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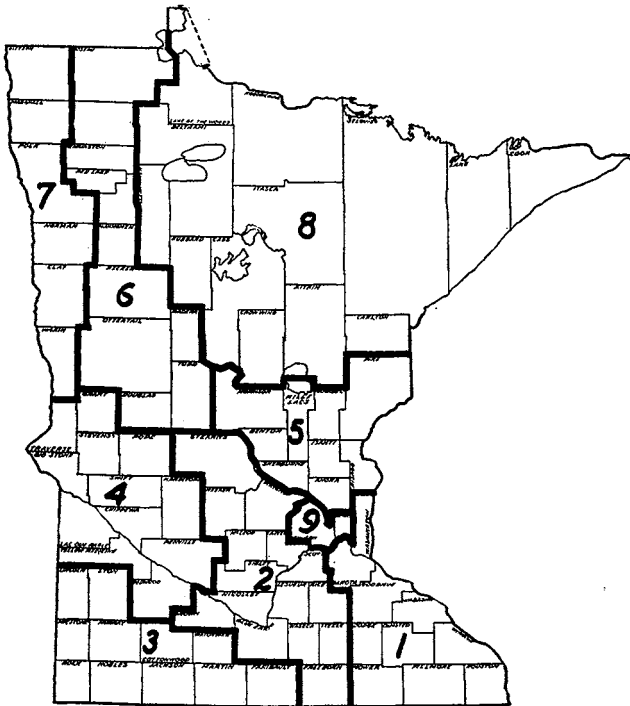
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FARM PLANNING

S. B. Cleland and W. A. Peters

TYPE-OF-FARMING AREAS



AREA 7

With suggested crop rotations suitable for Type-of-Farming Area No. 7, comprising the following counties:

Clay
Kittson

W. Marshall
Norman

W. Polk
Wilkin

PLANNING THE CROPPING SYSTEM

Farmers of Minnesota are asking "What is good farming?" With far-reaching adjustments being suggested in cropping practices, farmers are raising questions as to why we raise what we do, and what results will follow if we make certain changes.

To get at some of these facts, the Agricultural Extension Service and the Program Planning Division of the Agricultural Adjustment Administration invited the cooperation of practical farmers in a careful study of the situation. In each of 42 counties of Minnesota a committee of farmers has made an intensive study of the farming programs best adapted to the county. Starting with the crops now being raised, these "planning committees" have worked out cropping systems which they feel will maintain fertility, prevent erosion, and fit in with conditions as to labor, livestock needs and other physical conditions of the county. What adjustments away from these basic crop and livestock systems may be called for by other considerations need always to be taken into account. The questions that have been raised by these planning committees and that are being raised generally, have to do with good farming as expressed by such physical factors as soil, climate, labor supply, experience of operators, as well as market demand.

CHOOSING A CROP ROTATION

Crop rotations are desirable because—

1. A uniform acreage of desired crops is maintained which tends to give a uniform supply of feed and cash crops.
2. Soil fertility is maintained more uniformly over the farm. This is particularly true if legumes are included in the rotation.
3. Under proper planning the farm labor needs may be spread more uniformly over the entire year.
4. Operating the farm in a small number of fields of uniform size and as nearly rectangular as possible, usually results in increased efficiency of labor, power, machine use, fence, land use and accessibility.
5. A rotation gives opportunity for better control of weeds, crop and livestock diseases, and insect pests.

Points to consider in planning a rotation:

1. Include only the tillable land in the rotation.
2. Consider carefully the crops to be grown and the acreage of each.
3. Plan for hay and pasture in the rotation if they are not provided on non-tillable land.
4. Decide on the proportions of the crop acreage to be devoted to sale crops and to feed crops.
5. Satisfy yourself that the proposed rotation will maintain the fertility of the soil.
6. Choose crops adapted to the soil and topography of the farm.

RECOMMENDED CROPPING SYSTEMS

For Area 7

Rotation 1

1. Barley
2. Wheat
3. Oats
4. Sweet clover
5. Cultivated crops
6. Flax
7. Alfalfa (3 to 5 years)

For large farms with considerable livestock.

