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PRELIMINARY

COSTS IN HARVESTING HAY BY DIFFERENT METHODS

(A Report to Cooperating Farmers)

by

Ellis W. Lamborn and Ivan R. Bierly

Department of Agricultural Economics
Cornell University
Ithaca, New York

PRELIMINARY REPORT ON
COSTS IN HARVESTING HAY BY DIFFERENT METHODS

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For each farmer, the problem is to find that method of making hay best adapted to his farm and situation that insures as high-quality roughage feed as possible, and still combines efficient use of labor with minimum cost.

This is a progress report, based on the experiences of 89 farmers in 1944. Records on more farms, and for more than one season, since weather conditions vary so greatly from year to year, are needed to establish the levels of costs and labor requirements in harvesting hay by different methods now in use. Additional records of this kind will be obtained in 1945, and probably in other succeeding years.

As new machines for making hay are developed and made available, information on labor requirements and costs for these new methods will continue to be of value to farmers in selecting the method best adapted to their individual farms.

Areas and Farms Studied

Detailed information on the amount of labor and the cost of equipment used to harvest hay in 1944 were obtained by the survey method from 51 farmers in Livingston County (West-central New York) 2/, and from 38 farmers in Cortland County (in Central New York) in September and October 1944. The farms included in the study were suggested by the County Agricultural Agents in these counties, and by the cooperating farmers. Since the farms were selected on the basis of the method used to move hay from the windrow to the mow, they were widely scattered in both counties, with some farms located in nearly all sections of each county.

1/ K. M. Bird assisted in taking the records and J. H. Stevenson assisted in the first part of summarizing the records.

2/ Five farms were located in Genesee County and two in Wyoming County.

The amount of hay grown varied from about 40 acres per farm where buckrakes or stationary choppers were used to from 60 to 80 acres per farm where pickup balers were used (Table 1).

Method of Determining Costs

For each field from which hay was harvested on each farm, the following information was obtained:

- (1) The number of hours to do each job, i.e., mowing, raking, turning, tedding, baling, hauling, and storing.
- (2) The number of persons in the crew for each job.
- (3) The kind of power used, and the number of hours used.
- (4) The kinds of other equipment used for each job, and the number of hours of use.

For each item of equipment used in making hay, except tractors and trucks, detailed information was obtained on the costs for the use of the equipment for the whole year. Other data included background information for the farm business as a whole, and a summary of the labor force, hours worked by each person, and cost of labor used on the farm during the year.

The cost per hour of labor was calculated for each farm, based on the total cost of labor used on the farm (including the value of the operator's time and unpaid family labor), and the total hours of work done on the farm during the year. The rate for each farm was used in computing the cost of labor for each of the jobs in harvesting hay. The average hourly rates were \$0.46 in Livingston County, and \$0.44 in Cortland County.

The charges per hour of use for horses, tractors, and trucks were based on the costs for these different kinds of power as determined by Cost-Account records kept by farmers in New York State in 1944. The same rates were used on all farms in both counties. They were as follows: Horses, 35 cents per horse-hour (or 70 cents an hour for a team); tractors, 50 cents an hour $\frac{3}{4}$; trucks, 65 cents an hour.

To cut and rake an acre of second-cutting hay required less time than for the first-cutting; but more time was required per ton to haul and store the second-cutting hay. Since on some farms most of the fields were cut twice, while on other farms no fields were cut twice, the information in this report is based

$\frac{3}{4}$ Cost-Account records show that large tractors are used more hours than small tractors, with the same cost per hour of use.

only on costs in harvesting the first cutting. However, all charges for the use of labor, power, and equipment for harvesting the second cutting were first allocated to that cutting of hay.

CUTTING HAY

With a horse-drawn mower about an hour-and-a-quarter were required to cut an acre of hay, as compared with slightly more than half an hour with a tractor-drawn mower. There was, of course, considerable variation among the farms in each group in the rate of cutting. Most of the horse-drawn mowers had five-foot cutter bars, while the tractor-drawn mowers made a seven-foot swath. The cost of cutting an acre of hay was about the same in both counties; \$1.70 an acre with a horse-drawn mower, and \$0.85 with a tractor-drawn mower. The cost for labor was lower for the farms using tractor-drawn mowers because of the saving of time; the cost for power was lower both because of the saving of time and the fact that the use of a team was charged at 70 cents an hour as compared with 50 cents an hour for a tractor; the charge for the use of the mower per acre was lower because the farms with tractor-drawn mowers cut 70 to 80 acres of hay, while only about 40 acres were cut per farm where horse-drawn mowers were used. The total cost of operating a tractor-drawn mower for the year was about \$25, as compared with about \$20 for the horse-drawn mowers.

