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Minnesota Farm Business Notes

Organizing Farms in Southwestern Minnesota

H. R. Jensen

Improving your farm plan for increased income is a complex task. Many choices exist: alternative crops, livestock, and production techniques; addition of more capital to present acres; or addition of more acres.

Furthermore, your final plan must generally be developed by you; what your neighbor does is not always the best guide. He may have different kinds or quantities of equipment, buildings, capital, labor, and management abilities. These differences influence the selection of the best plan for each farm.

We made this study to provide guidelines for southwestern Minnesota farmers for reorganizing their farms to improve incomes. A study of 195 farms provided the basis for representative farm classifications. These classifications, in turn, were analyzed.

We sought an answer to this question: Can crop and livestock programs on the representative farms be reorganized to improve incomes given: (1) available machinery, buildings, and labor on the farms, (2) available cash or near-cash, including cash from selling all crop and livestock inventories, (3) available credit, and (4) participation in feed and wheat programs?

Some farmers have the opportunity to buy more land while others don't. Therefore, we first analyzed income-improving opportunities given existing acreages. Afterwards, we gave each farmer the opportunity of buying up to 160 acres of additional land.

Our Study Procedure

We interviewed a random sample of 195 farm operators in an area with similar soils and climate (see map). We obtained information on resource supplies and farm organization from each farmer. The farms were classified into four types and three sizes. From these classes, we constructed 12 representative farms.

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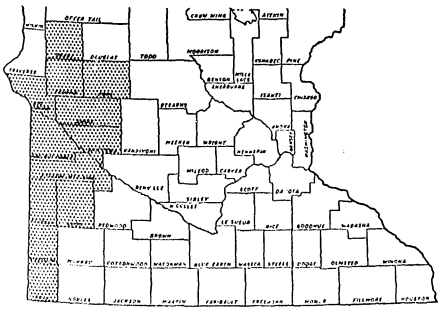

The Study Area

SHOULD I CHANGE TO NARROW ROWS?

Paul R. Hasbargen and Rex Smith

The switch to narrow row corn and soybeans has been a lively discussion topic in the Corn Belt during the past year. Many Minnesota farmers already have made this change. This article summarizes the advantages and disadvantages of narrow rows as reported by 33 of these innovators who responded to a survey questionnaire.

Cost Analysis

Cash Operating Expenses

Estimates of cash operating expenses affected by the change in row spacing are shown in table 1.

Seed—Costs went up as farmers increased corn planting rates from 21,000-23,000 to 23,000-25,000 plants per acre. (Perhaps some planting rates were too high for the particular varieties used.) Since many farmers now grow high cost, single cross varieties, this cost is reflected in table 1.

Insecticide—Entomologists recommend that if organic phosphates are used, the amount of insecticide applied *per row* should remain the same regardless of row spacing. Since the number of rows increases by one-third with the change from 40-inch to 30-inch spacings, insecticide costs would increase a similar amount. The farmers interviewed increased their per acre applications by about 30 percent when they shifted to narrow row corn.

Herbicide—Costs also must increase by about one-third when a band application is used. The average expenditure for farmers using the same materials in a band application increased from $3.15 per acre of corn in 40-inch rows to $4.10 per acre in 30-inch rows. Some farmers actually changed their application method from band to broadcast when they shifted to narrow rows. Others indicated that they planned to make this shift.

Fuel costs—Changes in fuel costs associated with the shift to narrow rows depend upon changes in the:

- Absolute widths of machines involved.
- Draft requirements.
- Number of cultivations.

Most farmers decreased the number of cultivations by at least one. They found that early shading of the ground hindered late weed germination so that fewer cultivations were required. The fuel savings shown in table 1 primarily resulted from this reduction in cultivations.

The other two factors affecting fuel costs almost cancel out each other when the shift is from four to six row planters and cultivators and from two to three row corn harvesting. The higher draft requirements of large machines about offset the advantage of overall increased machine widths.