Rotation 2

1. Small grain
2. Small grain
3. Small grain
4. Sweet clover (Hay, pasture, seed or plowed under)

For large farms with tractor power and little livestock.

Rotation 3

1. Wheat
2. Sweet clover
3. Cultivated crops
4. Oats or barley
5. Alfalfa (3 to 5 years)

For smaller farms with considerable livestock.

Rotation 4

1. Wheat
2. Sweet clover
3. Cultivated crops
4. Flax
5. Oats and barley

For smaller farms with very little livestock.

Rotation 5

1. Oats
2. Sweet clover
3. Cultivated crops
4. Rye or oats
5. Alfalfa (3 to 5 years)

For sandy land. Oats will be used as a companion crop for alfalfa; at other times rye will be seeded on field 4.

Rotation 6

1. Small grain
2. Small grain
3. Small grain
4. Cultivated crops
5. Alfalfa

For general livestock and grain farms with non-tillable pasture.

PROCEDURE FOR SETTING UP A CROP ROTATION

1. Decide on the kinds and approximate acreages of the crops to be grown. (A good rotation will contain small grain, corn or other cultivated crop, and legume hay or pasture.)
2. Select one or more rotations which appear to furnish the kinds and acreages of crop desired. (Frequently two or more rotations will fit the needs of the farm better than a single rotation.)
3. Draw trial maps of the farm, fitting these crops to the proposed fields, until a combination is found that will fit the selected rotations; or select other rotations to fit the best field arrangement.
4. Since it is usually impossible to get a rotation into operation immediately, due to present seedings, and other conditions, plan the crops for the coming year and succeeding years to fit into the final rotation program.

SUGGESTIONS ON FIELD ARRANGEMENT

1. The fields of a rotation should be as near equal in size as possible. The number of fields will be determined by the rotation selected.
2. In shape, each field should be as rectangular as possible, preferably longer than wide.
3. Where fields are sloping or hilly, it is desirable to have the long way of the field across the slope to reduce soil erosion.
4. The fields should be so arranged that it will be convenient to reach each field. If a lane is to be provided, it should avoid low spots, side hills, or other areas that would make travel or hauling difficult.
5. Two or more rotations, with corresponding field arrangements, may be more practical than one rotation.

ALFALFA IN THE ROTATION

The relation of alfalfa to the other crops in the rotations needs to be especially observed. Since it is usually desirable to leave alfalfa for several years before plowing, the field containing alfalfa is set out of the rotation during the time it is in alfalfa. Thus a rotation consisting of six fields, one of which is in alfalfa, would have the other five fields operated in a five-year rotation during the time the alfalfa was occupying the sixth field. When ready to change the alfalfa to a fresh field, the new field is seeded down, the old field plowed up and the five-year rotation continues. The change may come after the alfalfa has stood for three, four, five, or more years, depending on the desire of the operator. It should be borne in mind, however, that if the alfalfa is being depended on as one of the major factors in maintaining the fertility of the farm as a whole, it will not be desirable to leave the alfalfa in for more than three or four years.

USING ROTATIONS

This system of rotations is designed for farms sufficiently level for rectangular field arrangement. If the farm is to be laid out on a strip cropping basis, the sequence of crops as given may be desirable but a different arrangement of fields is necessary.

FEED PRODUCED PER ACRE

The quantity of feed produced per acre from the principal crops is shown by areas in Tables 1 and 2. In Table 1 the quantities are shown in bushels or tons; in Table 2 the quantities have been converted to total digestible nutrients.

