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by

BETTER CHOICE OF CROPS

G. A. POND

Wartime Feed Crops

★ **CORN** Produces more grain feed per acre than small grain crops.

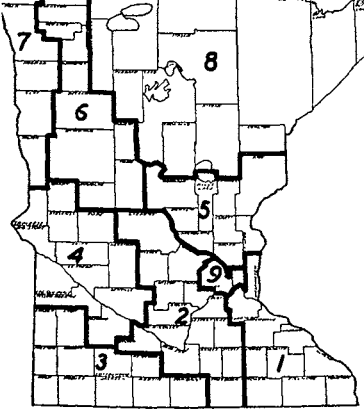
★ **ALFALFA** High total feed per acre. Best source of home-grown protein.

★ **OATS** Only as needed to balance crop program. Use Vicland or Tama.

★ **CLOVER** Use where alfalfa is not adapted or seed cannot be obtained.

★ **SOYBEAN HAY** To supply protein roughage if alfalfa or clover acreage is inadequate.

MAP OF TYPE-OF-FARMING AREAS



LEGEND

1. Southeast dairy and livestock
2. South central dairy
3. Southwest livestock and cash grain
4. West central cash grain and livestock
5. East central dairy and potatoes
6. Northwest dairy, livestock, and clover seed
7. Red River Valley small grain, potatoes, and livestock
8. Northern, cutover, dairy, potatoes, and clover seed
9. Twin Cities suburban truck, dairy, and fruit

★ 1944 FOOD PRODUCTION PROGRAM SERIES

UNIVERSITY OF MINNESOTA
Agricultural Extension Service
U. S. DEPARTMENT OF AGRICULTURE

Feed Increase Must Come from Present Acreage

THE 1944 WAR food production goals call for substantial increases over the high level of production achieved in 1943. Most of the food produced on Minnesota farms is marketed as livestock and livestock products, which means that to increase food production we must first increase feed production. Since there is little new land that can be brought into cultivation and we lack the machinery and manpower to develop it if there were, we must secure this increased feed production largely from our present acres. The greatest opportunity for achieving this lies in a more discriminating choice of crops. A basis for such a selection is suggested in table 1.

Some of the common feed crops of the state are compared on the basis of the quantity of total digestible nutrients and of digestible protein they produce with normal yields. Since oats is the most widely grown feed crop, it is used as a base for comparison with other crops and given a rating of 100. These comparisons are shown for each type-of-farming area in the state (see map on front cover). For the state as a whole and in most type-of-farming areas, one acre of corn or alfalfa will produce as much digestible feed as 2 acres of small grain. Alfalfa has the additional advantage that it produces three to five times as much digestible protein per acre. Protein is the element most likely to be deficient in livestock rations and at the present time the supply of protein supplements is critically short.

Table 1. Comparisons between Crops in Production per Acre of Digestible Nutrients*

Crop	Type-of-farming area								
	1	2	3	4	5	6	7	8	9
Index of total digestible nutrient production per acre (oats = 100)									
Oats	100	100	100	100	100	100	100	100	100
Barley	121	125	121	127	128	131	134	135	135
Corn	257	235	228	217	204	211	201	195	224
Alfalfa	324	342	287	277	335	259	222	249	388
Index of digestible protein per acre (oats = 100)									
Oats	100	100	100	100	100	100	100	100	100
Barley	104	108	104	109	109	113	115	116	115
Corn	128	118	114	108	101	105	100	98	111
Alfalfa	446	471	397	383	461	357	308	344	532

*Average yields, 1918-1942, except corn yields which have been adjusted for use of hybrid varieties.

