

To achieve safety, farming practices must be adapted to existing climatic hazards. A livestock economy based on the proper utilization of native range and seeded pastures supplemented by locally produced annual forage and feed crops can do much toward stabilization. In some places irrigation developments are under way; they will assure the production of forage and other feeds. These developments will bring a new era of stability in livestock production if the forage and other feeds thus produced are properly integrated with the use of large acreages of native range.

Yet despite its extremes, the climate is healthful for men and livestock. Certain diseases and pests of southern ranges do not molest northern ranchers. The people here come largely from pioneer stock and have been tested by adversity. Many remain because they treasure the wide horizons and ample elbowroom of the Northern Great Plains. Their experience and tenacity will be invaluable in developing a more stable program of range husbandry supplemented by crop agriculture in a region that normally produces at least 15 percent of the national total of cattle, sheep, and horses.

## THE PLACE OF GRASSLAND FARMING

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THE NORTHERN Great Plains is a transitional region.

From east to west, about 500 miles, it passes from the intensity of cultivation and management of the Corn Belt to the semiaridity and extensive operations found in range country.

From north to south, about 600 miles, it passes from the short summers and long cold winters, with wheat and small grains, to the longer summers and shorter winters, with corn, sorghums, and winter wheat. An hour's drive (particularly just east of the mountains) can take one abruptly from areas in which tillage (if there is tillage at all) depends upon natural rainfall into areas wholly dependent upon irrigation for crops and forage.

The economy does not depend uniformly on grassland. Its basis varies from area to area as the degree of its dependence upon cash grain or livestock varies, and as the degree of its dependence upon beef cattle and sheep or upon hogs and poultry changes. These variations fall into a pattern that reflects roughly the increasing aridity and climatic variability from east to west, and the increasing length of the summers from north to south.

Agriculturally, there are four subregions—the spring-wheat area, the wheat-range area, the corn area, and the range area.

In the spring-wheat area, grassland is secondary to cropland, and grassland as pasture is secondary to grassland as hay. Livestock and livestock products in 1944 produced only about a third of the gross cash agricultural income of the area, and grassland furnished only about a half of the nutrients required by the livestock that produced that income. Grassland as pasture produced about a tenth of the feed nutrients for this livestock; grassland as hay produced about 40 percent, and concentrates about 50 percent. Apparently this comparatively heavy use of hay and concentrated feeds arises from the rather large proportions of hogs, chickens, and dairy cows and from the striking fact that the native tall-grass pastures in the relatively humid spring wheat area should be no more productive than native short-grass ranges in the half-arid range country to the west.

One need not assume that the pastures of the spring wheat area are not used to capacity and that the feed they

produce is wasted. Their unproductive condition apparently results from a greater degree of depletion of the grass cover. On this point the report, *Postwar Program for Conservation and Improvement of Range and Native Pasture Lands in the Northern Great Plains*, said in 1944: "It is paradoxical that the grazing lands east of the 100th Meridian are in a relatively poorer condition than those in other parts of the region. Of the 15 million acres in poor condition, 9½ million acres are located in this area. The native grazing lands remaining in this area have lost so much of their original grasses from hard use that it generally requires complete new seedings before the potential production can be restored."

Free land and the Homestead Act influenced sharply the pattern of settlement. Peak periods of homesteading often coincided with relatively abundant rainfall and abnormal prices for wheat. Hidden then was the fact that under more normal rainfall and prices the homestead tracts were too small to produce adequate livelihood. Overcultivation, overdevelopment, and overstocking were the consequences.

The drought and depression of the 1930's brought widespread economic distress. The fundamental need was less dependence upon wheat and more on feed crops and pasture and livestock. But that was largely impossible without making farms larger—and that meant that some farmers had to sell their land to neighbors and move away. During the depression the lack of alternatives for these "surplus" farmers held many of them on their farms, and the adjustment was largely blocked. The new employment opportunities during the war helped the situation somewhat. According to estimates in the report, *Adjusting Agriculture in the Northern Great Plains for War and Postwar Needs*, in the long run it is desirable (in comparison with 1939 conditions) that the number of farms throughout the spring wheat area decline some 11 percent and that about 11 percent of the cropland be regressed

as additional pasturage. Although the number of farms has dropped, it is doubtful if much regressing occurred during the war years.

