226	235	256
Capital managed	\$25,912	\$31,402	\$42,663	\$49,342	\$60,984

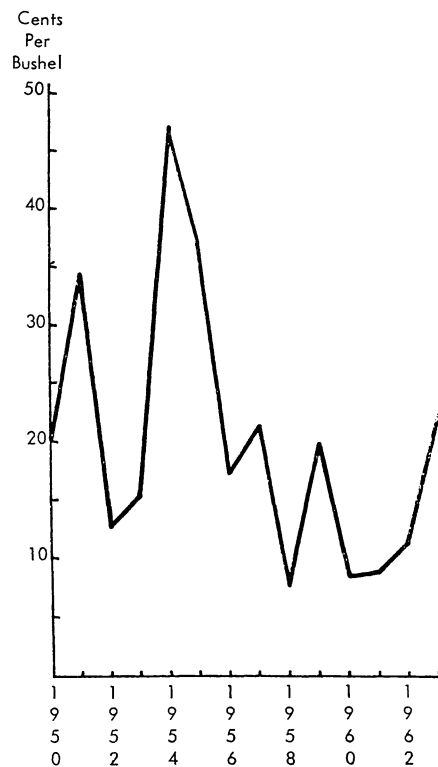


Figure 1. Protein premium paid on 16 percent protein wheat over 11 percent protein wheat at Minneapolis, year ending July 31, 1950-62. Source: The Daily Market Record.

Farm Receipts and Expenses . . . (Continued from page 1)

Table 2. Income and expenses, Southwestern Minnesota Farm Management Service, 1940-64

Item	1940-44	1945-49	1950-54	1955-59	1960-64
dollars					
Income:					
Value added by livestock:					
Dairy cattle	1,302	1,604	1,739	2,059	2,522
Beef breeding cattle	448	740	760	549	283
Feeding cattle	1,444	1,943	3,373	6,537	8,562
Hogs	3,653	6,641	7,194	6,654	7,969
Sheep	401	303	367	428	199
Poultry	1,124	1,520	1,366	1,369	1,365
Total	8,372	12,751	14,799	17,596	20,900
Less value of feed consumed	5,294	7,894	10,274	12,123	15,637
Return over value of feed	3,078	4,859	4,525	5,473	5,263
Value of crops produced	5,398	8,678	9,688	9,997	15,008
Other farm receipts	755	429	505	580	673
Total value produced	9,231	13,964	14,718	16,050	20,944
Expenses:					
Horses	174	96	16	3	5
Tractors	338	671	972	1,255	1,511
Trucks	92	261	361	309	319
Auto (farm share)	172	214	353	576	570
Gas engines, electric motors, and electricity	46	85	150	230	278
Hired power	84	138	174	300	382
Crop machinery	323	659	1,072	1,474	1,605
Livestock equipment	115	198	259	435	509
Farm buildings	352	625	817	1,090	1,331
Miscellaneous livestock expense	136	247	378	525	592
Hired and unpaid family labor	1,092	1,371	1,462	1,696	1,970
Property taxes	330	403	622	910	1,449
Interest on capital managed	1,807	2,030	2,885	3,762	4,990
General farm expenses	98	174	256	364	430
Total expense	5,159	7,172	9,777	12,929	15,941
Labor earnings	4,072	6,792	4,941	3,121	5,003

Table 3. Income and expenses, Southeastern Minnesota Farm Management Service, 1940-64