Table 2. Comparative Crop Returns and Costs

Crop	Yield per acre*	Pounds T.D.N.† per acre	Bushels or tons to equal corn in T.D.N.	Pounds T.D.N. per hour man labor	Cost per 100 lbs. T.D.N.
Corn	52 bu.	2,373	.....	221	$0.71
Oats	43 bu.	956	107	127	1.58
Barley	30 bu.	1,117	64	149	1.32
Wheat, winter	20 bu.	950	50	127	1.59
Wheat, spring	17 bu.	808	50	108	1.84
Rye	17 bu.	780	52	104	1.84
Alfalfa hay	2.4 tons	2,472	2.3	225	0.66
Corn silage	8.3 tons	2,789	7.1	155	0.81

* Average yields, Southeast Minnesota Farm Management Service, 1928-1942, except corn yields which have been adjusted for use of hybrid varieties.

† Total digestible nutrients, from "Feeding the Dairy Herd," Minnesota Agricultural Extension Service, Bulletin 218 (June, 1941).

Corn and Alfalfa Far in the Lead

The advantages of corn and alfalfa as feed crops are further emphasized by the data in table 2. This information was obtained from farm records in southeastern Minnesota. With the average yields obtained on these farms, corn will produce 2,373 pounds of digestible feed per acre. A bushel of oats contains 22.24 pounds of digestible feed. To produce as many pounds of digestible feed with oats as with corn would require a yield of 107 bushels (2,373÷22.24). Even the recently introduced varieties such as Vicland, Tama, and Boone do not produce yields even approaching 107 bushels on these farms. Corn and alfalfa not only produce more feed per acre and per hour of man labor than the other feed crops, but they produce it at a much lower cost per hundred pounds.

Plan Cropping Systems To Increase Feed Production

The opportunity for increased feed production by increasing the proportion of land in corn and alfalfa is indicated by the comparisons in table 3. In the first column is shown a cropping system with the distribution between oats, barley, corn, and hay substantially as they have been for the past 15 years on these farms. In proposed systems 1 and 2, corn and alfalfa have been increased at the expense of oats and barley. The production of digestible feed is greatest under proposed system 1, but slightly more labor would be required than at present. If 8 acres of alfalfa were pastured as suggested under proposed system 2, nearly as much feed would be produced (assuming 75 per cent as much feed could be obtained by pasturing as would be produced as hay) and the labor would be better distributed through the season. The greatest number of hours required in any one week would be less than under the present system.

Table 3. Comparative Feed Production with Different Cropping Systems

	Cropping system		
	Present	Proposed	
		No. 1	No. 2
Acres of crops			
Oats	35	10	10
Barley	15	15	15
Corn	33	50	50
Alfalfa hay	17	25	17
Alfalfa pasture	....	....	8
Total	100	100	100
Pounds of T.D.N.	170,548	206,765	201,821
Hours of labor	917	1,000	928
T.D.N. per hour of labor	186	207	217
Cost per 100 lbs. T.D.N.	$.93	$.79	$.77

It should be noted that the marked increase in feed production indicated in table 3 was attained by *increasing* the acreage of those crops which normally produce a large amount of feed per acre, and *decreasing* the acreage of a crop which ordinarily produces less feed per acre. No change in yield per acre was brought in.

Plant a high proportion of the land to those crops, such as corn and alfalfa, that can be expected to produce heavily.

Guard Against Erosion

Increasing the proportion of land in corn increases the danger from erosion, and this safe proportion decreases as the quantity of hilly land and degree of slope become greater. Soils authorities estimate that in the more level areas, 50 per cent of the land in corn or other cultivated crop is about the upper limit of safety from a soil conservation standpoint. In the more rolling areas, one third of the land in corn would be a safe general limit. In either case, a substantial proportion of the land needs to be constantly in sod crops if these percentages of land are to be planted to corn. On the more rolling land, at least one third of the land should be in sod crops, and on the level areas not less than 15 per cent.