### *The Wheat-Range Area*

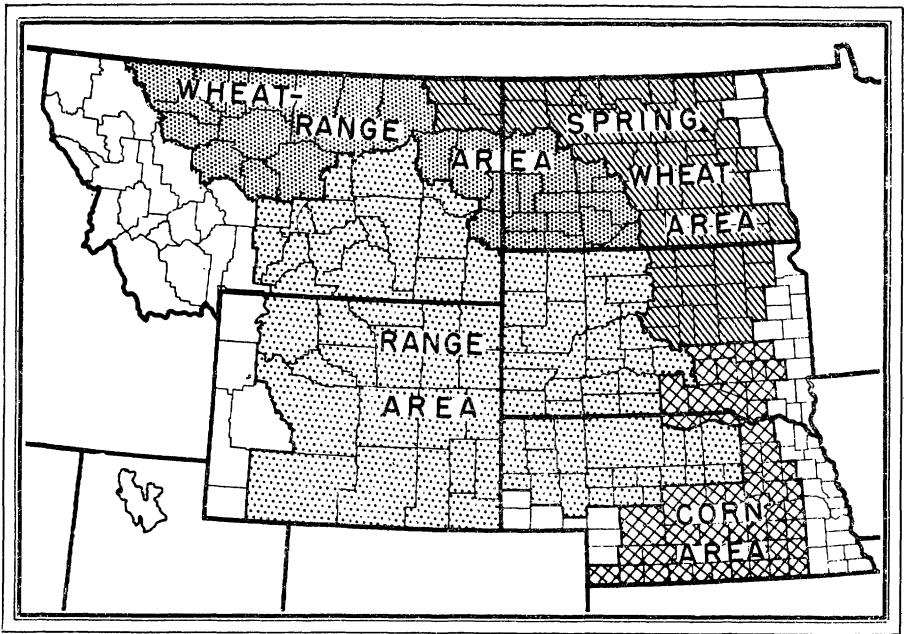
The wheat-range area lies west and north of the spring wheat area in southwestern North Dakota and north-central Montana. Here, too, grassland is less important than cropland, but grassland as range is more important than grassland as hay. Diversity characterizes the area. Dry-land wheat farms, wheat farms with range livestock, and livestock ranches sometimes are right next to one another.

Livestock and livestock products produced here in 1944 brought in only about a third of the gross cash agricultural income. But grassland supplied about three-fourths of the nutrients required by the livestock that produced this income; grassland as pasture alone produced almost half of the feed, grassland as hay produced about a fourth, and concentrates about a fourth.

The relatively heavy dependence of livestock in this area upon grassland, particularly pasture, comes from two factors: Only 5 percent of the livestock is swine and poultry, which use little roughage; beef cattle and sheep, animals that use relatively little concentrate feed and utilize hay only during a part of the year, comprise 80 percent of the livestock. Dairy cattle, so important as consumers of grain and hay in the spring wheat area, constitute only about a fifth of all roughage-consuming livestock in the wheat-range area. Almost three-fourths of the land in this area is in pasture.

Here, too, overcultivation and overexpansion of cropland caused distress. Farms of the usual homestead size frequently could not survive drought and depression.

The war encouraged many families on undersized farms to leave the area; the excellent market for agricultural goods encouraged the farmers who remained to add those properties to their



Generalized types of farming areas in the Northern Great Plains showing areas where grassland's place in farm economy differs. The map is adapted from "Generalized Types of Farming in the United States—Delineation on County Boundaries," U. S. Bureau of Agricultural Economics, 1946. Here, the Northern Great Plains is the sum of these farming areas and consequently may not correspond exactly with the other definitions given.

holdings. As a result the size of farms has gone up and the number of farms down since 1940. Now, with farms of more adequate size (although still further adjustment is needed) the prospect is favorable that high-risk cropland will be regrassed with the return of more normal weather and prices.

Here, more than anywhere else in the Northern Great Plains, grassland is the balance wheel. Climate, soils, and topography are variable, sometimes favorable for wheat, sometimes unfavorable. Wheat is at the margin—a risky venture in all but limited spots. Livestock production is not subject to irregular fluctuations to the same degree that crop production is in the wheat-range area. Between 1924 and 1945 crop production in all of the Great Plains varied less than 28 percent from average in two-thirds of the years, but livestock production in the same period varied less than 14 percent from its average, or only one-half

as much. Thus stability of the agricultural economy of the wheat-range area rests on an emphasized livestock enterprise, which, in turn, rests upon grasslands. Natural grasslands of the area provide the cheapest and most abundant forage. Native range grasses supply most of the nutrients needed by cattle, sheep, and horses.

