Use of Time and Labor on North Dakota Grain Farms

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Farms are expanding in size, with indications this trend will continue. Farm operators face the task of efficiently integrating resources to produce food and fiber on larger-sized farming units. This increases the importance of farmers' management contribution in comparison with their laboring contribution. North Dakota grain farmers were interviewed concerning the amount of time spent on labor and management.

Unstable markets, complex technology and larger farms make management an increasingly important part of the farmer's job. One reason family-sized farms are efficient is the combination of manager and laborer in one man. Little time is needed to communicate decisions to others, since the manager himself usually carries out the decisions. Often, the farm operator makes management decisions while driving the tractor or doing other tasks. The relative efficiency of large-scale farms in comparison with traditional family-sized farms depends in part upon the extent to which management costs, including coordination and supervision of labor, increase with farm size (1).

Little is known about the management activities of North Dakota farmers. What proportion of their time do farmers spend on management? How does this change with size of farm? How is management time varied by season of the year? What types of management tasks require the most time and which tasks do farmers consider most important? To obtain answers to these questions, the Department of Agricultural Economics conducted a study of labor and management activities of grain farmers in central North Dakota (2).

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Farm Survey

Farmers from eight counties in central North Dakota were interviewed in 1975 concerning the amount of time spent on labor and management activities (Figure 1). The information was obtained from 97 farmers randomly selected from the four farm size groups indicated in Table 1. The farmers surveyed operated farms ranging in size from 850 to 5,600 acres. The sample was limited to farmers receiving two-thirds or more of their gross income from grain production.

Table 1. Farm size groups by cropland acres and number of farmers interviewed, central North Dakota grain farms.

Farm size group	Cropland acres	Farmers interviewed
Small	800 - 1,399	22
Medium	1,400 - 1,999	26
Large	2,000 - 2,599	23
Very large	2,600 +	26
Total		97

Each farmer was given a description of activities considered as management and labor to help assure uniformity of responses. Management activities or tasks included purchasing inputs,

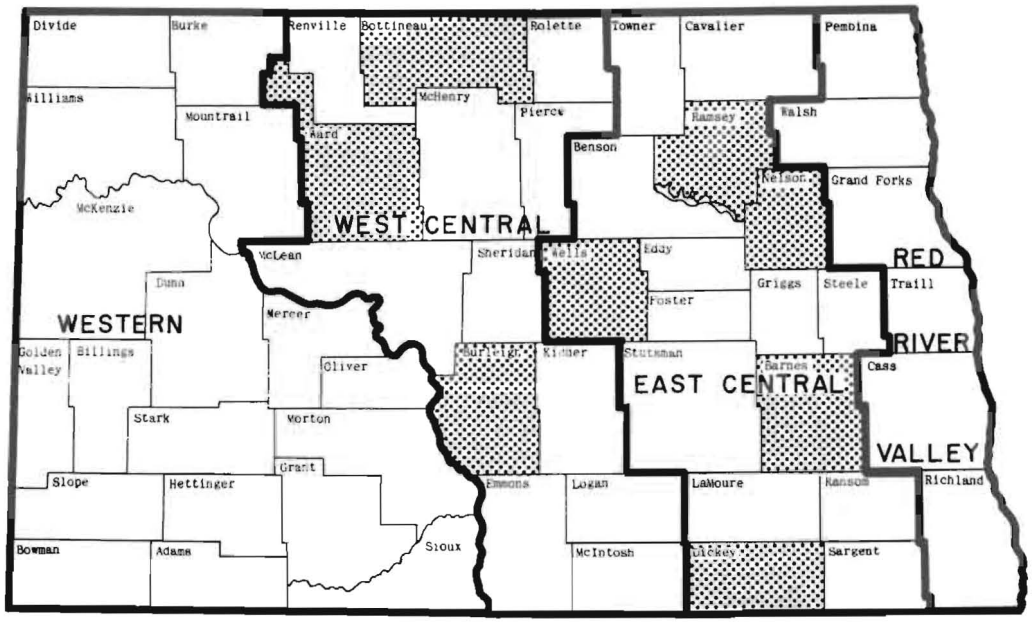

Figure 1. Counties included in the study.

acquisition of land, keeping and using records, information gathering and consultation, marketing of products, supervising labor, and planning. Activities, such as livestock chores, driving tractor, repairing machinery and others involving a large proportion of manual labor were classified as labor.