Item	1940-44	1945-49	1950-54	1955-59	1960-64
dollars					
Income:					
Value added by livestock:					
Dairy cattle	2,542	4,763	5,218	6,237	8,265
Beef breeding cattle	131	201	233	225	290
Feeding cattle	220	222	539	868	1,112
Hogs	2,552	3,563	4,167	4,468	5,686
Sheep	138	156	149	130	117
Poultry	1,346	1,917	1,590	1,216	1,003
Total	7,574	11,861	13,515	14,841	18,672
Less value of feed consumed	4,258	6,880	8,181	8,956	11,230
Return over value of feed	3,316	4,981	5,334	5,885	7,442
Value of crops produced	3,974	6,231	7,527	8,456	9,822
Other farm receipts	547	418	460	511	579
Total value produced	7,837	11,630	13,321	14,852	17,843
Expenses:					
Horses	202	143	57	11	2
Tractors	253	547	802	1,006	1,234
Trucks	116	175	281	332	315
Auto (farm share)	120	238	335	444	505
Gas engines, electric motors, and electricity	68	122	201	286	353
Hired power	80	197	265	355	418
Crop machinery	247	499	910	1,236	1,363
Livestock equipment	117	186	245	360	468
Farm buildings	331	601	846	1,058	1,327
Miscellaneous livestock expense	117	218	357	527	728
Hired and unpaid family labor	1,114	1,654	1,687	1,914	1,960
Property taxes	270	393	632	861	1,302
Interest on capital managed	1,296	1,570	2,133	2,467	3,049
General farm expenses	84	150	238	314	409
Total expenses	4,417	6,693	8,989	11,071	13,433
Labor earnings	3,420	4,937	4,332	3,781	4,410

Protein Premiums

(Continued from page 1)

figure 1). This article is a preliminary report of a study of factors influencing the level of protein premiums.

Commodity Credit Corporation Holdings

One item studied is the effect of Commodity Credit Corporation (CCC) holdings of spring wheat on protein premiums. Government spring wheat stocks represent a potential source of wheat protein from which millers can meet their requirements.

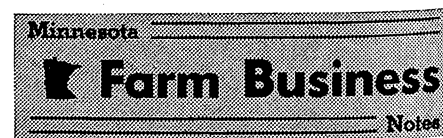
Government price support activities have resulted in large wheat accumulations in CCC stocks. Although hard winter wheat makes up the largest share of these stocks, CCC stocks of hard spring wheat are sizable. Spring wheat stocks grew from almost nothing at the end of World War II to 178.3 million bushels as of July 1, 1964, reaching a peak of 198.8 million in 1961. These stocks represent about 98 percent of the total spring wheat carryover.

Most government-owned wheat is

cent of the total value produced in 1940-44 but about 15 percent in 1960-64. Costs of machinery, equipment, and buildings rose in about the same proportion.

Labor cost was the only cost that increased modestly. The number of workers per farm fell from 2.2 to 1.7.

Since expenses rose more rapidly than income during this period, labor earnings did not rise. In fact, highest earnings were obtained during the immediate postwar period of 1945-49. Labor earnings are the amounts that would be left as a salary to the farm operator if he paid hired man's wages for the labor of other family members and 5-percent interest on all capital used.



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.

stored in commercial elevators; CCC holds warehouse receipts with protein certificates attached. CCC wheat is not usually stored in commercial elevators on an "identity preserved" basis. Therefore, it is not physically segregated from other hard red spring wheat stored in these elevators.

So, the elevator operator can use CCC wheat in his merchandising operations just like any other wheat he holds. The warehouseman may then sell high protein CCC wheat in a year when premiums are high. He replaces it with wheat of the same grade but lower protein in order to maintain his storage commitment because he must deliver this wheat to CCC when it is wanted. Therefore, protein in CCC wheat becomes available to the market without affecting the total quantity of wheat sold.

Of course, the warehouseman is responsible for grade, including protein, to within 0.3 percent of that specified on the warehouse receipt. When he receives a load-out order from CCC, he must deliver wheat of the quality specified (within allowable tolerances). If he cannot, he must pay the difference between the price of wheat he has and the price of wheat called for at the current market prices. In the case of a terminal warehouse, CCC may reject shipments not meeting the protein content specified in the load-out order.

Therefore, the warehouseman must balance the immediate gain from selling protein today against a possible future penalty. Opportunities of trading wheat with CCC may present warehousemen with sources of potential revenue in addition to regular storage fees.

As wheat stocks grow, warehousemen can find increased opportunities to "trade protein" with CCC; the result should be a depressing effect on protein premiums. In addition, with greater stocks, the volume and protein content of current receipts should have less and less effect on protein premiums.

