Historical Document
Kansas Agricultural Experiment Station

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Agricultural Experiment Station
Kansas State Agricultural College

A Great Need for Saving Soil Moisture This Spring.

There is no question but that the moisture condition of the soil at the beginning of the growing season is often closely related to the yield of crops for that year. Experiment Station men have observed this and have advocated winter and spring culture of the soil, such as may aid in storing up and conserving soil moisture. Practical farmers have observed this, also, in the poor growth of corn and other crops on spring breaking or on sod land, and by the low yield of crops following Kafir-corn and sorghum, which crops grow late in the fall and as a rule exhaust the soil water to such a degree that the supply is not replenished for the following spring crops.

While the moisture condition of the soil in the spring may be taken as a general criterion of crop yields for the season, there, of course, will be exceptions. For instance, an exceptionally wet summer may follow a winter unfavorable for the storing up of water in the soil, or an exceedingly dry summer may follow a winter favorable for the storing up of moisture. While these exceptions may occur, at the same time it holds true that crops will make a fair yield in a dry season if an abundance of water has been stored in the soil, or will make a poor yield in a season of average rainfall if the moisture content at the beginning of the season is low. In order to secure data on this subject the Agronomy Department of the Kansas Experiment Station, in 1903, began a study of the moisture condition of the soil under different crops at the beginning of the growing season, and has continued the work since that time. The following table gives the moisture condition of the soil in March, 1907 and 1908, to a depth of six feet, in ground in alfalfa, grass (sod), and wheat, and in corn ground which had been fall plowed in preparation for planting corn again.

Historical Document
Kansas Agricultural Experiment Station

INCHES OF WATER IN FIRST SIX FEET OF SOIL

DEPTH.	Mar. 23, '07.	Mar. 27, '08.	Difference.
ALFALFA (seeded in 1904).			
First foot	3.69	1.98	1.71
Second foot	3.64	2.02	1.62
Third foot	2.86	2.03	.83
Fourth foot	2 67	2.17	.50
Fifth foot	2 42	1.79	.63
Sixth foot	2 27	1.67	.60
Totals	17 55	11.66	5 89
SOD (*Bromus inermis* seeded in 1903).			
First foot	3 90	2.67	1.23
Second foot	3 88	2.91	97
Third foot	3 61	1.99	1.62
Fourth foot	2 57	2 12	.45
Fifth foot	2 09	1.84	25
Sixth foot	1 61	1.64	— .03
Totals	17.66	13 17	4 49
WHEAT (fall seeded).			
First foot	3 45	2.04	1 41
Second foot	3.71	3.02	.69
Third foot	3 70	3.15	.55
Fourth foot	4 00	2.93	1.07
Fifth foot	3 67	2.23	1.44
Sixth foot	3.15	1.81	1.34
Totals	21 68	15 18	6.50
CORN GROUND.			
First foot	4.25	3.43	.82
Second foot	4.28	4 08	.20
Third foot	4.32	2.86	1.46
Fourth foot	3.74	2.46	1.28
Fifth foot	2.97	2.57	.40
Sixth foot	3.00	2.71	.29
Totals	22.56	18.11	4.45

A glance at this table will show the contrast in the amount of stored moisture in the soil this spring as compared with last season at this time. The moisture content in six feet of soil is less in every case as follows: In alfalfa ground, 5.89 inches, which is equivalent to 668 tons of water per acre; in sod ground, 4.49 inches, or 500 tons per acre; in fall-plowed corn ground, 4.45 inches, or 508½ tons per acre; while in wheat ground, which seems to be comparatively in the greatest need of water, there is 6.5 inches, or 732 tons, less water per acre than was stored in the soil for the use of the crop at that date in 1907. Also, that this difference in soil moisture extends deeper than the surface soil is evidenced by the drying up of the shallower wells in the vicinity of Manhattan.

When we appreciate the fact that an inch of water stored in the soil is said to be equivalent to two inches of rainfall, and some investigators say three inches of rainfall, we begin to appreciate what a deficiency of 6½ inches of water in the surface six feet of soil means. It means 13 inches of rainfall, or over one-third of the total average rainfall at this Station for the year. That the spring

Historical Document
Kansas Agricultural Experiment Station

of 1907 was dry we well remember, and the moisture stored in the soil on March 23, 1907, was below the average. Crop at this station suffered last season from an insufficient supply of moisture.

Perhaps the spring of 1905 presents what would be considered more nearly an average for the moisture content of the soil for the spring of the year. During the six winter months from October, 1904, to March, 1905, inclusive, there was 7.27 inches of rainfall, or about .25 of an inch less than normal for the six winter months. The soil on the first of April, 1905, was recorded as in excellent condition, and both soil and weather conditions were favorable for seeding. Moisture samples taken on April 7, 1905, in fall-plowed corn ground showed 28.39 inches of water in the surface six feet of soil as against 18.11 inches this season, a difference of 10.28 inches. In sod land there was 21.7 inches of water in 1905, as against 13.17 inches this spring, a difference of 8.53 inches. In wheat ground there was 25.86 inches of water in 1905 and 15.18 inches this spring, a difference of 10.68 inches, which, according to Professor King, of Wisconsin, is sufficient water to produce thirty-five bushels of wheat per acre.

It is evident from these figures that unless the rainfall for the spring months exceeds the average there will be a shortage in the yield of winter and spring grains, alfalfa, and pasture. The yield of corn, which also depends upon the spring rains, is influenced quite as much by the rains of early summer. Thus every effort should be made to put the ground in the best possible condition for absorbing the rainfall and conserving the moisture already in the ground. The preparation of the ground for corn should have been started three weeks ago, but even yet much moisture may be saved between this and planting time by disking the corn ground or, better yet, by listing. The early listing puts the ground in the best possible condition for receiving the greatest amount of rainfall, and at the same time the stirring of the soil forms a soil mulch for the conservation of moisture already stored in the soil. The corn can be planted in the early listed ground by listing in the old furrow or by splitting the ridges. After the corn is planted every effort should be made to prevent the growth of weeds, for from present indications every ounce of water wasted from the soil through weeds means a decrease in the yield of corn.

It is during seasons of this kind that the storing of a few extra inches of moisture in the ground decides between a crop and a partial or total failure. Knowing the condition the farmers should

Historical Document
Kansas Agricultural Experiment Station

take every precaution to store up and conserve the much-needed supply of soil moisture. L. E. CALL, *Assistant Agronomist.*

NOTE.— A circular on "Dry Land Farming" written by Prof. A. M. Ten Eyck, may be obtained by request from the Farmers' Institute Department, Kansas State Agricultural College, Manhattan, Kansas.

Manhattan, Kan., April 7, 1908.