Labor and management time estimates were obtained from the farmer for "typical" spring fieldwork, spring non-fieldwork, summer, harvest, wet harvest, postharvest and winter days. "Typical" days were examined throughout the year, since the time spent on labor and management varies by season. Labor or management time could occur in the evening or night as well as during the day. Daily operator labor time for partnerships included time spent on labor by the dominant partner, while daily management time included the management time contributions of all partners.

Labor and Management Time Estimates

The annual time the farmer spent on labor and management was obtained by multiplying the daily labor and management time estimates for each season by the length of the season and summing for all seasons. The average farmer surveyed worked a total of 3,045 hours a year. Thirty per cent of the time was spent on management activities and 70 per cent on labor activities. Management time which overlapped with labor, such as planning while driving tractor, accounted for 20 per cent of the farmers' total time. Overlapping time was all counted as labor time.

Allocation of time between labor and management changed with size of farm as illustrated in Figure 2. Although total hours worked changed very little with farm size, the average allocation of time to management activities increased from 21 per cent for the smallest size group to 41 per cent for the largest size group.

In spite of the greater time spent on management by the operators of larger sized farms, the management time per crop-acre decreased on larger farms. Management time per crop-acre averaged 0.6 of an hour for the smallest group, while for the largest group it averaged only 0.4 of an hour Some management time is required for any size of farm. Spreading the fixed management time over more acres reduces per-acre needs. Supervision of labor is a management task that occurs only on farms with more than one worker. However, the largest farm size group had an average of only 2.4 workers, of which one was hired. Not enough farmers were supervising several workers to determine if added labor supervision would increase management time per acre.

Allocation of time by season of the year is shown by Figure 3. Spring and harvest seasons were divided into those days when fieldwork is possible and those when it is not due to field conditions. The average farmer worked 15 hours on a spring fieldwork and harvest day; 13 of these hours involved labor. In contrast, hours worked per day declined during less pressing periods and a larger portion was devoted to management.

Factors Affecting Daily Labor and Management Time

The data were analyzed to identify factors associated with the farmer's daily labor and man-