Table 1.* Ten-Year Average Yield of Feed Crops by Areas, 1921-1930

Crop	Type-of-Farming Areas								
	1	2	3	4	5	6	7	8	9
Corn	37	38	33	32	29	28	26	27	34
Barley	29	31	29	27	28	25	24	27	31
Oats	37	39	37	34	34	30	28	33	36
Alfalfa	2.6	2.8	2.2	2.2	2.4	2.4	2.2	2.2	2.6
Clover (red and alsike)	2.0	1.9	1.5	1.5	1.6	1.6	1.5	1.8	1.9
Sweet clover	1.7	1.6	1.4	1.4	1.3	1.3	1.3	1.3
Corn silage	7.9	8.3	8.3	7.4	7.1	6.5	5.5	5.5	8.6
Timothy	1.6	1.7	1.3	1.3	1.5	1.4	1.2	1.6	1.4

* Tables 1 and 2 prepared by Division of Agricultural Economics, University of Minnesota. Source: 1930 U. S. Census; Minnesota Crop and Livestock Statistics. SAE 1/4/38.

Table 2. Pounds of Total Digestible Nutrients Produced per Acre (Based on average crop yields, 1921-1930)

Crop	Type-of-Farming Areas								
	1	2	3	4	5	6	7	8	9
Corn	1693	1739	1510	1464	1327	1281	1190	1235	1556
Barley	1105	1181	1105	1029	1067	953	915	1029	1181
Oats	834	879	834	766	766	676	631	743	814
Alfalfa	2652	2856	2244	2244	2448	2448	2244	2244	2652
Clover (red and alsike)	1984	1885	1488	1488	1587	1587	1488	1786	1885
Sweet clover	1724	1622	1420	1420	1318	1318	1318	1318
Corn silage	2654	2789	2789	2486	2386	2184	1848	1848	2890
Timothy	1565	1663	1271	1271	1487	1369	1174	1565	1369

LEGUME ROUGHAGES ARE HIGH IN PROTEIN

In addition to the total quantity of digestible feed produced per acre, the feeding quality and particularly the percentage of protein need to be taken into account. The percentages of digestible protein of some of the common feeds, as reported in Morrison's "Feeds and Feeding," are shown in Table 3. It will be noted in the case of the different kinds of hay that a wide range of protein content is possible, depending on the time of cutting and the manner in which the hay is cured and handled. Since protein is costly and the element most likely to be deficient in the ration, it is important that those feeds high in protein, particularly legume hays of good quality, form a large proportion of the feed acreage.

Table 3. Per Cent Digestible Protein in Farm Crops

Farm grains	
Corn, dent, No. 3	7
Barley	9.3
Oats	9.4
Wheat	11.6
Rye	10.3
Hay	
Alfalfa	8.2 to 14.2
Red clover	6 to 8.8
Alsike clover	7.7 to 8.6
Sweet clover, first year	14.6
Sweet clover, second year	10.5
Timothy and clover (30% to 50% clover)	4.8
Timothy	2.4 to 5.6
Silage and fodder	
Corn fodder (well eared)	3.5
Corn stover (ears removed)	2.1
Corn silage, well matured, fair in ears	1.1
Corn silage, immature, southern type	0.9
Sunflower silage	1.1

ADJUST LIVESTOCK TO AVAILABLE FEED

If a farming program is followed that results in more hay and pasture and less grain and corn being available for feed, the following adjustments may be made:

1. Hay could be fed later in the spring and during periods of short pasture in the summer. If hay was plentiful, considerable quantities could be utilized in this way.
2. To some extent, roughage could be substituted for grain in the ration. Cows and ewes especially can use large quantities of good hay, especially good-quality alfalfa and clover. An increased proportion of the animal's total nutrients could in many cases be obtained from better hay, without any lowering of production.
3. Keep fewer head of grain-consuming livestock (hogs, fattening steers, feeder lambs, turkeys, chickens) and more roughage-consuming livestock (dairy cattle, beef-breeding herds, farm flocks of sheep).
4. More hay and less silage and corn fodder could be fed. Feeding dairy cows about 20 pounds of silage per day instead of the 35 or 40 which is frequently fed is practical provided the cow is given plenty of good legume hay. If the hay is not of good quality, this substitution is not so satisfactory.
5. A reduction in the acreage of corn and small grain does not necessarily decrease feed production. The seeding of alfalfa in place of corn or grain may even increase the feed produced because in terms of digestible feed, alfalfa produces more per acre than does corn or grain at normal yields.

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