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Changes in Eastern South Dakota Crops Patterns: 1950s to 1990s

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**Changes in Eastern South Dakota
Crop Patterns: 1950s to 1990s**

by Thomas L. Dobbs
with assistance from Lisa M. Carr¹

Econ Pamphlet 97-1

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Changes in Eastern South Dakota Crop Patterns: 1950s to 1990s

Introduction and Overview

This report contains background data for a study on possible impacts of the 1996 Farm Bill ("Federal Agricultural Improvement and Reform Act of 1996") on crop system diversity. The study, being conducted by the Economics Department at South Dakota State University (SDSU), is focused on the 7-county area of eastern South Dakota shown in the map on the following page. This area constitutes a major portion of the Big Sioux River drainage area in South Dakota. The aquifer underlying the Big Sioux River in these counties provides drinking water for a significant portion of the State's population. Therefore, agricultural practices that potentially affect the river and underlying aquifer are of great interest to both farmers and the general public.

Of special interest are practices that might affect nitrate leaching. Nitrate leaching can be impacted by the types of crops grown, how they are grown in rotation, and the types of tillage and fertilization practices used. This report contains information only on the crops grown in these seven counties, and how patterns have changed over the last half of the twentieth century.

The narrative is limited to historical descriptions in this report. Analyses of the historical patterns and potential future changes as a result of new provisions in the 1996 Farm Bill will come in later reports. Information obtained in recently completed focus group meetings with farmers in two of the seven counties--

Codington and Moody--will contribute to those analyses.¹

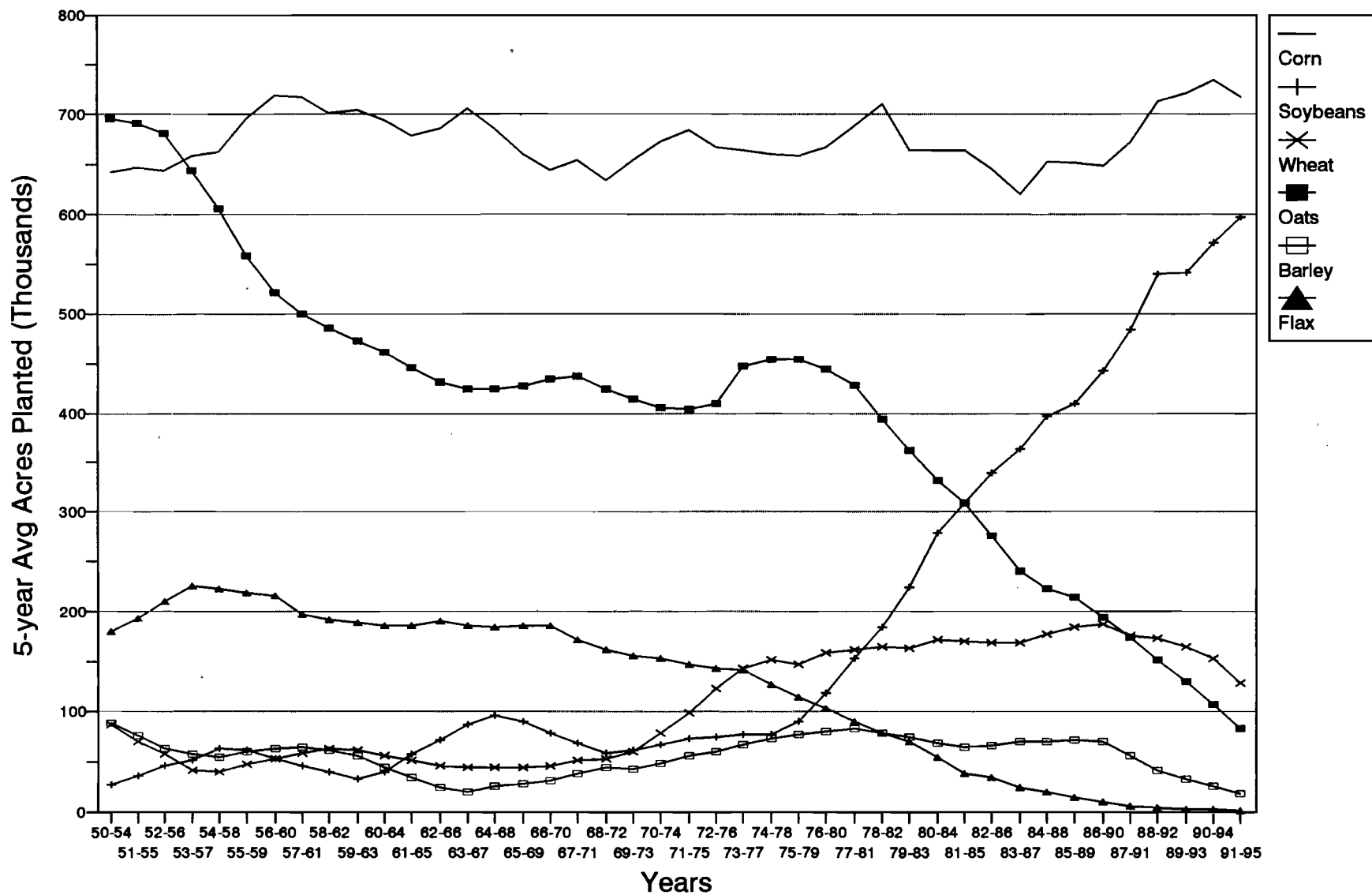
Changes in acreage of six major crops in the 7-county study area are shown in the figure on the following page. Five-year averages were used, to make trends more clear. Clearly, corn was the major crop in this region throughout much of the 45-year period running from 1950 to 1995. Oats went from a major crop, with more acreage even than corn in the early 1950s, to a minor crop by the 1990s. Flax acreage also declined to negligible levels by the end of the period. The most dramatic increase was in soybean acreage, especially from the late 1970s onward. Wheat acreage increased some in the 1970s, and remained at higher levels than in the first half of the time period examined.

Changes in hay acreage in this same 7-county area are shown in the figure on page 5. Hay acreage declined by over 40 percent between 1959 and 1992.

