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Cropping Practices: Introduction

Cropping practices for dryland agriculture have been developed on the basis that water is generally the factor limiting production. Successful cropping practices make the most efficient use of water and provide maximum conservation of soil and water resources. This concept has not always been practiced; farmers who settled in semiarid areas of the western part of the USA starting in the late 1840's brought with them familiar cropping practices from the humid east. Many of these practices were actually a carry-over from the native country of immigrant farmers—also humid areas. When precipitation was better than normal in dryland areas, these practices of the early settlers produced satisfactory results. In normal and below-normal precipitation years, production failed. When crops failed in successive years, the settlers generally moved elsewhere. By the late 1800's, there was positive evidence that the semiarid areas of the USA were going to be permanently settled. Stable, economic crop production from these areas was urgently needed but was not actually achieved until the 1940's.

In 1862, the Morrill Bill, passed in the U.S. Congress, established agricultural colleges and experiment stations throughout the USA. Research from these institutions helped the early dryland farmer, but much was yet to be learned. As the drier areas became more intensively cropped and experiment station results became available, a need arose to exchange ideas among those directly involved in dryland cropping. To meet this need, the first Dryland Farming Congress was held in 1907. The organization that followed was important in promoting early dry farming practices. It often awarded prizes for outstanding production to stimulate interest. From research and promotional schemes, cropping practices evolved that provided the necessary economic stability from dryland production in the semiarid areas.

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Table 20–1. Hectares of fallow and major crops produced on dryland in each geographic area, 1977 statistics.

Geographical area	Total fallow	Crop								
		Wheat	Corn	Rye	Barley	Oat	Sorghum	Cotton	Special crops†	Oilseed‡
	hectares × 1000									
Southern Great Plains	1645.6	5862.0	--	--	--	--	2241.2	2922.4	--	0.2
Central Great Plains	5080.0	7961.2	119.6	75.6	216.8	190.0	2581.2	--	64.8	--
Northern Great Plains	5682.4	7606.0	1484.0	--	2008.0	2072.8	136.8	--	--	506.0
Canadian Prairie Provinces	7077.6	10 111.0	730.0	242.0	4646.0	2132.0	--	--	--	1421.0
Pacific Northwest	1730.4	2391.6	--	--	685.6	121.6	--	--	70.6	--
Pacific Southwest	280.4	436.8	--	--	494.4	165.2	--	--	--	--
Total for all areas	21 496.4	34 368.6	2333.6	317.6	8050.8	4681.6	4959.2	2922.4	135.4	1927.2

† The special crop in the Central Great Plains is millet, in the Pacific Northwest pea.

‡ Oilseed crops in the Southern Great Plains are sunflower and guar, in the Northern Great Plains safflower and flax, and in the Canadian Provinces rapeseed and mustard.

One of the practices that evolved for dryland crop production was the use of fallow. This practice is common to all semiarid dryland cropping areas. Because of the different roles that fallow plays in various areas and its potential interaction with characteristics that are unique to individual areas within the USA and Canada, each of the different geographic areas will be discussed individually in the following chapters: Southern Great Plains, Central Great Plains, Northern Great Plains, Canadian Prairie Provinces, Pacific Northwest, and Pacific Southwest.

Wheat is the major crop throughout all dryland cropping areas. Winter wheat predominates in all areas except the Northern Great Plains and Canadian Prairie Provinces, where spring wheat and durum are most common. Most of the wheat in all areas is produced on medium- to fine-textured soils, with only limited plantings on the sandy soils. Planted hectarages of crop-fallow for each geographic area are presented in Table 20–1.

Since most wheat is produced on soils capable of storing considerable amounts of water, fallow plays an integral role in the overall wheat production system in all areas. The value of fallow for this purpose ranges from minimal in some areas to absolutely necessary in others (Greb et al., 1974). Where fallow is needed, its major attribute is the stabilization of economic production. This stabilization occurs in the entire Central Great Plains area (Smika, 1970) and in other areas where annual precipitation ranges from about 250 to 400 mm in the Northern Great Plains, Canadian Prairie Provinces, and the Pacific Northwest to about 400 to 450 mm in the Pacific Southwest and the Southern Great Plains.

The concept and importance of fallow must be thoroughly understood and appreciated before further study of dryland cropping systems can be made. This information was presented in detail earlier in this book. For the purposes of this chapter, however, the necessity of fallow for wheat production can be defined as the capacity of fallowed soil to supply water to the crop during prolonged periods without rainfall. With winter wheat in the Great Plains, this period occurs in the fall after emergence and after spring growth begins—typically 6 to 8 weeks before spring rains are expected. In the Pacific Northwest, fallow is most important for the fall stand establishment of winter wheat. Other benefits of fallow include control of problem weeds, disease, and insects; storage of 18 months of nitrate mineralization; and production of enough crop residue to prevent wind erosion.

20–1 LITERATURE CITED

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