RAKING

Although there was some variation, about 42 minutes were required to rake an acre of hay with a side-delivery rake drawn by a team, and 30 minutes when the rake was drawn by a tractor. The cost per acre for the use of the rake was about 22 cents in both counties. Total cost for labor, power, and use of the rake was about \$1.05 an acre when the rake was drawn with a team, as compared with about \$0.75 when a tractor was used on the rake. This difference resulted from savings in labor and power costs. The labor charge was lower when the tractor was used because less time was required. The power charge also was less because of the saving in time, and because the tractor cost was at the rate of 50 cents an hour, whereas the team was charged at 70 cents an hour.

MOVING HAY FROM WINDROW TO MOW

The most laborious and time-consuming part of the job of harvesting hay is involved in moving hay from the windrow to the mow. This section of the report deals with the labor requirements and costs for doing this job in different ways. (The data for this section are summarized, for the most part, in Table 1).

Acres of hay per farm.

On the farms using loaders and wagons in Livingston County, there were 34 acres of hay per farm, as compared with 57 acres for those using this method in Cortland County. The farms in Cortland County also kept more cows per farm. The farms in Livingston County that used loaders and trucks had 54 acres per farm. In both counties there were about 40 acres per farm when buckrakes were used. Farms on which balers were used had about 65 acres of hay in Livingston County, and about 75 acres in Cortland County. However, only about one-fourth of the season's baling on the farms in Livingston County, and one-half of it in Cortland County, was done on the home farm. The largest share of the use of these balers was for custom work. For the one-man balers, custom work accounted for four-fifths of the use in Livingston County, and more than two-thirds of the total in Cortland County. This meant that the overhead cost of maintaining the balers was spread over many more tons of hay than if they had been used only on the home farm, with the result that the cost per hour or per ton on the home farm was reduced.

Distance to the barn (storage).

(The distances reported for each method in Table 1 are the averages for the distances from each field on each farm to the barn).

The average distance from the field to the barn on farms where loaders and wagons were used in Livingston County was about four-tenths of a mile. In Cortland County the distance on farms using this method was about three-tenths of a mile.

On farms with buckrakes, the fields averaged about two-tenths to three-tenths of a mile from the barn. For farms where pickup balers were used, the distances varied from about one-third to almost one-half of a mile.

Man-hours per ton.

In Livingston County, 3.8 man hours were required per ton on farms where loaders and wagons were used, and 3.2 man hours where loaders and trucks were used. For the Cortland County farms, where the acreage of hay was greater and larger crews were used, 2.7 man hours were required per ton. In both counties, 2.1 man hours were required per ton where buckrakes were used. With buckrakes and blowers only 1.5 man hours were required per ton.

(Note: All of these blowers were made by removing the fan assembly and blower pipe from an old threshing machine, mounting this part of the machine on wheels or skids, and using a tractor for power on the belt to blow the hay into the barn.)

Where loaders and wagons or trucks were used with a stationary chopper at the barn, 2.5 man hours were required to move a ton of hay from the windrow to the mow. With buckrakes and choppers, 1.9 man hours were required.

From 2.2 to 3.1 man hours were required per ton with pickup balers. About 20 per cent less labor was required where one-man balers were used as compared with the use of three-man balers, to bale and move hay from the windrow to the mow. The most laborious part of the job is moving hay from the field to the barn.

Cost per ton.

The total cost for labor, power, and equipment for moving hay from the windrow to the mow with loaders and wagons averaged \$3.69 a ton in Livingston County, as compared with \$2.56 a ton for loaders and trucks in the same county, and \$2.41 a ton for loaders and wagons in Cortland County. Apparently the larger acreage of hay handled per farm in Cortland County reduced the equipment cost per ton, and since fewer man hours were required per ton, partly because more tons were handled per hour with larger crews and a shorter haul to the barn than in Livingston County, the cost for labor was also lower. The lower cost for loaders and trucks in Livingston County is the result both of a saving in labor, and a saving in power costs.

Where buckrakes were used, the cost of labor in each county was about one-fourth less than the labor cost where loaders and wagons were used. In each county, the charge for power and equipment was also less than where wagons and loaders were used, even though the investment in Livingston County in buckrakes was considerably greater than in wagons and loaders. The total cost for handling hay with buckrakes averaged \$2.47 a ton for Livingston County and \$2.06 a ton in Cortland County.