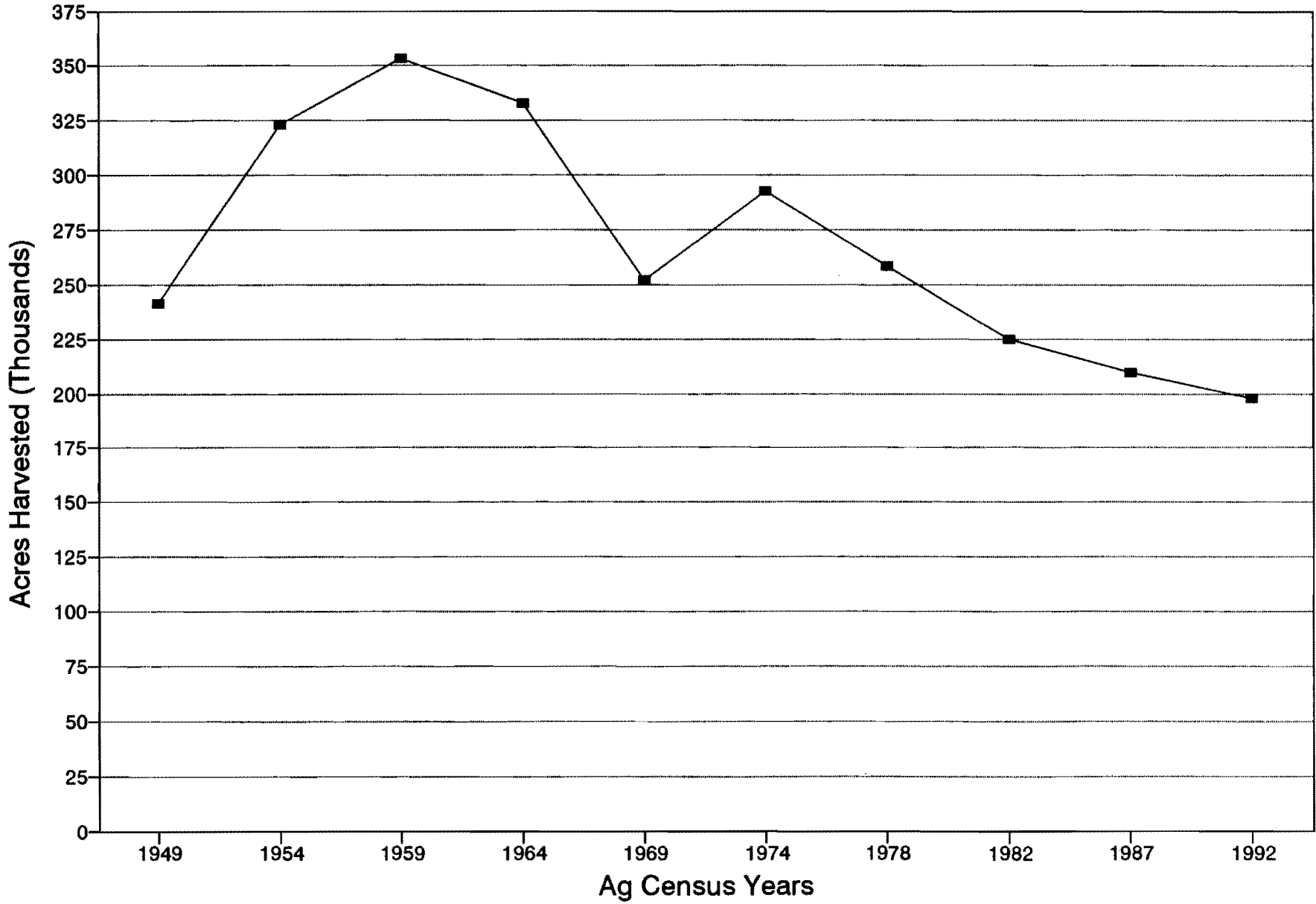
We turn now to the crop system changes that have taken place over the last half of this century in the seven individual counties--Codington, Hamlin, Deuel, Brookings, Lake, Moody, and Minnehaha.

¹Linda Dumke, a Graduate Research Assistant in Economics at SDSU, is playing a central role in the focus group meetings and other research related to this investigation. The charts on pages 4 and 5 were prepared by her.

Major Crops: Eastern South Dakota



All Hay Acres: Eastern South Dakota



Codington County

Small grains historically have been important in Codington County (Table 1 and Figure 1). However, the single most important crop in 1954 was flax (31.5 percent of crop acreage, excluding hay), followed closely by oats (30 percent). Wheat made up only 11 percent of Codington County's crop acreage in 1954, but it increasingly replaced other small grain crops and made up 25 percent of planted acreage by 1974 and 26 percent in 1992. Corn also gradually took on greater importance in Codington County, going from 16 percent of the acreage in 1954 to 20 percent in 1974 and 31 percent in 1992. The really dramatic changes in Codington County, though, were in soybeans and flax, which essentially reversed each other in importance. Soybeans made some minor inroads in Codington County in the 1950s, and then faded out, before taking off in the late 1970s and 1980s. By 1992, soybeans made up nearly 30 percent of the county's crop acreage, almost that of flax in 1954. Flax had largely disappeared. Thus, three crops--corn, soybeans, and wheat--made up more than 85 percent of the acreage by the early 1990s.

Other crops of some importance over the years in Codington County include barley and rye. Barley has been up and down, ranging from 2.9 to 14 percent of non-hay crop acreage in the years shown. Rye acreage has ranged from less than 1 percent (1954) to nearly 7 percent (1978). Sunflower acreage made a modest surge in the late 1970s and early 1980s--reaching 7 percent of crop acreage in 1982--and subsequently declined to only 1-2 percent.

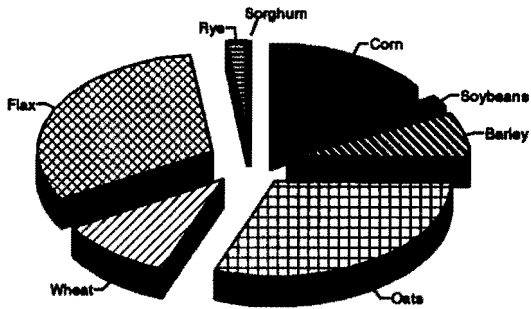
Table 1. Percentage of Acres Planted to Different Crops: Codington County, SD.

Year	Percent in Different Crops									Total ¹
	Corn	Soybeans	Wheat	Oats	Barley	Flax	Rye	Sorghum	Sunflower	
1954	15.6	1.9	10.8	30.3	7.8	31.5	1.6	0.3	---	100
1959	19.1	1.4	14.7	26.1	9.6	26.5	2.0	0.5	---	100
1964	21.5	0.5	13.0	33.0	3.3	25.3	2.5	0.8	---	100
1969	16.6	0.3	12.8	31.9	5.8	27.2	5.1	0.4	---	100
1974	19.6	---	24.6	24.2	5.7	21.9	3.6	0.3	---	100
1978	19.9	0.5	25.9	25.5	10.0	10.0	6.8	---	1.5	100
1982	21.6	4.0	24.2	22.2	9.7	7.4	3.7	---	7.1	100
1987	23.2	12.9	26.7	16.7	14.0	1.8	2.9	---	1.8	100
1992	31.0	29.5	26.2	6.9	2.9	---	2.4	---	1.1	100

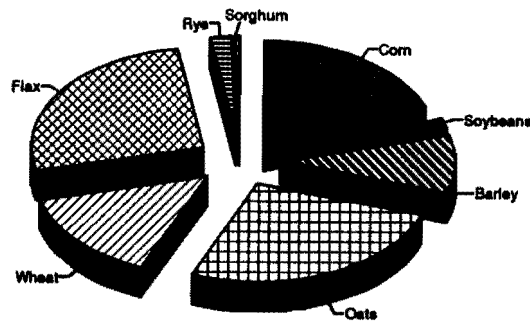
¹Due to rounding, may not total to exactly 100%.