Table 1. Effect per acre of row spacing of corn and soybeans upon selected cash operating costs

Factor	40-inch rows	30-inch rows	Change to narrow spacing
	corn		
Seed	$ 4.50	$ 5.00	+$ .50
Insecticide	2.00	2.60	+ .60
Herbicide	3.15	4.10	+ .95
Fuel & oil*	1.00	.75	− .25
Total	$10.65	$12.45	+$1.80
	soybeans		
Seed	$ 3.00	$ 4.00	+$1.00
Herbicide	3.00	4.00	+ 1.00
Fuel & oil*	.90	.70	− .20
Total	$ 6.90	$ 8.70	+$1.80

* Calculated on basis of changing from four row to six row planters and cultivators and from two row to three row combine heads, and of reducing cultivations from two to one.

Capital and Labor Requirements

The change in capital requirements varied greatly among respondents. By converting existing equipment, some

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Organizing Farms . . .

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The four-type classification included: (1) livestock, (2) cash grain, (3) dairy, and (4) general. Farms with 50 percent or more of their gross sales from hogs and beef, from cash grain, or from dairy were classed as livestock, cash grain, or dairy farms, respectively. Farms on which no one enterprise returned as much as 50 percent of the gross sales were classed as general. Then, we classified each farm type into three size groups: (1) small, less than 180 crop acres, (2) medium, 180-259 crop acres, and (3) large, 260 or more crop acres.

An analysis based on representative farms is more useful for farm planning than an analysis based on an average of all farms. For example, a southwestern Minnesota farmer with a particular type and size of farm may feel that a farm situation studied here is quite similar to his own. Then, he can use the profit-maximizing plan for this representative farm as a guideline for his own operation.

After determining resource supplies for each representative farm, we developed, with the help of crop and livestock specialists, output levels for crop and livestock production alternatives. These alternatives were considered attainable with use of recommended inputs and management practices.

For crops, the per acre yields used were: corn, 70 bushels; soybeans, 25 bushels; wheat, 35 bushels; flax, 15 bushels; and alfalfa-brome, 3.5 tons.

For livestock, we used the following:

Hogs—8 pigs per litter, marketed at 6 months at 225 pounds.

Calf feeding—calves bought at 430 pounds in October and sold the following early September or late October (depending on system) at 1,030 or 1,110 pounds.

Yearling feeders—calves purchased at 693 pounds and sold 180 days later at 1,089 pounds.

Dairy—production at 10,000 pounds of 3.5-percent fat-corrected milk per cow.

Development of information based on a set of price projections also was necessary. In farm organization planning, relative prices are important. Therefore, we were more concerned with having selling prices in line with one another than we were about absolute levels. Selling prices used were: corn, $0.90; hogs, $14; choice steers, $19.90; manufacturing milk, $3.

We set feeder calf prices at $1.10 above the $19.90 selling price and feeder yearlings at $0.90 below. Purchased corn was figured at $0.10 above the selling price. We projected other buying prices at levels reflecting recent trends.

By using an electronic computer, we then analyzed the information on these crop and livestock alternatives, prices, and restrictions. Profit-maximizing plans for each representative farm were calculated.

In the near future, you will be able to get the specific study findings in an Agricultural Experiment Station bulletin, *Profitable Farm Adjustments in Southwestern Minnesota.* However, some guidelines are listed below.

Farm Organization Guidelines

● Corn and soybeans are strong competitors for the use of land. However, do not overlook flax or wheat, within limits of farm program restrictions, as crop alternatives.

For example, the representative medium livestock farm was most profitably organized with full use of its corn allotment of 81 acres, full use of its wheat program acreage of 15 acres, 49 acres of soybeans, and 10 acres of flax.

● When reorganizing, most farmers should consider increased emphasis on cattle and hog feeding. Reorganization of the medium livestock farm for maximum profits increased sow farrowings from 21 to 31 head and fed cattle from 25 to 131 head.

● Beef cow herds were not profitable alternatives for the farm situations analyzed. Nevertheless, situations may exist where such herds would be included in the best farm plan.

