Cropping Practices in the Great Plains
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MOISTURE CONSERVATION PRACTICES AND THE RELATIONSHIP OF CONSERVED WATER TO CROP YIELDS

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VARIOUSLY described as a “great American desert,” the “dust bowl,” “problem area,” and “short grass country,” the unpredictable Plains have repeatedly absorbed and obscured the errors of the overconfident. Perhaps the hazards of farming in this dry land area have been exaggerated. It is truly a region of sparse and irregular rainfall but, in the words of Hallsted (11), “On the level lands of the Plains the soil has lost very little of its original abundance of fertility through leaching and erosion and thus far not a great deal has been removed by cultivated crops. The application of fertilizers, including barnyard manure, green manures, and commercial fertilizers on the Fort Hays Kansas Branch Experiment Station has not increased the yields of wheat. This indicates that failures or low yields are not due to lack of fertility.”

Average annual precipitation in the Plains region ranges from more than 20-inches along the eastern border to as little as 11 inches in the far west. Approximately three fourths of the precipitation is during the growing season. Precipitation is erratic from year to year and droughts are frequent (15). Wind velocities are relatively high, particularly during late winter and early spring.

PURPOSE AND METHOD OF STUDY

The purpose of this study was two-fold, first, to show the effect of conserved moisture upon the yields of crops commonly grown in the area, and second, to compare the effectiveness of various moisture conservation practices.

It has been impossible to review all of the pertinent work bearing upon the question, but many publications from various stations on the Plains have been consulted. Some data representing investigations of only brief duration were included merely to indicate possible trends or to support other findings because the writer is more familiar with the conditions under which the Kansas work was done. However, Kansas is situated near the center of the Great Plains from north to south, and conditions therefore may as nearly represent Plains conditions as do conditions at any other state in the region.

Crops were selected to represent the area in measuring the relationship of conserved moisture to crop yields. Winter wheat is grown rather extensively over much of the Plains region, spring wheat is commonly grown only in the north, cotton in the south, and sorghum in Kansas and southward.

Moisture conservation practices were appraised from the standpoint of moisture conserved as evidenced by differences in soil moisture and crop yields, and by the degree to which the improvement might depend upon the performance of other practices.

For the purpose of this study, the term conservation is defined as wise use.

RELATION OF CONSERVED WATER TO CROP YIELDS

That there is a relation between available water and yield of winter wheat was shown by Hallsted (5) in 1915. It was later shown by Hallsted and Mathews (12) that the depth to which the soil is wet at seeding time is definitely related and that the prospects of a good yield increase as an increase in the depth to which the soil is wet.

The extremely low probability of success in planting wheat in a dry or nearly dry soil as shown in Table I emphasizes the desirability of promoting those practices which store a maximum of water in the soil. Furthermore, the frequency of profitable yields increased as the depth to which the soil was wet increased.