Source: Data from South Dakota Agricultural Statistics Service.

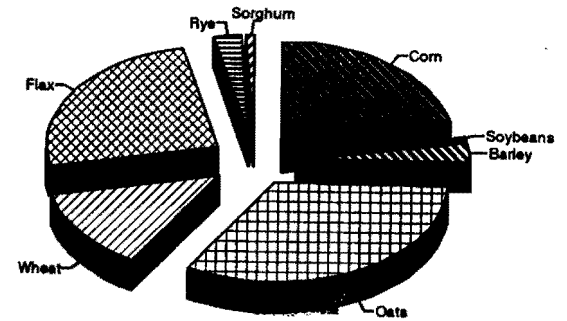
Figure 1. Proportion of Acres Planted to Different Crops: Codrington County



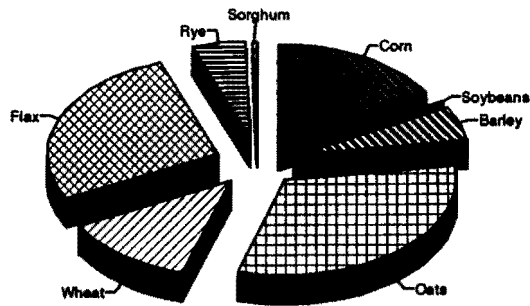
1954



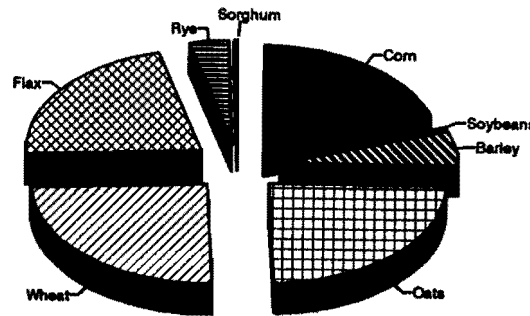
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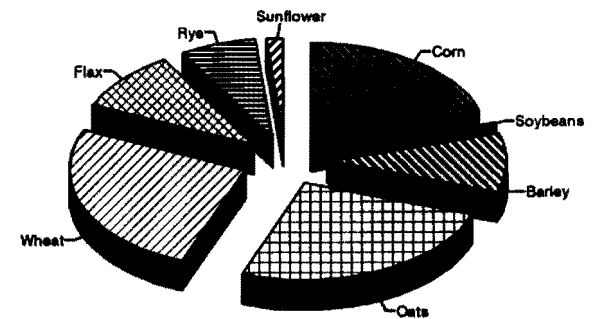
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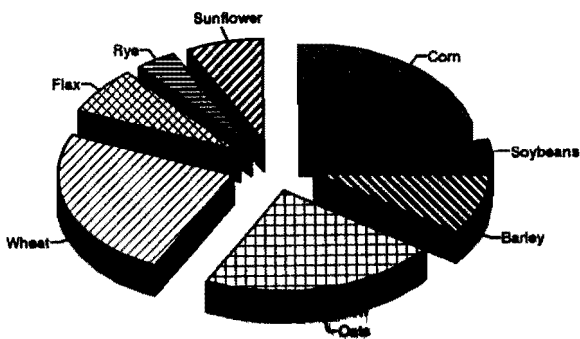
1969



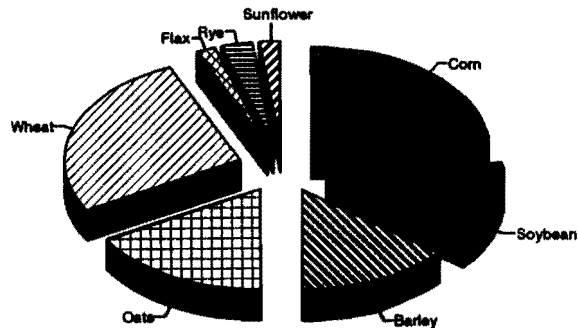
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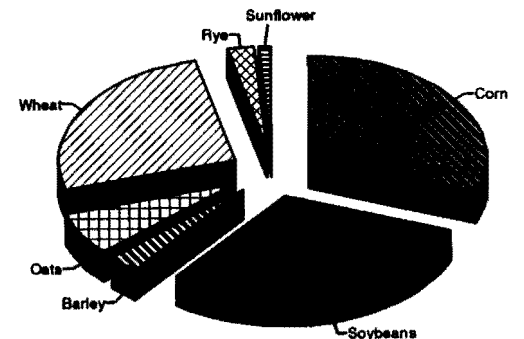
1978



1982



1987



1992

Hamlin County

Oats, corn, and flax covered most of the non-hay planted acreage in Hamlin County in the early 1950s, while corn, soybeans, and wheat dominated other crops by the early 1990s (Table 2 and Figure 2). The biggest change was in oats, which went from 40.6 percent of the acreage in 1954 to 5.2 percent in 1992. Flax largely disappeared by the 1990s, after covering more than one-fifth of planted acres as late as the mid-1970s. Declines in oats and flax acres were offset by increases over time in corn, soybeans, and wheat acres. The big increases in soybean acres in Hamlin County did not come until the late 1980s and early 1990s, however, when soybeans appear to have displaced not only oats and flax, but also barley and some wheat. More than three-fourths of Hamlin County's planted acreage consisted of corn and soybeans by 1992.

