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FEED---

Per Acre and Per Hour

By PETER NELSON and E. A. TUCKER

THE GIST OF IT

RECORDS kept by successful farmers show that —

Hay crops, both wild and tame, produce more feed units *per hour of labor* than either corn or sorghum silage. (A feed unit as used here is the feeding value of one bushel of wheat.)

The silages rank ahead of hay in yield of feed units *per acre* (but not per hour of labor.)

In northwestern Oklahoma, small grains generally produce more feed units than other grains, both per acre and per hour of labor.

In central and eastern Oklahoma, corn ranks first in *yield per acre*; **BUT** wheat, oats and barley are all ahead of corn and grain sorghums in yield of feed units *per hour of labor*.

OKLAHOMA AGRICULTURAL EXPERIMENT STATION

Oklahoma A. and M. College, Stillwater

W. L. BLIZZARD, *Director*

LOUIS E. HAWKINS, *Vice Director*

FEED — Per Acre and Per Hour

By PETER NELSON and E. A. TUCKER
Department of Agricultural Economics

What crops will yield the largest quantity of feed nutrients per acre with the least possible amount of labor?¹ The answer will not be the same every year, because of weather variations, insect attacks, and other hazards. But records kept by successful farmers throughout Oklahoma show that over a period of years the answer to this question is about as summarized on the cover of this circular.²

In Table I are results from farm records of Garfield County farmers. The farms are classified into three groups, based on variation in average yield of wheat during the eleven years 1930 to 1940 inclusive. These groups are referred to, for convenience, as low-, medium-, and high-yielding farms as shown in the table. After making allowance for abandonment of planted acres before harvest and minimum requirements for seed, the net yield per planted acre of the various crops was obtained. The net yields of these various crops were converted into wheat feed unit equivalents for purposes of comparing more nearly the quantities of feed obtained from one crop in relation to the other crops.

It will be noted that on the low-yielding farms, alfalfa, prairie hay, sudan hay, oats, and wheat in the order named were the high-yielding crops in number of feed units per acre. In yield per hour of labor, the ranking of the crops on these farms was changed slightly to prairie hay, alfalfa, wheat, sudan hay, and oats (Top of Table I).

On the medium-yielding farms the five high feed-yielding crops ranked in order of feed units per acre were alfalfa, sudan hay, wheat, oats and barley. The ranking on this group of farms per hour of labor was wheat, prairie hay, alfalfa, barley, and sudan hay.

¹ Principal attention is given to those crops which Oklahoma farmers are accustomed to raising. The authors hold that the greatest immediate farm production can be achieved when farmers raise the crops to which they are accustomed and for which they have the buildings and equipment. In Oklahoma, that means small grains, row crops, and hay. Most Oklahoma farmers can change from one to the other of these without having to learn new methods or buy new machines.

² The analyses in this circular are based on records kept by farmers in cooperation with the Oklahoma Agricultural Experiment Station since 1930, and on reports from farmers cooperating with the Oklahoma State Statistician, United States Department of Agriculture, Oklahoma City, from 1923 to 1932.

TABLE I.—Net Yield of Wheat Equivalent Feed Units Per Acre and Per Hour of Man Labor for the Principal Crops in Garfield County, Oklahoma; 1930 to 1940.

	Net yield per acre	FEED VALUE IN RELATION TO BUSHELS OF WHEAT		Hours of man labor per acre ²	Production of wheat feed units per hour of man labor
		Per unit ¹	Per acre		
Farms with LOW wheat yields:					
Wheat, bu.	8.8	1.00	8.8	2.3	3.83
Oats, bu.	19.8	.49	9.7	5.3	1.83
Barley, bu.	7.6	.74	5.6	3.5	1.60
Corn, bu.	7.2	.92	6.6	7.6	.87
Grain Sorghums, bu.	8.3	.87	7.2	7.3	.99
Sudan, tons	.7	16.15	11.3	5.0	2.26
Alfalfa, tons	1.3	22.93	29.8	7.4	4.03
Prairie hay, tons	.7	19.63	13.7	3.0	4.57
Farms with MEDIUM wheat yields:					
Wheat, bu.	14.6	1.00	14.6	2.4	6.08
Oats, bu.	26.3	.49	12.9	5.5	2.35
Barley, bu.	16.9	.74	12.5	3.7	3.38
Corn, bu.	9.3	.92	8.6	7.8	1.10
Grain Sorghums, bu.	11.9	.87	10.4	7.5	1.39
Sudan, tons	1.1	16.15	17.8	5.8	3.07
Alfalfa hay, tons	1.3	22.93	29.8	7.4	4.03
Prairie hay, tons	.6	19.63	11.8	2.9	4.07
Farms with HIGH wheat yields:					
Wheat, bu.	20.2	1.00	20.2	2.4	8.42
Oats, bu.	33.3	.49	16.3	5.7	2.86
Barley, bu.	17.2	.74	12.7	3.7	3.43
Corn, bu.	11.4	.92	10.5	7.9	1.33
Grain Sorghums, bu.	12.9	.87	11.2	7.6	1.47
Sudan, tons	1.0	16.15	16.2	5.7	2.84
Alfalfa, tons	1.0	22.93	22.9	7.0	3.27
Prairie hay, tons	.7	19.63	13.7	3.0	4.57