● Dairying with production of manufacturing milk may be in income-improving plans on farms already equipped for dairying. The large dairy farm, with 34 cows in the existing organization, was most profitably organized with 30 cows.

On the other hand, production of manufacturing milk probably cannot compete with cattle and hog feeding on farms where dairy facilities must be added. Therefore, the medium cash grain farm, which had no dairy facilities, was most profitably organized with no dairy cows.

● If additional land is not available, consider increasing your feed supply through corn purchase to expand beef and hog production. For instance, when the small dairy farm was most profitably organized, about 4,900 bushels of corn were purchased to supplement homegrown corn for feed.

● If additional land is available, carefully consider purchasing it. A land purchase may increase incomes and add to net worth substantially over time on some farms. So, when the small dairy farm had this alternative, 122 acres of land were purchased. Annual net cash income increased by about $875 above the level attained when the farm was most profitably organized given the existing acreage.

On other farms, however, a more intensive use of capital on existing acreage may be as effective or more effective in improving incomes as is farm reorganization with added land. Therefore, profits were maximized on the medium general farm and the medium dairy farm by reorganizing within existing acreages.

● Improvements in income from farm reorganization will differ from farm to farm because kinds and quantities of resources differ. But over the range of sizes and types of farms analyzed, the opportunity for substantial income improvements apparently exists—primarily through use of increased capital and careful planning and management.

Gross incomes for profit-maximizing plans were between $5,700 and $18,300 higher than from the plans followed on these farms in 1961. These potentially higher incomes were based largely on sharp increases above present levels in use of borrowed funds (from $4,000 to $34,000 more). You must weigh the potential risks from further borrowings against potentially higher incomes from reorganization. But high volume business is needed for a satisfactory income in modern day farming.

In summary, corn, soybeans, and cattle and/or hog feeding apparently are strong planning alternatives in southwestern Minnesota. Increases in business volume, either through more livestock feeding on existing land or through reorganization with more land, also are worthy of consideration. ■

Minnesota Farm Business Notes

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Narrow Rows . . .

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farmers held down additional investment cost. Many indicated that they would have changed to large, wide row equipment even if they had not gone to narrow rows. Others traded relatively new equipment in order to make the shift.

Consequently, any "average" change in investment is meaningless. The investments shown in table 2 are for the two systems most commonly involved in the changeover. Over half the respondents changed from four to six row equipment. One in three went from two to three row combine harvest.

The figures shown compare the cost of a *new* set of 40-inch equipment with a *new* set of 30-inch equipment. Costs of individual machinery items varied considerably. However, the *difference* in the cost of the two complements, the important factor, was quite uniform at the levels shown in table 2.

The 20-percent use cost includes depreciation, interest, repairs, taxes, insurance, and shelter expenses. The total of these costs varies considerably between farms. However, the 20-percent estimate is a fair average for comparative purposes.

The labor requirements per acre for corn (table 3) were calculated from answers to the question: "How many acres could you plant (cultivate or harvest) in a 10-hour day with the new machine? With the old machine?"

Total Costs

Total annual ownership costs do not vary greatly with acreage covered per year. Therefore, the number of acres is the important variable affecting per acre costs. Table 4 data were developed to show comparative ownership and operating costs between the two production systems with various acreages. These figures do not include labor cost changes.

If a value is placed on the 28 minutes saved in this case, it would partially offset the higher costs of narrow row spacing. However, in other cases, equipment capacities were reduced rather than increased, and labor costs actually increased.

Table 2. Effect of row spacing on selected capital requirements

Investment	40-inch rows	30-inch rows
Planter	4 row $1,500	6 row $1,900
Cultivator	4 row 775	6 row 1,000
Combine head	2 row 1,900	3 row 3,200
Total	$4,175	$6,100
Annual use cost (20%)	$ 835	$1,220

Table 3. Effect of row spacing on selected labor requirement per acre for corn

Task	Labor requirement per acre	
	40-inch rows	30-inch rows
Planting	16 minutes	14 minutes
Cultivating*	28 minutes	13 minutes
Combining	37 minutes	26 minutes
Total labor	1 hour, 21 minutes	53 minutes

* Two times over with 40-inch rows, one time over with 30-inch rows.