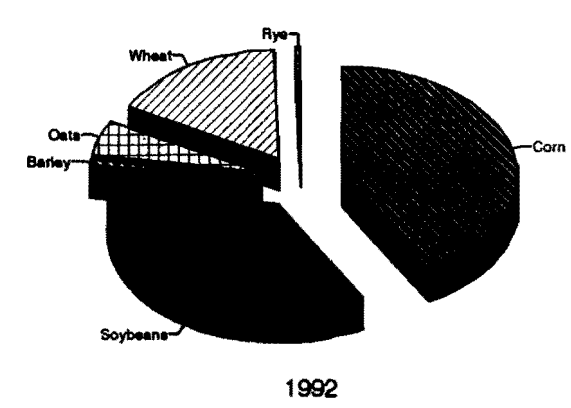
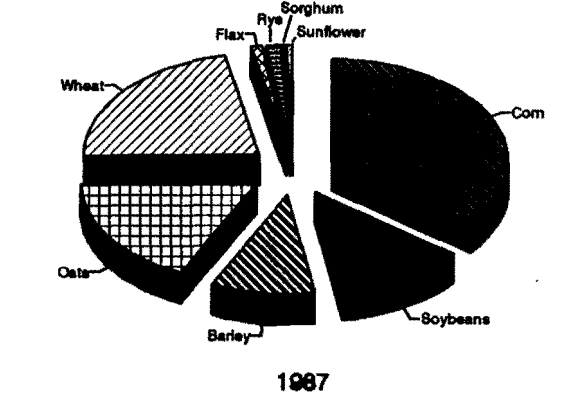
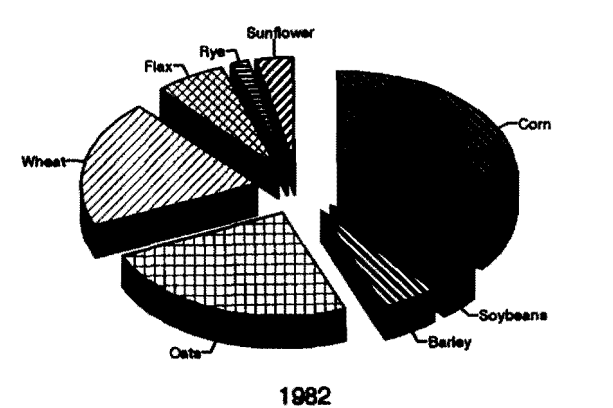
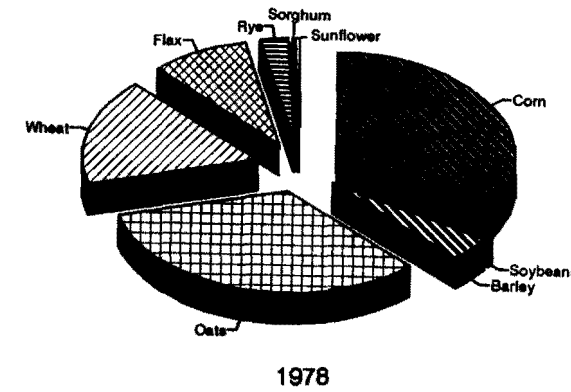
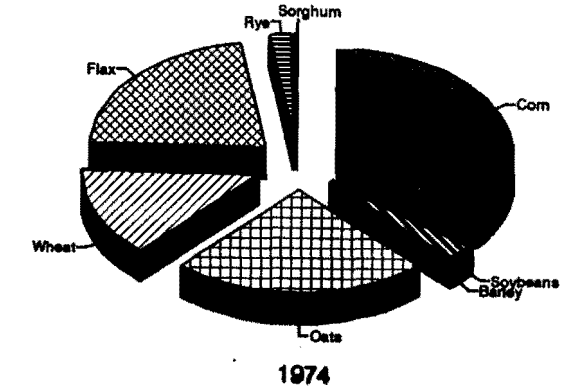
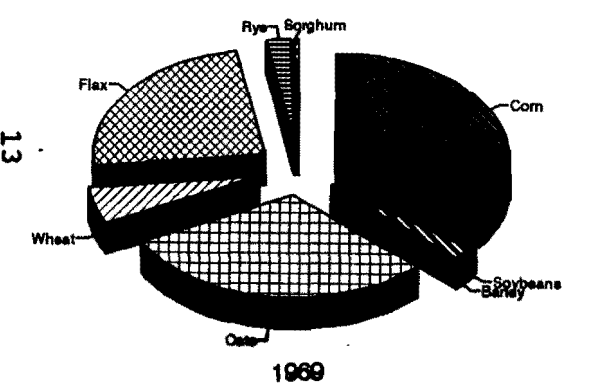
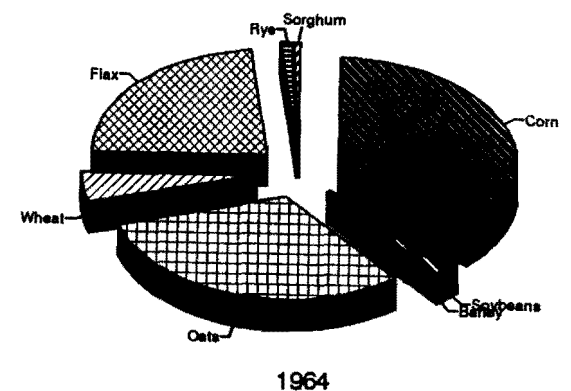
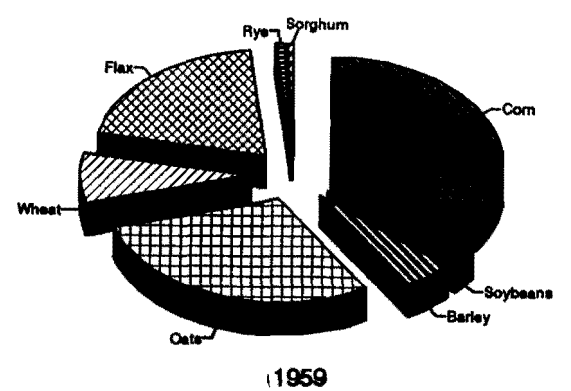
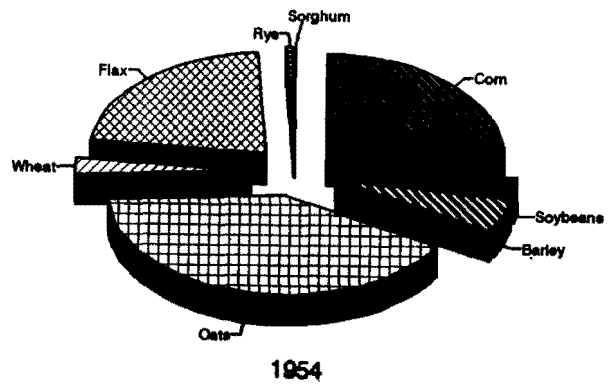
Table 2. Percentage of Acres Planted to Different Crops: Hamlin County, SD.

Year	Percent in Different Crops									Total ¹
	Corn	Soybeans	Wheat	Oats	Barley	Flax	Rye	Sorghum	Sunflower	
1954	25.5	2.5	2.8	40.6	5.5	22.3	0.6	0.2	---	100
1959	34.0	2.7	7.8	28.9	4.8	20.2	1.0	0.6	---	100
1964	37.1	1.2	4.7	31.0	1.0	23.4	0.9	0.7	---	100
1969	34.6	0.7	5.7	30.2	1.9	24.2	2.3	0.5	---	100
1974	35.4	0.2	13.9	23.6	2.4	22.1	2.0	0.4	---	100
1978	33.2	0.6	16.9	33.0	3.9	9.1	2.5	0.3	0.5	100
1982	35.4	3.9	19.8	24.3	5.1	6.5	1.6	---	3.5	100
1987	35.6	11.9	22.2	17.5	9.6	0.9	1.3	0.3	0.5	100
1992	42.0	34.9	16.6	5.2	0.9	---	0.4	---	---	100

¹Due to rounding, may not total to exactly 100%.

Source: Data from South Dakota Agricultural Statistics Service.