The distribution of protein within

Distribution of protein content among CCC holdings of hard wheats, May 31, 1965

Protein category	Hard red winter wheat	Hard red spring wheat
	percent of total	
13 percent and over	43.5	81.1
14 percent and over	17.9	41.4
15 percent and over	5.2	23.2
16 percent and over	1.1	7.1

Source: CCC Report, July 28, 1965.

CCC stocks provides another measure of the opportunity to "trade protein" (see the table). Over 80 percent of the hard spring wheat owned by CCC has 13 percent protein or more. Over 23 percent of these stocks contain at least 15 percent protein. Although CCC stocks of hard winter wheat are lower in protein than spring wheat, more than 43 percent of them have at least 13 percent protein.

Factors Important in Minneapolis

The protein premium paid on spring wheat in Minneapolis is influenced primarily by three factors:

1. The average protein content of spring wheat receipts at Minneapolis. Since 1950, the proportion of total receipts in the high protein range (over 14.5 percent) has increased while the proportion containing 12.5 percent or less has declined (see figure 2).

2. The volume of wheat receipts at Minneapolis and Duluth.

3. The volume of wheat stored at Minnesota terminals. A large portion of these stocks is composed of CCC-owned wheat.

The analysis showed that 85 percent of the variability in protein premiums was associated with these three factors. If the protein content of wheat receipts increases by 1 percent, the premium paid on 15 percent protein wheat over 11 percent protein wheat declines by 9.8 percent—a relatively large change. Total premium income to sellers as a group declines as the average protein content of receipts increases because an increase in protein content is accompanied by a larger percentage decline in the protein premium.

Moreover, if wheat receipts at Minneapolis increase by 1 percent without any change in their average protein content, the protein premium falls by only 0.8 percent. Since the decline in the premium is less than proportional to the increase in receipts, total premium income to sellers as a group increases.

Finally, the protein premium for 15 percent protein wheat increases by 0.61 percent as terminal stocks increase by 1 percent. This situation is definitely at odds with what is known about the behavior of elevator operators. The opportunities for "trading protein" with CCC should result in a decline in the protein premium as elevator stocks increase. The proper explanation for this

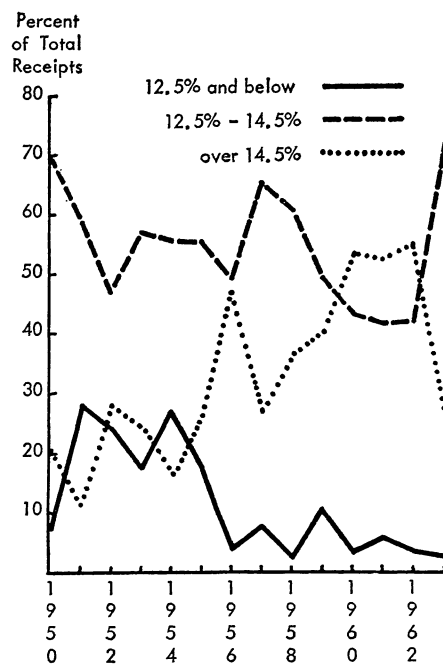


Figure 2. Percentage distribution of spring wheat receipts into three protein ranges: 12.5 percent and below, 12.6-14.5 percent, and over 14.5 percent; year ending July 31, 1950-62. Source: The Daily Market Record.

result may lie with factors for which data are not currently available.

Other Factors at Work

First, protein supplies in hard winter wheat may be important. Substitution occurs between spring and winter wheats in making bread flours; most bread flours are a blend of these wheats. Probably, the protein content of winter wheat supplies (including CCC stocks) greatly determines the extent of substitution and the composition of blends.

Second, spring wheat stocks in positions other than Minnesota terminal elevators and the share of these owned by CCC may provide a better measure than data used of the influence of stocks.

Finally, protein content of stocks may be the most important missing factor. If these data were available for the period studied, the effect of protein in stocks could be analyzed just as in receipts.

However, the analysis tends to show the effect of current production on protein premiums. Analysis of how premiums vary with changes in current production of spring wheat protein can help in understanding why premium income has declined while newer wheat varieties and nitrogen fertilizers have increased the wheat protein supply. ■

the outlook corner

Barley Production in Minnesota

J. C. Chai and H. C. Pederson

Minnesota ranked third in the nation in barley production during the early 1950's. Since then, Minnesota's production has declined although nationally production has increased.