¹ Professor H. W. Cave, Head of the Dairy Department, Dr. Charles S. Hobbs of the Animal Husbandry Department and Professor R. B. Thompson, Head of the Poultry Department, contributed to this work by supplying relative feeding values for the crops discussed here. Feeding values are necessarily somewhat generalized. All grains are assumed to be ground, which gives them a higher feeding value than would be realized in most cases from feeding whole grain. The grain figures are intended to reflect the feeding value relationship to be expected in feeding dairy cows and poultry or for fattening cattle and hogs. The oil-seed meals are shown in relation to grain for dairy cows when used as a protein supplement. Forage crop relationships shown here are likewise based on returns to be expected from dairy cows. All feeding values are in relationship to wheat, though using any other crop as a base would have shown the same results.

This discussion is not intended to deal with feeding practice, but rather to make use of a standard which it is believed makes feeding values of various crops more readily comparable than is possible by using the conventional bushels, pounds, tons, etc. Detailed information on the use of different feeds by various classes of animals may be had by inquiring of County Agents, or by addressing the Oklahoma Agricultural Experiment Station.

² From unpublished data in the files of the Department of Agricultural Economics.

On the high-yielding farms, alfalfa again ranked highest in number of feed units per acre. Wheat was second, oats third, sudan hay fourth, and prairie hay fifth. But per hour of labor, on this group of farms, wheat had no close competitor for first place and prairie hay was elevated to second place. Barley was third, alfalfa fourth, and oats fifth.

The data may be generalized a little further as follows: The three hay crops all showed up well as feed unit yielders during the 11-year period, both per acre and per hour of labor. Alfalfa was considerably the highest in yield per acre. This may be due partly to the tendency of farmers to select rather carefully the land for alfalfa. The yield situation was reversed in terms of labor; in all three groups of farms, prairie hay turned out more favorably than alfalfa. Another point of importance in this connection is that prairie hay is not generally grown on the most productive land of the farm.

Among the grains, wheat was by far the highest yielder of feed on all three groups of farms. Barley was second to wheat in yield per hour of labor on the high- and medium-yielding farms, and oats was third. It seems significant that corn and grain sorghums did not place among the five high feed unit yielding crops on these farms, except in net yield per acre on the low-yielding farms where these two crops ranked above barley. In this group oats also ranked second to wheat in yield per hour of labor.

In Table II are the results of a brief study of efficiency of feed production in four selected crop-reporting districts of the State. This study, though less detailed (because of inadequate data) than that in Table I, shows net feed unit yields per acre and per hour of labor of the important feed crops on a general district basis.

In District II (see Figure 1 for location of districts), which includes Garfield County, wheat was again found to be the outstanding feed unit yielding crop both per acre and per hour of labor. Barley also showed up well. The forage crops all showed high feed unit yields per acre, but only all tame hay and wild hay showed up very favorably in yield per hour of labor.

Eastern Oklahoma, according to the data for District VI, produces much higher feed unit yields per acre among the crops with large labor requirements. The forage crops all show favorable yields per acre and per hour of labor. Corn and grain sorghums show the most favorable yields of grain per acre, but the small grains are considerably more efficient in production of grain per hour of labor.

TABLE II.—Net Yield of Wheat Equivalent Feed Units Per Acre and Per Hour of Man Labor for Principal Feed Crops in Selected Crop Reporting Districts of Oklahoma, 1923 to 1932.