Figure 2. Proportion of Acres Planted to Different Crops: Hamlin County



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Deuel County

Changes in crop systems in Deuel County (Table 3 and Figure 3) were generally similar to those that have taken place in Hamlin County. Corn, soybeans, and wheat (in that order) covered the most planted acres in Deuel County in the early 1990s, compared to oats, corn, and flax in the early 1950s. Significant growth in soybean acreage took place a little sooner in Deuel County than in Hamlin County. However, like Hamlin County, corn and soybean acreage increases in Deuel County eventually displaced flax, much of the oats, and--by the early 1990s--most of the barley and some of the wheat acreage. By 1992, corn and soybeans made up 78 percent of the non-hay planted acres in Deuel County, and wheat and oats constituted another 20 percent. Sunflowers made modest inroads in Deuel County in the late 1970s and early 1980s, and then largely disappeared by the early 1990s.

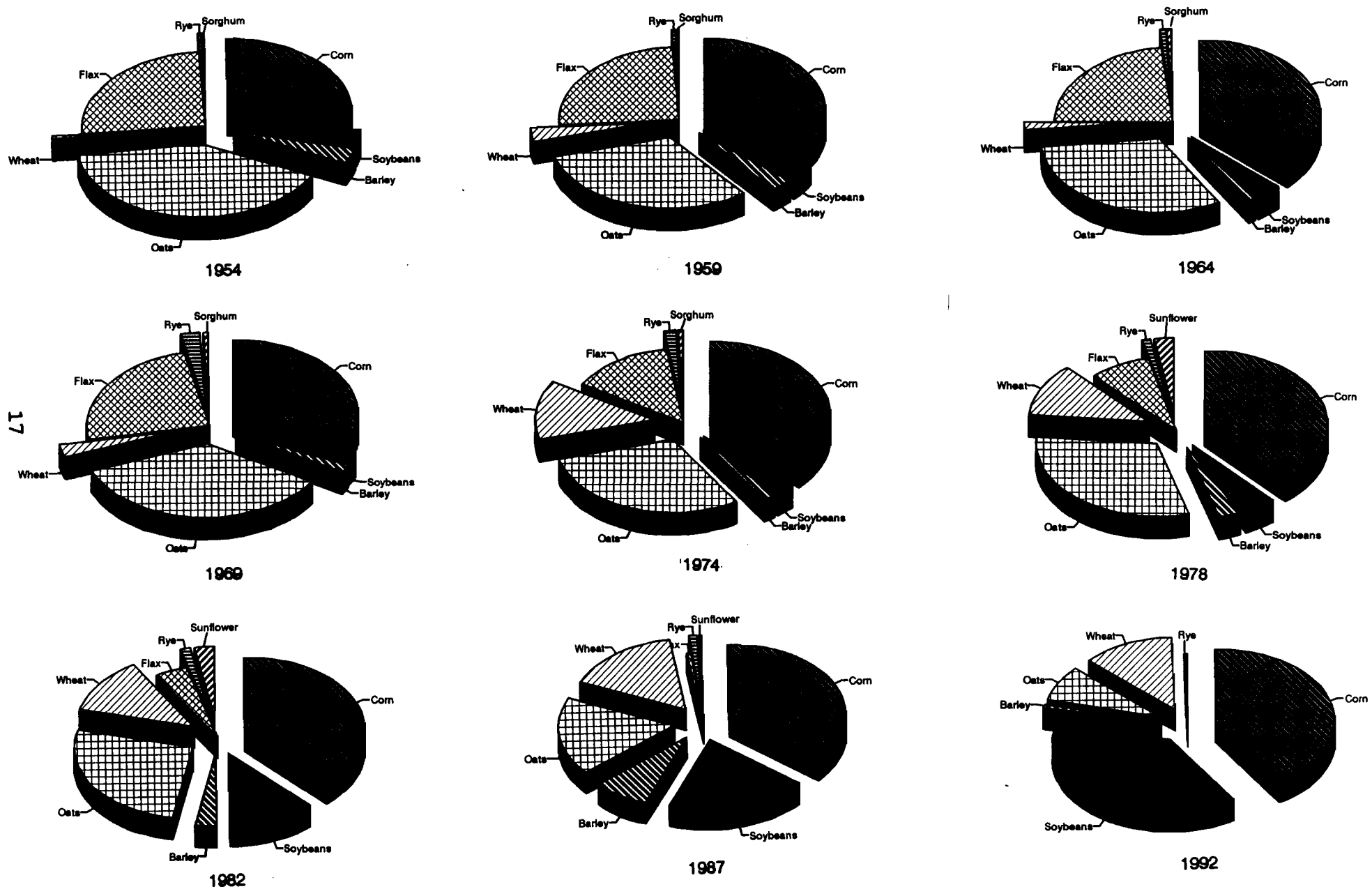
Table 3. Percentage of Acres Planted to Different Crops: Deuel County, SD.

Year	Percent in Different Crops									Total ¹
	Corn	Soybeans	Wheat	Oats	Barley	Flax	Rye	Sorghum	Sunflower	
1954	25.8	3.3	0.7	40.5	3.5	25.5	0.5	0.2	---	100
1959	32.8	3.9	3.2	31.0	2.9	25.3	0.6	0.3	---	100
1964	37.3	3.5	1.7	31.8	1.0	23.3	0.8	0.5	---	100
1969	30.0	2.0	2.8	35.5	2.0	24.7	2.6	0.7	---	100
1974	36.9	2.6	13.0	29.6	1.6	14.1	1.6	0.6	---	100
1978	38.6	4.2	11.5	30.8	2.9	8.2	1.1	---	2.6	100
1982	38.2	11.8	12.4	26.3	2.8	4.4	1.4	---	2.7	100
1987	36.5	19.4	16.0	18.0	8.0	0.6	1.1	---	0.3	100
1992	41.2	37.0	12.6	7.8	0.9	---	0.4	---	---	100

¹Due to rounding, may not total to exactly 100%.

Source: Data from South Dakota Agricultural Statistics Service.

Figure 3. Proportion of Acres Planted to Different Crops: Deuel County



Brookings County

Oats and corn were the principal crops in Brookings County in the early 1950s, accounting for 84 percent of non-hay planted acres (Table 4 and Figure 4). Flax constituted another 10 percent of the acres. By 1992, corn had increased to 50.4 percent of planted acres, and soybeans had increased from less than 3 percent in 1954 to nearly 38 percent. Thus, corn and soybeans combined accounted for 88 percent of planted acres in 1992. Flax continued to account for 10-12 percent of planted acres until the mid-1970s, and then it began to fade out. Although oats had declined to only 5 percent of Brookings County's crop acreage by the early 1990s, the crop still made up nearly a quarter of the acreage as late as 1982. Wheat was almost never as important in Brookings County during the last half of this century as it was in Codington, Hamlin, and Deuel Counties to the north (the exception shown is in comparison to Deuel County in 1959). Wheat acreage did rise for a time in the late 1970s and 1980s in Brookings County, reaching 10 percent of planted acres in 1987 before declining to 6 percent in 1992.