In 1939, Minnesota produced nearly 60 million bushels of barley; in 1964, it produced only about 20 million bushels. During this period, Minnesota's proportion of the nation's total production declined steadily from 21 to 4.9 percent.

The decline in Minnesota's barley acreage since 1951 has been accompanied by noticeable shifts in production (see map). Traditionally, western Minnesota, especially the Red River Valley, was a major barley-producing area. However, prior to 1951, barley also was an important crop in the southeast, south-central, southwest, and central crop-reporting districts. These districts often produced about a third of the state's barley.

Since 1951, a drastic decline in barley production has occurred in these four districts. By 1964, the west-central and northwest districts actually accounted for 97 percent of the state's barley production—leaving only 3 percent accounted for by the rest of Minnesota.

In the northwest and the west-central districts, six counties along the North Dakota border accounted for most of the state's barley production (see table). These counties were Kittson, Marshall, Polk, Norman, Clay, and Wilkin.

Although production in the six counties declined in recent years, barley is still an important crop. In 1964, barley acreage accounted for 11 percent or

more of the total crop acreage in each of the six counties.

The following developments are probable reasons for the changes occurring in Minnesota's barley production.

● Soybeans are now an important cash crop for farmers in southern Minnesota where climate, soil, and other factors are favorable to both its production and marketing. The increase in soybean acreage probably has resulted in part from a reduction in both barley and oat acreages.

In the southwest district, for example, barley acreage dropped from 161 thousand acres in 1951 to 2 thousand acres in 1964. Soybean acreage increased from 179 thousand acres to 602 thousand acres during the same period. At the same time, oat acreage declined from 5 million acres to 3 million acres. Some of the recent increase in wheat production in southern Minnesota may also have decreased emphasis on barley.

A substantial increase in soybean acreage, no doubt replacing some barley, was also reported for the northwest and west-central districts. But such substitution has not been a major factor in the northern part of this area.

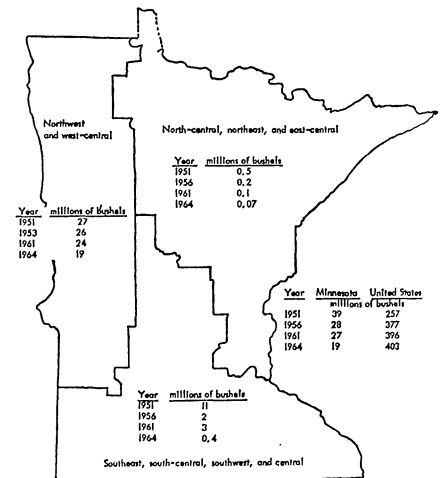
● Barley as a crop differs from corn or oats in that a substantially smaller portion of it is used for feed. The malting industry accounted for roughly 22 percent of the barley disposition in the United States in 1964. Minnesota producers generally grow malting barley

varieties and try to meet malting barley requirements. So a larger share of the crop qualifies as malting barley in Minnesota. Market prices paid for malting grades are substantially higher than for feed barley.

The outlook for barley production in Minnesota depends upon its ability to compete with alternative crops. The expected yield and price of both malting and feed barley are determining factors.

In southern Minnesota, corn and soybeans are major cash crops. A departure from present barley acreage trends is unlikely.

Malting barley probably will continue to be a primary cash grain crop in the Red River Valley. However, producers will have to compete with barley producers elsewhere in the United States and Canada. Nevertheless, the demand for malting barley is increasing so there is a good market potential for malting barley.



Barley production, Minnesota and United States, 1951-64. Source: Minn. Agr. Statistics.

Barley production and barley acreage as a percent of total crop acreage, Red River Valley, 1964

County	Barley production	Barley acreage
	million bushels	percent of total crop acreage
Kittson	1.5	13
Marshall	2.0	12
Polk	5.0	16
Norman	2.0	13
Clay	2.0	11
Wilkin	1.5	11

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
 8-65 2,885

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