The lowest-cost method was found on the farms using the buckrake-blower combination. The total cost was \$1.62 a ton. Both the labor and equipment charges were lower than for any other methods. Of course, the blowers used on these farms were very inexpensive since all of them had been made for the purpose at low cost from old threshing machines.

Where one-man balers were used in Livingston County, the cost per ton from the windrow to the mow averaged \$2.78, with the power and equipment charge accounting for \$1.52 of the total. In Cortland County, where the one-man balers were used, only about one-half as many hours during the year as in Livingston County, the cost averaged \$3.35 a ton, with power and equipment charges accounting for \$2.47 of the total.

The cost per ton where three-man balers were used in Livingston County was \$3.44, as compared with \$2.51 in Cortland County. In both counties, the three-man balers were used less than one-half as many hours during the year as the one-man balers. The machines used in Cortland County were somewhat older than those in Livingston County, and hence had lower charges for depreciation and interest on investment. Repair costs were also lower. These differences account for the lower cost per ton for three-man balers in Cortland than in Livingston County.

Investment in haymaking equipment.

To obtain the total investment in haymaking equipment for each farm, the inventory values of all the items of equipment except tractors and trucks were added together, even though some of them were used during the year for some other purposes than harvesting hay.

In general, the average total investment in haymaking equipment on farms using loaders and wagons was from \$300 to \$400. This represented an investment of from \$8 to \$10 per acre of hay grown. Where a stationary chopper was used at the barn, the total investment was about \$600, or about \$15 per acre of hay.

On farms with one-man balers, the total investment in haymaking equipment averaged about \$1,700 in Livingston County, and almost \$2,000 in Cortland County. For each county, this was an investment of \$28 per acre of hay grown on the home farm. However, as noted earlier in this report, four-fifths of the hours of use of the one-man balers in Livingston County was for off-the-farm, or custom work, and more than two-thirds of the use of these balers in Cortland County was for similar work. In addition, part of the total use (9 per cent in Livingston County and 5 per cent in Cortland County) was to bale straw on the home farm.

For farms with three-man or four-man balers, the total investment varied from \$1,100 to \$1,300 - or about \$15 to \$20 per acre of hay grown on the home farm. But again, at least one-half of the use of these balers was for custom work and from 5 to 10 per cent for straw on the home farm.

Apparently, most of the farmers included in this study, who used pickup balers, purchased them with the intent of doing a considerable amount of custom work to help pay for the machines, and to reduce the overhead cost of owning and operating the machines on their own farms by spreading this overhead cost over more acres and more tons of hay.

TABLE 1. LABOR REQUIREMENTS AND COSTS FOR MOVING HAY FROM
WINDROW TO MOW BY DIFFERENT METHODS, 1944

Methods	Number of farms	Acres of hay per farm	Miles to the barn	Man hours per ton	Cost per ton for:			Investment in haymaking equipment*
					Labor	Power and Equipment	Total	
<u>LIVINGSTON COUNTY - 51 FARMS</u>								
Loader and wagon	6	34	0.43	3.8	\$1.73	\$1.96	\$3.69	\$286
Loader and truck	8	54	0.37	3.2	1.32	1.24	2.56	261
Buckrake	10	44	0.19	2.1	1.14	1.33	2.47	398
Buckrake and blower	7	36	0.30	1.5	0.64	0.98	1.62	342
Loader, wagon or truck, and chopper	4	34	0.44	2.5	1.08	1.67	2.75	608
Buckrake and chopper	4	43	0.22	1.9	0.80	1.69	2.49	576
One-man baler	5	60	0.42	2.4	1.26	1.52	2.78	1679
Three-man baler	3	67	0.45	3.1	1.33	2.11	3.44	1275
Four-man baler	4	62	0.38	2.8	1.58	1.67	3.25	1318
<u>CORTLAND COUNTY - 38 FARMS</u>								
Loader and wagon	17	57	0.29	2.7	1.20	\$1.21	\$2.41	\$460
Buckrake	13	40	0.27	2.1	0.90	1.16	2.06	335
One-man baler	2	71	0.45	2.2	0.88	2.47	3.35	1974
Three-man baler	6	77	0.33	2.6	1.03	1.48	2.51	1125

* Does not include trucks, or tractors; Includes mowers, rakes, tedders, balers, wagons, buckrakes, hay rope, sling, hay tracks in barns, elevators, etc.