On any sloping or hilly land, special soil-conserving practices should be followed. A good general guide for corn or other cultivated crop is as follows:

Slope, per cent	Practice to follow
Up to 3	Grow in rotation
3 to 6	Drill on contour
6 to 15	Drill in contour strips with alternating strips of hay or grain
Over 15	Do not plant corn

Increase the Acreage of Alfalfa or Clover

With the critical shortage in protein feeds, clover and alfalfa hays have a greater importance than usual. If the feeding of wild hay, timothy, corn fodder, and corn silage can be reduced and good clover or alfalfa hay fed instead, the total daily ration will provide a much higher proportion of protein. Under normal circumstances this is good livestock management, and at present it is about the only practical method of getting enough protein in the ration to keep production at a good level.

Alfalfa is the better of the two in most parts of the state, but where alfalfa is not adapted, or alfalfa seed cannot be obtained, clover is the crop to grow.

Good stands are important, of course, and the good farmer will seed some every year in order to have good stands coming on; but this year it may be necessary to hold poor stands that would normally be plowed up, in order to have enough hay.

Soybeans can be planted for hay if other legume hay falls short. Beans are rich in protein and make a satisfactory hay if well cured.

Use This Table to Plan Your Crop Program

Crop	Yield per acre	ACRES OF CROPS		TOTAL DIGESTIBLE NUTRIENTS				DIGESTIBLE PROTEIN			
		Usual acreage	Proposed acreage	Pounds per unit (Bu. or ton)	Pounds per acre	Total pounds		Pounds per unit (Bu. or ton)	Pounds per acre	Total pounds	
						Usual acreage	Proposed acreage			Usual acreage	Praposed acreage
	1	2	3	4	5	6	7	8	9	10	11
					Col. 1x4	Col. 2x5	Col. 3x5		Col. 1x8	Col. 2x9	Col. 3x9
Corn	____bu.			46				4.1			
Oats	____bu.			22				3.3			
Barley	____bu.			37				4.7			
Winter wheat	____bu.			48				5.3			
Spring wheat	____bu.			48				5.3			
Rye	____bu.			46				5.1			
Alfalfa	____tons			1,030				208.			
Red clover	____tons			992				148.			
Alsike clover	____tons			946				158.			
Clov. and Tim.	____tons			986				102.			
Timothy hay	____tons			960				56.			
Soybean hay	____tons			1,000				180.			
Corn silage	____tons			336				24.			
TOTALS											

Crop Yields

The comparison of total feed produced from the "usual" and "proposed" acreages referred to in the table is based on the same yields per acre. The use of adapted varieties, the careful use of commercial fertilizer, and better cultural methods may result in materially higher yields. This would increase the total feed production but would not be likely to make much difference in the choice of crops. Corn and alfalfa would, in most cases, still retain their advantage.

Instructions for Using Work Chart

Using average or normal yields per acre, and the usual or normal acreage of each crop, compute the total digestible nutrients produced per acre (column 5) and the total digestible nutrients from the usual acreage (column 6). Then compute the total pounds that would be produced on the proposed acreage (column 7), and compare the totals for the farm.

Compute the protein production in the same way, and compare these totals.

Special War Crops

Minnesota produces, in addition to feed crops, considerable acreages of other crops vitally needed for war purposes—flax, soybeans, potatoes, hemp, vegetables for canning, navy beans, and others. Where these crops are adapted, they should be grown, at least up to the recommended goals.

The fact that land must be reserved for these war crops makes it doubly important that we get maximum feed production from the acres left available for feed crops. With a limited acreage of feed crops, we must raise more feed per acre in order to produce enough total feed to meet our livestock goals. A careful selection of crops is the best method of getting this increased production per acre.

FURTHER INFORMATION

The following Extension publications can be obtained from the county agricultural agent or by writing to Bulletin Room, St. Paul 8, Minnesota.

Well-Managed Pastures—Bulletin 241

Pasture Plants and Combinations—Bulletin 197

Grow Vicland, Tama—Better Oats—Pamphlet 129

Feed Shortage—Pamphlet 127

Commercial Fertilizers—Pamphlet 118

Pasture Renovation—Folder 115

Legume and Grass Mixtures—Folder 62

Improved Varieties of Farm Crops—Folder 22

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