Barley was generally present in Brookings County in the years shown, usually (except for 1964) making up around 2-6 percent of planted acres. However, in 1992 it fell to only 0.5 percent. Rye and sorghum were present in small proportions in the 1950s, 1960s, and 1970s, and sunflowers were of some importance in the early 1980s. However, none of these three crops had reported acres in Brookings County in 1992.

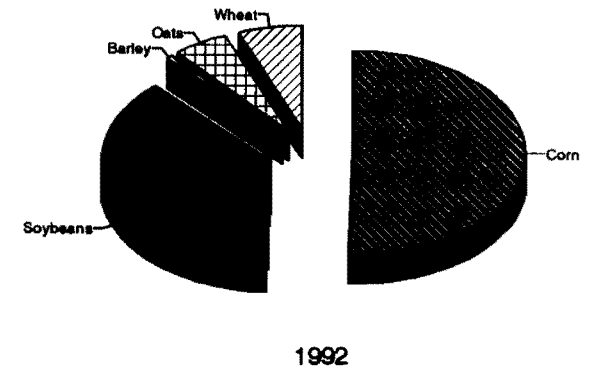
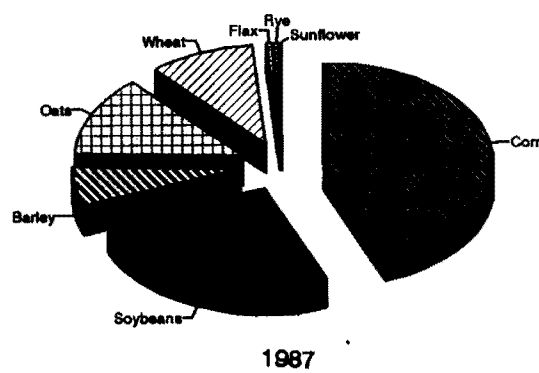
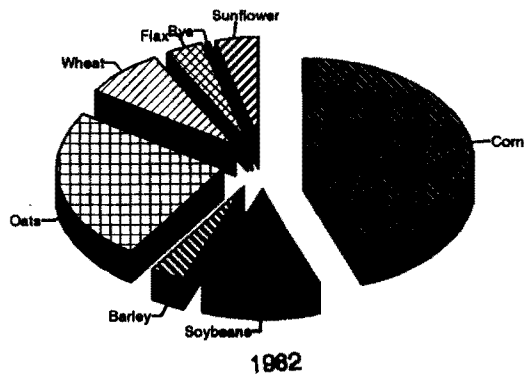
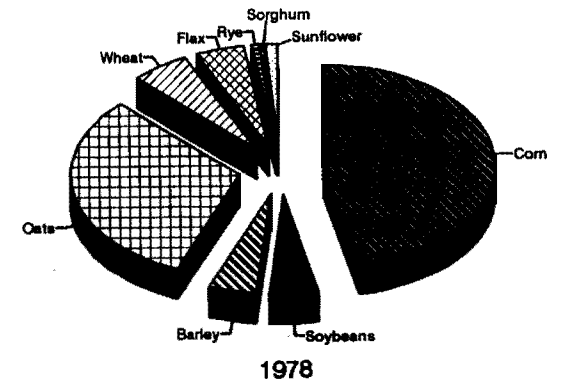
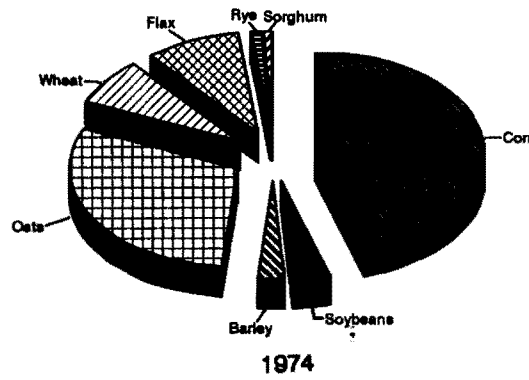
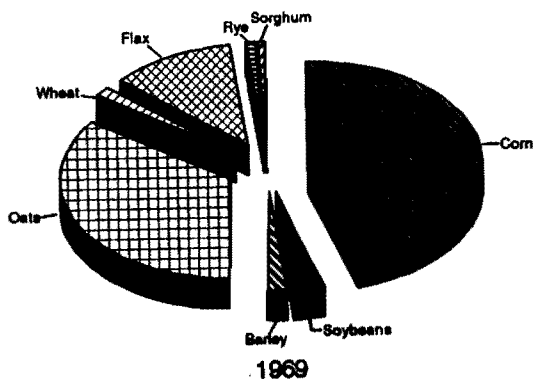
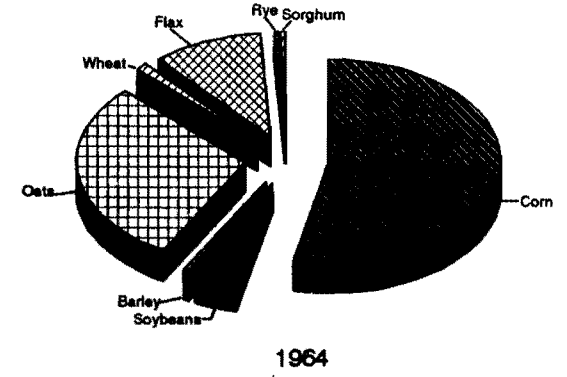
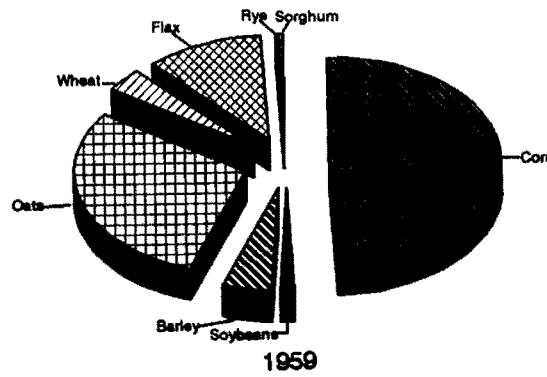
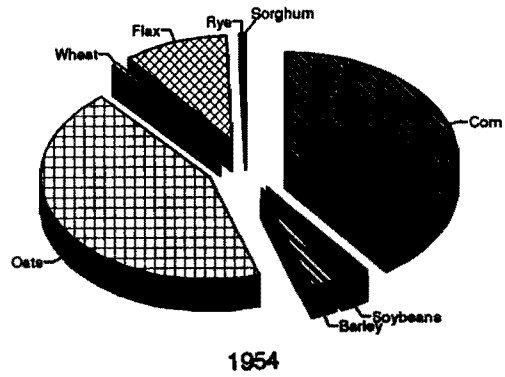
Table 4. Percentage of Acres Planted to Different Crops: Brookings County, SD.