### *The Corn Area*

In the corn area, grassland is subordinate to cropland, and grassland as pasture is less important than grassland as hay. But, unlike the spring-wheat area, livestock and livestock products furnish two-thirds of the gross cash farm income of the corn area, where only about 40 percent of the feed nutrients for the livestock that produces this income is derived from grassland—25 percent from grassland as hay and 15 percent from grassland as pasture.

The fact that about 60 percent of the feed requirements of livestock in this area is supplied from concentrates indicates the importance of the corn crop as a base for the stock enterprise.

This relatively heavy dependence upon concentrates and upon grassland as hay rather than as pasture reflects the importance here of hogs and chickens (17 percent of all livestock) and of dairy and feeder cattle.

Possibly because of this importance of corn and grain-consuming animals and the concentrated settlement of the area, pastures have been so abused that—although they are in an area of greater humidity and originally in the tall-grass belt—they supply only about twice as much nutrients per acre as do the short-grass ranges of the drier range area.

To conserve soil resources and to enhance and stabilize incomes, grassland in the corn area should be made more productive and plentiful. In the long run, we think, the acreage of cropland should be reduced about 9 percent (from the 1939 figure) and put back into grass. Although it might be profitable to use the poorer croplands for pasture, it is probable that they will yield less income than when they are cropped. To maintain or to enhance incomes, larger farms, about 20 percent fewer than in 1939, will be necessary if this needed regrassing is to be carried out.

### *The Range Area*

The range area is the part of the Northern Great Plains where climate, soil, or topography make crop production too risky.

Generally it lies south and west of the Missouri River and includes the sand hills of north-central Nebraska. The economy rests primarily on livestock ranching, although spots of dry farming and irrigation are scattered throughout the area. Beef cattle and sheep predominate and are run mostly under range conditions, rather than on farm pastures.

Crop production is less important than anywhere else in the Northern Great Plains. In 1944, crops occupied only 10 percent of the land, produced about 28 percent of the gross agricultural income, and supplied about 15 percent of the nutrients fed to livestock in the area.

Grassland as range occupied some 85 percent of the land in 1944 and supplied about one-half of the nutrients needed by the livestock, which furnished about three-fourths of the gross agricultural income. Grasslands as hay furnished about 30 percent of the feed required by the livestock.

These grasslands have suffered from overextension of cultivation and overgrazing, although, by and large, they have suffered less than grasslands of the wheat area. Homesteading spread into the range area as it did through the wheat area; many farm units were too small; livestock pressure on the range was severe; taxes were too high. Drought, depression, and the recent war caused a reduction in the number of operating units, the extent of cropland cultivated, and numbers of range-using livestock. But in this area limited rainfall and considerable wind make range recovery and regrassing of abandoned cropland extremely slow, unless actively assisted by man.

The vital importance here of grassland makes its protection and rehabilitation essential to stability and welfare. In the long run, we believe, approximately 20 percent of the land in crops in 1939 should be regrassed; in local areas, where wheat is grown, there should be a reduction in use of land for crops and, on the land retained in cropland, there should be a considerable shift to feed crops and away from wheat as a cash crop.

Although the size of units has increased during the war years, it is doubtful if the recommended reduction in cropland has taken place to any significant extent. In fact, there probably has been some recropping of formerly abandoned lands.

The need is still before us to widen

the extent of grassland and reduce cropland, increase the economic reliance upon range-using livestock, and put the relation between livestock and grassland in such shape that grasslands are protected against deterioration.

### *Importance of Grassland*

To the individual farmer or ranchman the value of grass is reflected in how much another acre of it will affect his net income and whether the effect will be plus or minus. To him, whether he adds an acre of grassland to his farm or whether he shifts an acre of cropland to grass, the question is the same—how much does it add to or subtract from his net income? As an individual farmer, he will be concerned with which added acre adds the most income—if either adds to income at all.

To the individual, grassland may have economic importance in two directions. An additional acre added to his farm area may enable an increase in the size of his business from which added gross income can be received with less than proportional increase in costs, thus adding to his net income. Or it may enable him to carry the same size of business as before but with less pressure on resources, less resource deterioration, and lower costs but with equal gross income and hence a greater net income.

