

## Herbicides are Key to Sustainable Great Plains Dryland Farming

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Dryland farming is crop production without irrigation in semiarid regions. The Central Great Plains comprise about 20 million acres of dryland farms in parts of Colorado, Wyoming, South Dakota, Nebraska and Kansas. One of the practices that evolved for dryland crop production was the use of summer fallow wherein no crop is grown in order to store water for the following crop.

To maximize the amount of stored water, weeds must be controlled throughout the fallow season. Undisturbed weeds remove 2 to 6 inches of soil water per year [1]. Tillage systems developed to remove weeds during the fallow season involve 7 to 10 operations per season. Although the system kills weeds, soil dries out to the depth that is tilled. The maximum tillage system resulted in soil water storage of only 19% of precipitation [2].

Frequent tillage of fallow fields made the soils of the Great Plains extremely vulnerable to wind erosion, which reached its peak in the 1930s when periods of record-setting drought combined with extensive tillage resulted in the “Dust Bowl”[3].

Experimentation with herbicides to remove weeds during the fallow period began during 1948-55. The use of herbicides during the fallow period reduced the need for tillage operations to 2 to 4 per season and resulted in storage of 33% of precipitation [2]. The extra soil water stored with the use of herbicides was reflected in an average 21% increase in winter wheat grain yield over conventional tillage fallow [4].

Fallow acreage in the US has declined significantly in recent decades [5] (Figure 1). In dryland areas of the Great Plains, there has been an expansion of summer corn and sorghum acreage. Improved herbicide options have eliminated the need for fallow in all but the driest areas of the Great Plains [6]. Research demonstrated that by using herbicides to remove weeds without any tillage, soil water storage improved to 40% [2].



Cultivating fallow fields: 1930s



Dust Bowl storm

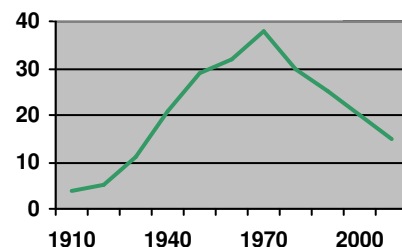


Figure 1: Cultivated Summer Fallow (Million Acres)

### References

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