Year	Percent in Different Crops									Total ¹
	Corn	Soybeans	Wheat	Oats	Barley	Flax	Rye	Sorghum	Sunflower	
1954	40.2	2.8	0.5	43.8	2.4	10.0	0.4	0.1	---	100
1959	49.4	1.3	3.6	29.3	4.5	11.1	0.2	0.4	---	100
1964	53.4	4.1	1.1	29.2	0.7	10.6	0.4	0.5	---	100
1969	45.6	2.9	1.5	34.8	1.8	11.7	1.0	0.6	---	100
1974	45.6	2.9	1.5	34.8	1.8	11.7	1.0	0.7	---	100
1978	46.8	4.6	5.6	31.6	4.6	4.6	0.8	0.3	1.1	100
1982	44.6	11.5	7.8	24.8	3.4	3.5	0.3	---	4.2	100
1987	44.3	24.8	10.1	13.2	6.4	0.6	0.4	---	0.2	100
1992	50.4	37.6	6.1	5.3	0.5	---	---	---	---	100

¹Due to rounding, may not total to exactly 100%.

Source: Data from South Dakota Agricultural Statistics Service.

Figure 4. Proportion of Acres Planted to Different Crops: Brookings County



Lake County

Lake County's non-hay crop acreage was dominated by corn and oats throughout the 1950s and 1960s (Table 5 and Figure 5). These two crops made up 88-92 percent of the acreage during those two decades. Oats acreage declined some in the late 1950s and early 1960s, but those declines were largely offset by increases in corn acreage. Soybean acreage grew some in the early 1960s, and then declined. Soybeans did not really take off in Lake County until the 1980s. It was not until the late 1980s that the combination of corn and soybean acres exceeded the combination of corn and oat acres in Lake County. By 1992, corn and soybeans constituted 89 percent of the crop acres.

Wheat, barley, and flax have each been significant minor crops in Lake County at different times since the early 1950s. Flax covered around 6 percent of the planted acres in the late 1960s and early 1970s, but had disappeared by the early 1990s. Barley made up 6-8 percent of the acres in the 1970s and 1980s, but only 1 percent in 1992. Wheat grew in importance in the 1970s and 1980s, reaching 11 percent of the acreage in 1987, and then it declined to 5 percent in 1992. Combined acreage of wheat, oats, and barley was a little under 10 percent of Lake County's non-hay planted acreage in 1992. Sunflowers covered 1.4 percent.

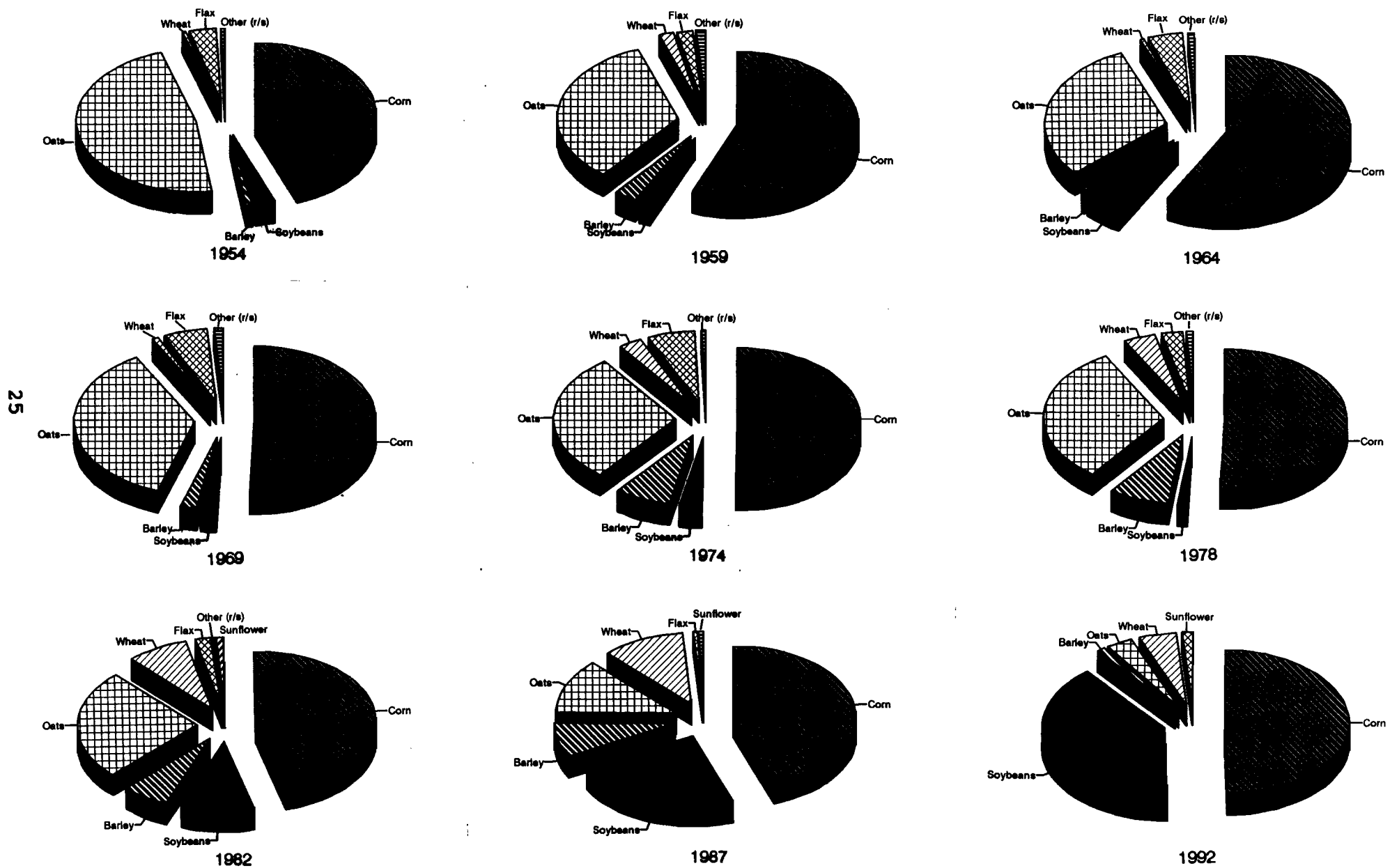
Table 5. Percentage of Acres Planted to Different Crops: Lake County, SD.