Table 4. Average cost increases per acre from shift to narrow rows for corn and soybeans at various acreage levels*

Acreage	Cost increase per acre	
	Corn	Soybeans†
100	$5.65	$3.05
200	3.75	2.45
300	3.05	2.20
400	2.80	2.10

* Based on cost data in tables 1 and 2.
† Cost increase is less for soybeans since no added investment is needed for harvesting.

Increased Returns

The average yield increases from narrow rows that respondents reported were 10 percent (9 bushels per acre) for corn and 17 percent (6 bushels per acre) for soybeans. Research results suggest expected yield increases from narrow rows of 5-8 percent for corn and 10-15 percent for soybeans.

Some increases may have resulted from changes in plant populations, reduced cultivations, or other practices that are possible without shifting to narrow rows. Although a few farmers had check plots, most based estimates upon visual observations.

The average yield increase expected with soybeans should easily cover the added costs of growing soybeans in narrow rows. However, increased corn yields may not cover added costs on small acreages if added investments are much higher than those used in the above cost analysis.

Likes and Dislikes

Most respondents were satisfied with the results of their switch to narrow rows. However, a few who tried narrow rows in 1965 did not intend to switch entirely to them in 1966.

Table 5 summarizes the respondents' likes and dislikes about narrow row corn. Almost every farmer said that the ground was shaded early, resulting in fewer weeds and less moisture loss than with wider rows. This factor could be particularly important in the low rainfall areas of western Minnesota.

Table 5. Respondent's likes and dislikes of narrow row corn compared to wider row corn

Likes	Number reporting
Less weed problem	23
Better moisture utilization (reduced evaporation)	17
Earlier shading of ground	15
Reduced labor due to:	
fewer cultivations	8
larger equipment	5
Less trouble with trash in plow	4
Dislikes	
Additional cash costs	5
Cost of trading machinery (acreage too small to justify)	5
Requires more careful equipment operation	5

The primary disadvantages of the shift to narrow rows were additional machine ownership costs and cash operating costs.

Conclusions

Apparently, increases in operating costs associated with a shift to narrow rows are more than recovered from yield increases. Consequently, the important question relative to costs is how much *machine ownership costs* will increase.

To minimize this increase, farmers with small acreages will have to depend upon custom operators or do custom work themselves in order to justify a major increase in machinery investment.

Farmers who are field shelling corn will shift to narrow rows the fastest. Only 7 of the 33 farmers surveyed harvested ear corn. And three of these seven expressed concern about the need for larger harvesting equipment.

Cash grain farmers who grow mainly soybeans will find the change to narrow rows more desirable economically than will livestock feeders or strictly corn producers.

When considering a shift to narrow rows, carefully examine all the changes required. Crop spraying and nitrogen sidedressing caused serious problems for some operators. If custom work is hired for these or other operations, be sure the custom operator can handle narrow rows.

Finally, compare added cost estimates with expected gains. Many farmers may find that other practices promise higher returns on their farms than does the shift to narrow rows. ■

the outlook corner

J. C. Chai

The 1964-65 data on U.S. corn production reveal noticeable changes in total and regional production. The table shows the changes that occurred in Minnesota, both in the state as a whole and in the three major districts.

U. S. Corn Production

The total production of corn in the United States increased by one-third during 1945-65. This marked increase was accompanied by greater acreage reduction in low yielding regions than in high yielding regions. More significant, however, was the yield increase—from 37.4 bushels per acre in 1945-55 to 73.1 bushels per acre in 1965. This increase more than offset the reduction in acreage.

During the two decades studied, total production declined in the north Atlantic region (where yields went up slightly) and the south-central region (where yields were the lowest in the nation). The western and south Atlantic regions reported little change. Therefore, the north-central region accounted for most of the increase in total production.