An acre of cropland converted to grassland will add to the farmer's net income when the relationship between costs and returns is such that the net is larger from the grassland than from the cropland. This condition may arise for one of two reasons—first, as a result of climatic uncertainty or quality of soil or topography, the spread between costs of tillage and gross returns on the acre may not be so large when it is in crop as when it is in grass; and, second, the acre when in grass may fit so well with other aspects of the farm business that it affects the gross farm income or costs or both so that its net income is enhanced.

How does the economic importance of grassland look to most individual operators in the major areas of the Northern Great Plains in the light of these considerations?

In the spring-wheat area and the corn area the farmer is faced with like problems when evaluating the importance to him of adding another acre of grassland to his farm or converting another acre of cropland to grassland.

In either area, when one operator wants to acquire additional grassland to add to his farm he usually will have to buy some other farmer's entire farm unit—not only the grassland he wants but cropland he may not want, and improvements (e. g., buildings) that are of little value to him. Under such circumstances the grassland must be worth considerably more to him than to the adjoining farm to warrant the investment, or the farm he is buying must be so poor that these unwanted values are small, or the public must step in to assume the loss occasioned by the value of the unwanted improvements. Only rarely and under unusual circumstances can the operator who wishes to do so expand his grassland in the wheat area and in the corn area by adding additional land to his farm.

What economic considerations face the individual farmer when he is considering converting some of his cropland to grassland in these areas?

The most common kinds of farms in these areas are only big enough to produce a minimum adequate livelihood under normal price and weather conditions and then usually only by pushing the resources to their productive limit. Except under conditions of unsuitable climate, poor soil or topography, and down to a point of proper relation between cropland and grassland on the farm, an acre of grassland will not produce as much net profit as will the same acre in cropland use. On farms that must be pushed to the limit to make a minimum living for the operator's family, a sacrifice of net income cannot be made by a shift of cropland to grassland use.

Even where the farm produces more than enough for a comfortable living, the shift cannot be made unless the farm is oversupplied with cropland relative to its labor and machinery, or unless it is undersupplied with grassland relative to the needs of the livestock necessary to utilize the feed crops produced, or unless the farmer includes "resource deterioration" as a cost in his accounting and can reduce this cost more than his income by shifting certain crop acres to grass. Farms on which these possibilities occur are few in the spring wheat and corn areas, however.

Rapidly expanding mechanization in both areas also retards the spread of grasslands even though farms are growing in size. Not only can the operator with modern equipment handle more crop acres, but he is compelled to do so in order to carry his investment in machinery. In the spring-wheat area, the wheat-range area, and the corn area, the increasing size of farms is only just barely keeping up with the expanding pressures of mechanization—if it is doing even that.

Thus, though grassland is important in these areas, its expansion, if left to the judgment of individual farmers, faces economic obstacles. Mechaniza-

tion of hay and silage equipment may help to increase the use of grass.

In the range area economic pressure for more grassland is a more compelling force; the tendency among ranchmen is to acquire lands from those who have moved away and to stabilize and secure the business by getting firmer control over grasslands that formerly were used but not leased or owned. Mechanization and high wheat prices with favorable weather have retarded the expansion of grassland, but conditions are more favorable for regrassing to take place with the return of weather and wheat prices more normal than they have been since 1920 or so.

The grasslands are essential in the economy of the Northern Great Plains. Without them there would be no economy at all (as in the range area) or a crippled economy (as in the corn area). Yet it is true that the importance of the grasslands and the need for managing them well are not yet appreciated.

To too many persons the grasslands need no management, only harvesting. To too many, they still are only an adjunct to farming—not farming itself. To too many, the yield on grassland is as natural as the weather—not to be affected for good or ill by man.

## THE TYPES OF PLAINS VEGETATION

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THE FORAGE that grows on 176 million acres in the Northern Great Plains is the basic raw material for a great range livestock industry.

Hundreds of species, mostly grasses but including shrubs and weeds, make up the total forage crop. Even if they are not grazed, all are of value for holding the topsoil and as a source of humus to retain moisture and enrich the soil.

The plains vegetation is of five types, based on the native vegetation on 231 million acres before a fourth of the total was plowed.

The northern short-grass (mixed prairie) type covers about 228,000 square miles—most of eastern Montana and adjacent parts of the Dakotas and Wyoming, where average precipitation is from 11 to 17 inches a year. The dominant species are blue grama, bluestem wheatgrass or western wheatgrass, needle-and-thread and green needlegrass, buffalograss, Sandberg bluegrass, and threadleaf sedge. These seven provide about 75 percent of the total range forage, but shrubby plants (such as big, silver, and fringed sage-