	Net yield per acre ¹	FEED VALUE IN RELATION TO BUSHELS OF WHEAT		Hours of man labor per acre ³	Production of wheat feed units per hour of man labor
		Per unit ²	Per acre		
District II					
Wheat, bu.	11.6	1.00	11.6	2.3	5.04
Oats, bu.	20.8	.49	10.2	5.5	1.85
Barley, bu.	13.8	.74	10.2	3.7	2.76
Corn, bu.	11.4	.92	10.5	11.1	.95
Grain Sorghums, bu.	8.4	.87	7.3	7.5	.97
Sorghum Forage, tons	1.44	7.63	11.0	8.4	1.31
Sorghum Silage, tons	3.46	7.63	26.4	19.6	1.35
Corn Silage, tons	5.12	7.63	39.1	22.1	1.77
All Tame Hay, tons	1.65	19.82	32.7	5.8	5.64
Wild Hay, tons	.74	19.63	14.5	3.0	4.83
District VI					
Wheat, bu.	9.0	1.00	9.0	6.1	1.48
Oats, bu.	13.5	.49	6.6	6.5	1.02
Barley, bu.	8.1	.74	6.0	6.6	.91
Corn, bu.	16.3	.92	15.0	20.8	.72
Grain Sorghums, bu.	10.8	.87	9.4	11.4	.82
Cotton Seed Meal, lbs.	103.0	.05	5.2	50.5	.10
Peanut Meal, lbs.	194.0 ⁴	.05	9.7	52.9	.18
Sorghum Forage, tons	1.40	7.63	10.7	11.9	.90
Sorghum Silage, tons	5.18	7.63	39.5	27.2	1.45
Corn Silage, tons	7.95	7.63	60.7	34.4	1.76
All Tame Hay, tons	1.30	19.84	25.8	6.1	4.23
Wild Hay, tons	.98	19.63	19.2	3.6	5.33
District VII					
Wheat, bu.	11.8	1.00	11.8	3.5	3.37
Oats, bu.	20.5	.49	10.0	4.7	2.13
Barley, bu.	14.2	.74	10.5	3.5	3.00
Corn, bu.	14.1	.92	13.0	11.1	1.17
Grain Sorghum, bu.	10.9	.87	9.5	7.1	1.34
Cotton Seed Meal, lbs.	113.0	.05	5.7	26.0	.22
Peanut Meal, lbs.	194.0 ⁴	.05	9.7	30.0	.32
Sorghum Forage, tons	1.06	7.63	8.1	8.1	1.00
Sorghum Silage, tons	3.00	7.63	22.9	13.6	1.68
Corn Silage, tons	4.91	7.63	37.5	19.4	1.93
All Tame Hay, tons	1.36	19.17	26.1	5.1	5.12
Wild Hay, tons	.78	19.63	15.3	3.0	5.10

TABLE II.—(Continued.)

	Net yield per acre ¹	FEED VALUE IN RELATION TO BUSHELS OF WHEAT		Hours of man labor per acre ²	Produc- tion of wheat feed units per hour of man labor
		Per unit ²	Per acre		
District VIII					
Wheat, bu.	10.6	1.00	10.6	4.1	2.59
Oats, bu.	18.4	.49	9.1	6.8	1.34
Barley, bu.	11.5	.74	8.5	6.8	1.25
Corn, bu.	16.4	.92	15.1	15.1	1.00
Grain Sorghums, bu.	10.4	.87	9.0	9.4	.96
Cotton Seed Meal, lbs.	101.0	.05	5.1	33.7	.15
Peanut Meal, lbs.	194.0 ⁴	.05	9.7	40.0	.24
Sorghum Forage, tons	.99	7.63	7.6	9.1	.84
Sorghum Silage, tons	3.54	7.63	27.1	19.1	1.42
Corn Silage, tons	6.81	7.63	52.0	30.6	1.70
All Tame Hay, tons	1.25	20.23	25.3	6.8	3.72
Wild Hay, tons	.84	19.63	16.5	3.4	4.85

¹ We are indebted to Mr. K. D. Blood, Agricultural Statistician, Bureau of Agricultural Economics, U. S. D. A., at Oklahoma City for the figures from which net yields were derived. Net yields is yield on the planted acreage (or harvested acreage adjusted for abandonment) less seeding requirements as supplied by the Agronomy Department.

² and ³—See footnote on Table I.