The north-central region, where corn traditionally has been an important crop, has the most favorable conditions for growing it. Highest yields for this region were reported in the east north-central area; they ranged from 72 to 83 bushels per acre for 1961-64.

Minnesota Corn Production

Minnesota is a major corn producing state. It accounted for nearly 8 percent of the nation's total corn production in the 1945-55 period; 9.1 percent in 1956-58; and 8.1 percent in 1959-64. But, primarily due to unfavorable weather conditions, Minnesota's share decreased to 6.5 percent in 1965. Although Minnesota's rank dropped slightly, it was still fourth among all states. Last year, Minnesota was exceeded only by Illinois with 892 million bushels, Iowa with 812, and Indiana with 648.

Undoubtedly, a remarkable yield increase has provided impetus to corn production. Annual rates of increase in corn yield per acre during 1945-65 were 1.5 bushels for Minnesota and 1.7 bushels for the United States.

The yield per acre for corn in Minnesota for 1945-55 and 1956-58 exceeded the national average by 7 bushels and 8.1 bushels, respectively. Then, during 1959-64, Minnesota's yield dropped below the national average by 1.2 bushels. In 1965, the adverse Minnesota weather dropped the state's corn yield to 12.1 bushels below the national average.

Nevertheless, yields in the south-central and southeast districts of Minnesota have exceeded the national average and compared favorably to those of the east north-central region of the United States. Yields in Minnesota's southwest district have been below the national average since 1958.

During 1959-64, the northern one-third of Minnesota accounted for less than 1.5 percent of the state's production after producing 4 percent during 1945-55. The southern third of the state now accounts for about 65 percent of Minnesota's corn production. While percentage increases in yield for each district have been quite similar, increases in total production have been most pronounced and consistent in the southern district where yields are highest.

Expected Changes

In the future, many factors will influence corn production. The following seem most significant:

1. A substantial and continuous increase in yield has occurred, especially in the north-central region of the United States and in southern Minnesota. Since this trend probably will continue, a further concentration of production in these areas may occur.

2. Increased corn production will occur only if the demand for meat—through increasing population, higher incomes, and growing export markets for feed grain—provides a market. All indications favor a rising demand.

3. The competitive position of corn over soybeans in the United States has strengthened, especially since 1962. This situation has resulted primarily from the rapidly increasing corn yields. For example, gross receipts per acre from corn were about 5 cents above soybeans during 1945-52 but were 15 cents during 1962-65.

Because the major corn producing areas also are important soybean areas, this relationship of the gross receipts between the two crops should favor increased corn production. ■

Corn production and yield: north, central, and southern Minnesota and the United States, averages of 1945-55, 1956-58, 1959-64, and 1965*

Period	United States	Minnesota	Minnesota production by districts		
			North†	Central‡	South§
	- - - production—million bushels - - -				
1945-55	3,098	243	6	97	139
1956-58	3,553	323	8	118	197
1959-64	3,777	307	3	105	199
1965	4,171	270	NA#	NA	NA
	- - - - yield—bushels per acre - - - -				
1945-55	37.4	44.4	28.6	41.3	48.1
1956-58	48.1	56.2	35.8	51.6	61.9
1959-64	60.6	59.4	39.1	53.4	64.2
1965	73.1	61.0	NA	NA	NA

* Data from 1959-65 are for grain only.
† Northwest, north-central, and northeast districts.
‡ West-central, central, and east-central districts.
§ Southwest, south-central, and southeast districts.
#NA=not available.
Source: *Agricultural Statistics*, USDA; Crop-Livestock Reporting Service, Minnesota Dept. of Agr., USDA.

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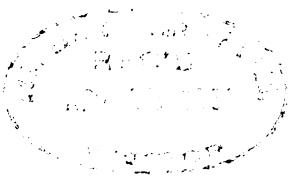

Hubert J. Sloan
Experiment Station - Coffey Hall
St. Paul Campus I