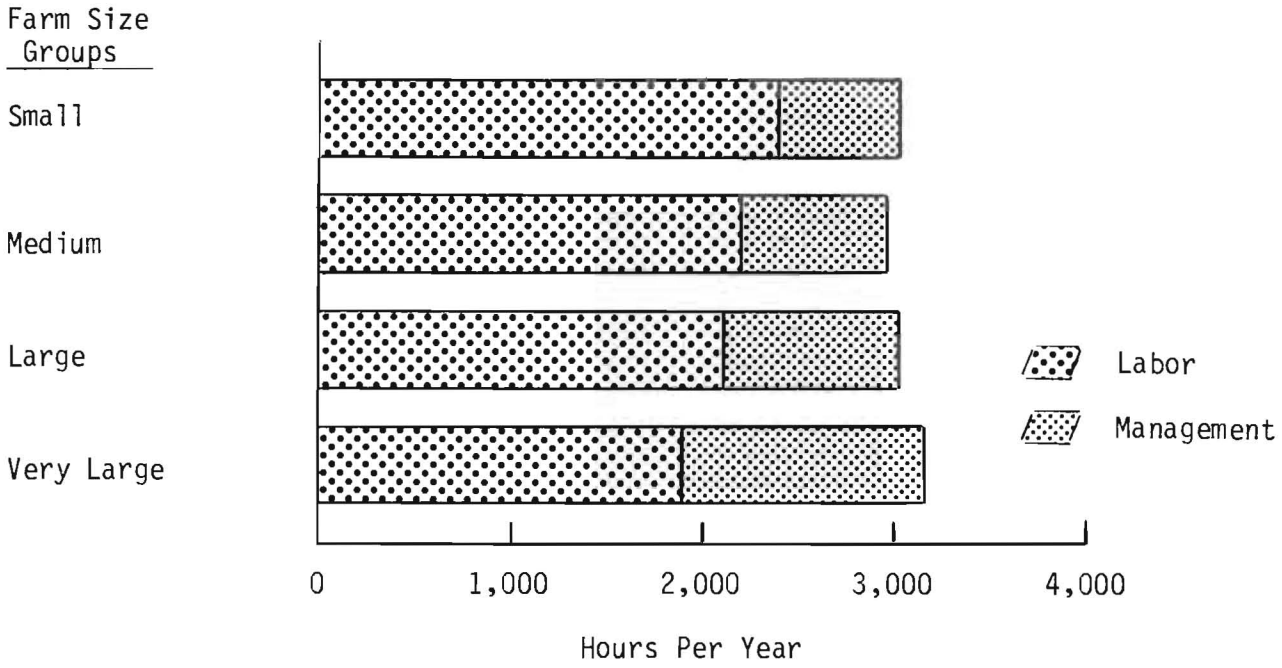

Figure 2. Amount of time spent annually on labor and management activities by farm size groups, Central North Dakota grain farms.

agement time for each season. Factors accounting for some of the differences in daily labor time included the amount of hired labor, operator age, amount of livestock and machinery size. The greater the amount of hired labor, the less time the operator spent doing labor-type tasks. This inverse relationship was true for all seasons. Older operators spent less time on labor on typical spring fieldwork and harvest days. Farmers with livestock spent more time laboring on typical spring nonfield work, summer and winter days. Machinery size was inversely associated with operator labor time on typical wet harvest and postharvest days when fall tillage activities were being performed. The amount of the variability in farmer labor time explained by all of the above mentioned factors ranged from 7 to 38 per cent, depending on the season examined.