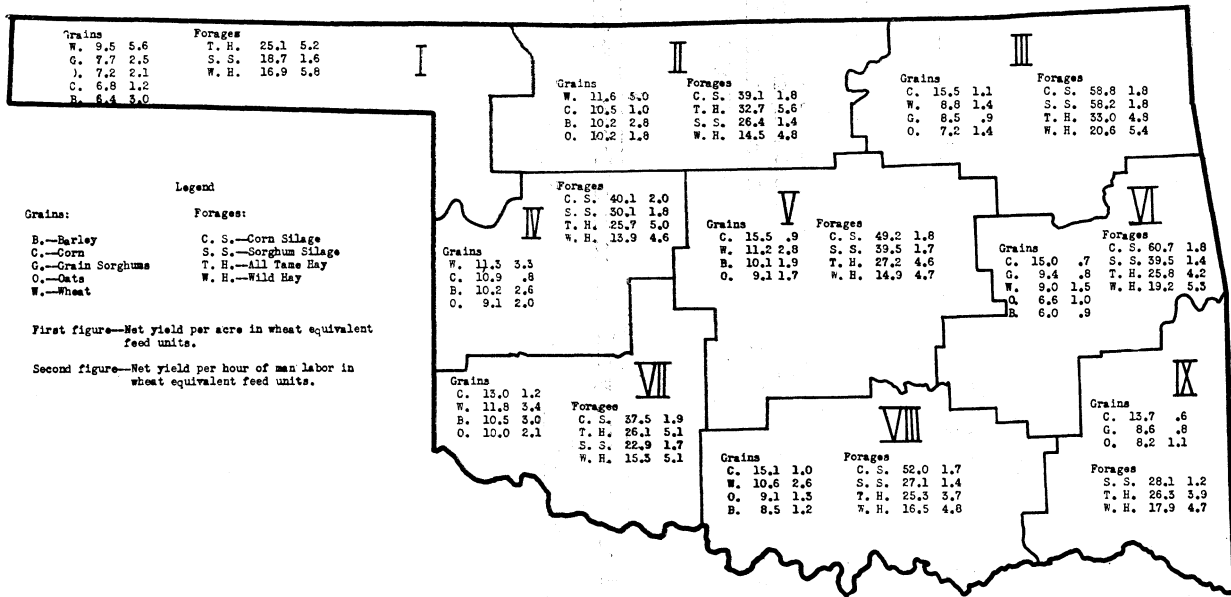
⁴ An assumed yield (600 lbs. per acre), and a meal turnout of 35 percent. Some recent estimates show a meal turnout as high as 54 percent.

The figures for District VII, the district located in southwest Oklahoma, bear a close resemblance to the figures in District II. One difference is that corn shows a higher yield of grain per acre than the small grains, which probably is of slight significance as corn is grown on only a limited area. Per hour of labor, however, small grains and tame and wild hay far out-yield other crops.

In District VIII the silages and hays are among the highest feed yielding crops. It is noteworthy, however, that although corn ranks first in yield of feed grain per acre, wheat ranks second in yield of feed grain per acre and a strong first in yield of feed grain per hour of labor.

In Figure 1 is a summary of net yields per acre in wheat-equivalent feed units and net yield per hour of man labor in wheat-equivalent feed units for selected crops by crop-reporting districts for the State. In each district are shown the high yielding grain and the high yielding forage crops, each group arranged in order of yield of feed units per acre.

This summary again supports the results already explained, namely, that the small grains are generally outstandingly superior to other grains in northwestern Oklahoma, both in yield



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Figure 1.—Net yield of wheat-equivalent feed units per acre and per hour of man labor, by crop reporting districts of Oklahoma.

of feed per acre and per hour of labor. On the same basis, tame hay and wild hay are the efficient forage crops in this region. On the basis of the data used, wheat is the most efficient feed grain crop per hour of labor in all but one district of the State, namely District IX, in the southeast corner where little or no wheat is grown. In the eastern part of the State the crops with high labor requirements compare more favorably with crops having low labor requirements than is true in other parts of the State.

From the foregoing analysis it seems that the general direction of farm adjustment to meet the demands for maximum feed in the face of a reduced labor supply should be toward larger acreages of small grain (especially wheat) and tame hay. The wild hay acreage is perhaps not readily expanded, but it appears that the present production could be maintained at least for the emergency. If frost or drought destroys the small grains during the winter season, as occurred in parts of southwest Oklahoma this year, the only alternative, however, is a suitable spring substitute—no doubt grain sorghum.

Another aspect is suggested by the graphic presentation of the data used here, namely, the general lack of agreement between yield per acre and yield per hour of labor. This suggests the proposition that high yield per acre and economy of production may be and often are quite the opposite of each other.