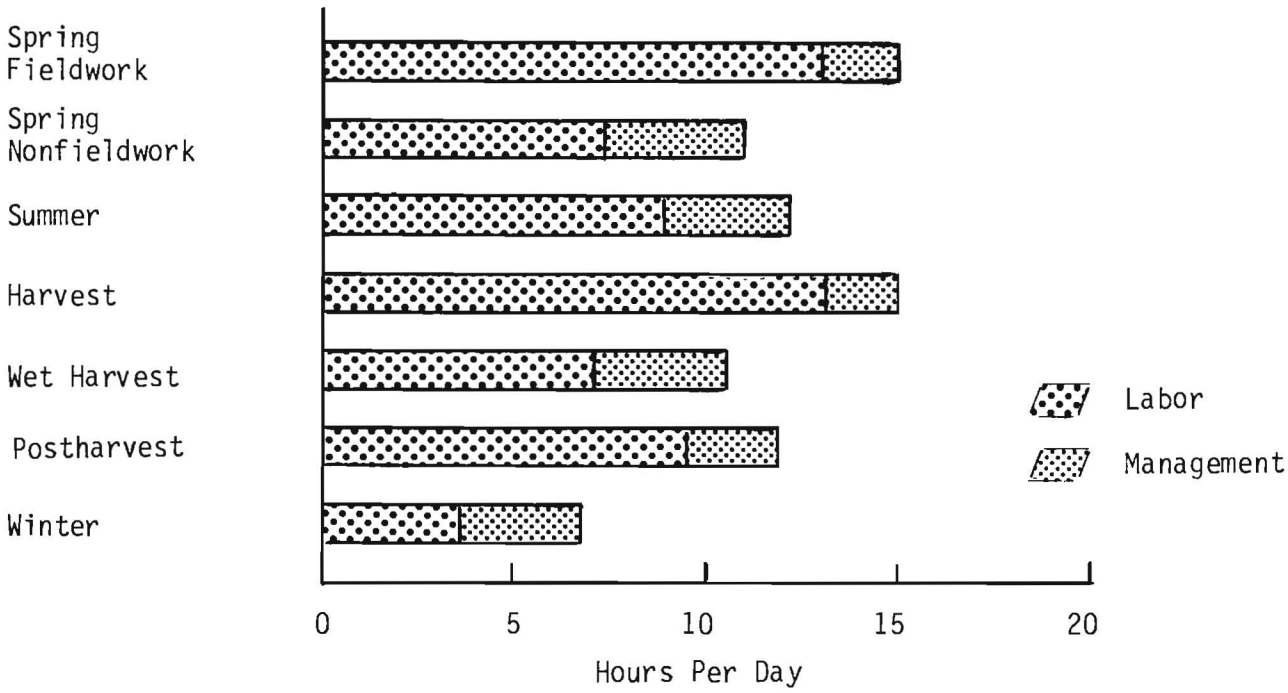

Figure 3. Amount of time spent per day on labor and management activities by season, central North Dakota grain farms.

Factors accounting for some of the variability of the farmer's daily management time included gross farm sales, amount of labor, farmer's age, years of education, farmland dispersion and type of business organization. Increased gross farm sales were associated with greater time spent on management activities during all seasons. The results indicated that gross farm sales was the best farm size measure to explain differences in management time requirements. Amount of labor was also directly associated with management time for all seasons except harvest and winter. Labor supervision required increasing attention as the amount of labor increased. Older operators spent more time on management activities on typical spring fieldwork and harvest days. Farmers with more years of education spent additional time on management activities on a "typical" spring nonfieldwork day. On "typical" spring nonfieldwork and summer days, operators of farms which were more geographically dispersed spent more time on management activities. More management time occurred on partnerships compared to sole proprietorships of similar size during all seasons except harvest. There appeared to be some duplication of management activities when there was more than one operator. The amount of variability in operator management time explained by these factors ranged from 7 to 38 per cent, depending on the season examined.

Management Tasks Evaluated

Farmers estimated the percentage of their total management time spent on each of the several management tasks. They also indicated which tasks they thought were of most importance to the success of their business (Table 2).

Planning and labor supervision were the two most time-consuming management tasks, taking approximately 40 per cent of the farmer's management time. Following in order of management time usage were marketing products, purchasing inputs, record keeping, information gathering and acquisition of land. Marketing products was selected as the most important management task, since with widely fluctuating markets the correct timing of grain sales has a great effect on farm income. Although a substantial percentage of the farmer's management time was spent supervising labor, this task was ranked second from last in importance. Record keeping was ranked third in importance, though this task did not require a large percentage of management time. The low importance attributed to acquisition of land was due to the fact that many of the farmers interviewed were not currently interested in getting additional land.

Table 2. Percentage of management time spent on management activities and relative importance of the management activities.

Management activity	Per cent of management time required*	Rank of importance
Planning	25	2
Labor supervision	16	6
Marketing of products	13	1
Purchasing inputs	11	4
Record keeping	10	3
Information gathering	8	5
Acquisition of land	2	7

**Column does not total 100 per cent, since the farmers did not have to allocate all of their management time.*

Summary

Management typically accounted for 30 per cent of a central North Dakota grain farmer's work when it was defined to include all nonphysical type activities. The operators of larger-sized farms spent more time on management activities and less on labor than operators of smaller farms. However, within the size range of this study, no management time diseconomies were observable. Management time per acre actually decreased with size of farm. Labor still dominated the use of the farmer's time, even for the largest size group considered. It appears that from the standpoint of the amount of time spent by the farmer on management, farms could increase substantially in size before the operator would utilize all his time on management activities.

There was extreme variability in the amount of time spent on labor and management by farmers. Though some of this variability could be attributed to farm and farm operator characteristics, most of the differences could not be explained by the factors studied.

Planning and labor supervision took the most management time, while the farmers considered marketing as the most important management activity.

References

1. Madden, Patrick J. 1967. **Economies of Size In Farming,** Agricultural Economic Report No. 107, Economic Research Service, U.S. Department of Agriculture, Washington, D.C., February, pp. 8-12.
2. Hvinden, Steven. 1977. **Use of Labor and Management Time On North Dakota Grain Farms,** Unpublished M.S. thesis, Department of Agricultural Economics, North Dakota State University, Fargo, January.