Year	Percent in Different Crops									Total ¹
	Corn	Soybeans	Wheat	Oats	Barley	Flax	Rye	Sorghum	Sunflower	
1954	44.4	2.6	0.4	47.4	0.9	3.6	0.4	0.2	---	100
1959	56.0	1.5	2.0	34.0	3.0	2.0	0.4	1.0	---	100
1964	58.0	5.2	0.5	30.4	0.5	4.5	0.2	0.8	---	100
1969	51.0	2.2	0.9	37.0	2.2	6.0	0.1	1.1	---	100
1974	50.2	2.9	3.1	29.4	7.5	6.3	---	0.5	---	100
1978	50.5	1.3	4.2	32.2	8.0	2.8	0.2	0.7	---	100
1982	46.3	9.9	8.3	25.6	6.5	2.0	---	0.4	1.0	100
1987	44.7	22.5	11.0	12.5	8.0	0.5	---	---	0.7	100
1992	49.7	39.5	5.0	3.5	1.1	---	---	---	1.4	100

¹Due to rounding, may not total to exactly 100%.

Source: Data from South Dakota Agricultural Statistics Service.

Figure 5. Proportion of Acres Planted to Different Crops: Lake County



Moody County

Corn was a major crop in Moody County in the 1950s, and it remained so in the 1990s (Table 6 and Figure 6). Most of the time over the past half century, corn has covered around half of the non-hay planted acreage. Corn expanded to 60 percent of the planted acreage in the late 1950s and early 1960s when oats acreage started to decline significantly. As soybean acreage expanded over time, however, corn acreage settled back to around half of the acreage. By 1992, soybeans covered 44 percent of the planted acres in Moody County--approximately what oats had covered in 1954--and oats had dropped to 2.2 percent. Together, corn and soybeans covered 96 percent of the planted acres in 1992. Moody County's agriculture had evolved to basically a corn-soybean system. It had become a part of the vast U.S. Corn Belt lying to its east and south.

Along with oats, a little wheat remained in Moody County in the early 1990s. Very little wheat was grown in this county in the 1950s and 1960s, but acreage expanded some in the 1970s and 1980s, reaching about 5 percent in 1987. It then declined to under 2 percent in 1992.

Some flax--ranging from 3 to 8 percent of planted acres in the period 1954 to 1974--was grown in Moody County until the late 1980s. The small amounts of rye and sorghum that had been grown over the years also largely disappeared by the 1980s. Modest amounts of barley were grown at times over the years, but no acreage was reported in 1992.

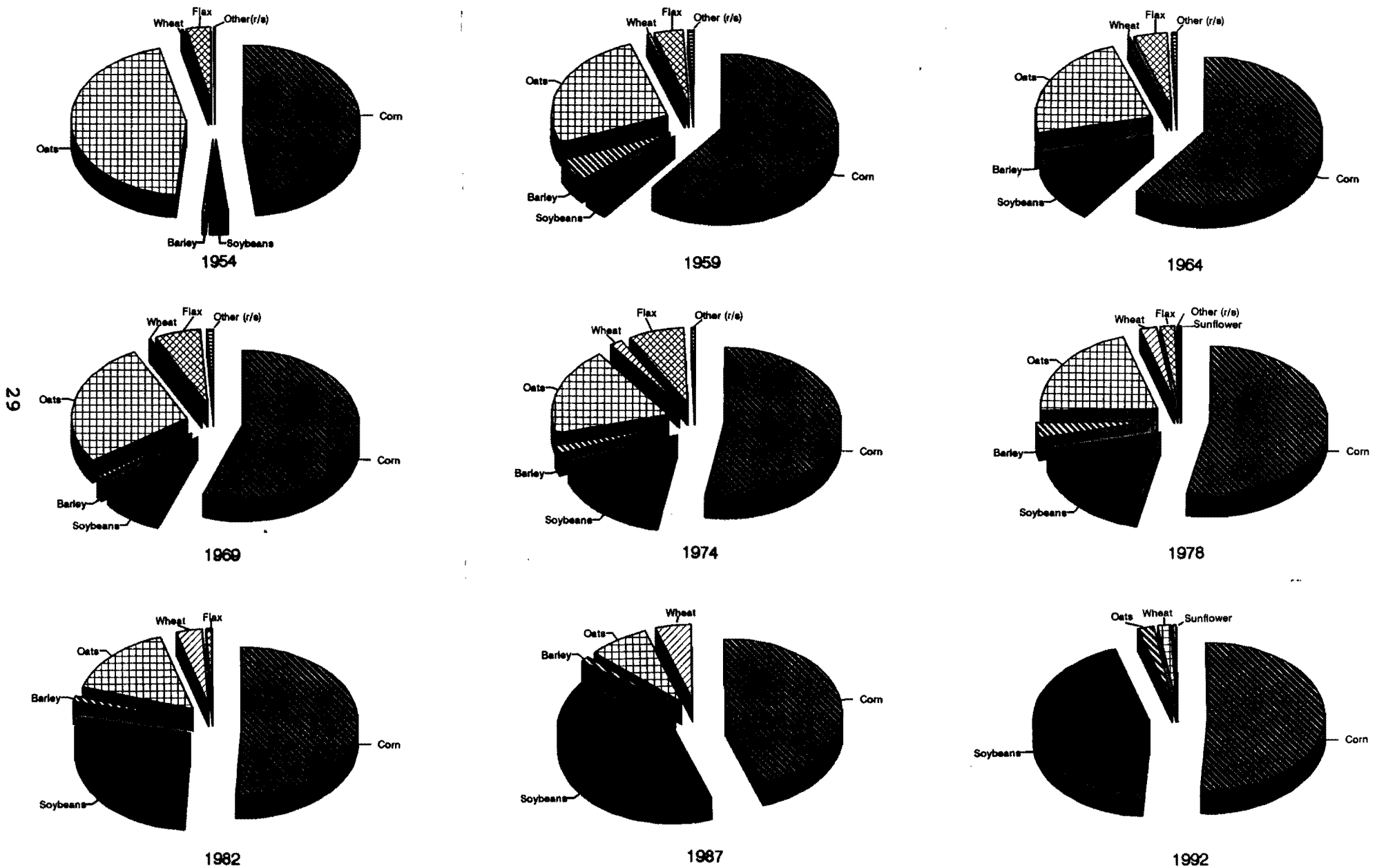
Table 6. Percentage of Acres Planted to Different Crops: Moody County, SD.

Year	Percent in Different Crops									Total ¹
	Corn	Soybeans	Wheat	Oats	Barley	Flax	Rye	Sorghum	Sunflower	
1954	48.2	2.7	0.2	44.9	0.5	3.4	0.1	---	---	100
1959	60.1	3.4	0.5	26.0	5.2	4.0	0.3	0.5	---	100
1964	59.9	11.2	0.2	23.2	0.3	4.6	0.1	0.6	---	100
1969	55.6	8.7	0.1	27.2	0.9	6.5	0.2	0.7	---	100
1974	52.7	16.2	1.7	19.2	1.8	7.9	0.3	0.2	---	100
1978	53.1	17.9	2.2	20.9	3.4	2.0	---	0.2	0.3	100
1982	50.9	27.6	3.7	15.8	1.2	0.7	---	---	---	100
1987	45.0	40.4	4.9	8.5	1.2	---	---	---	---	100
1992	51.2	44.3	1.8	2.2	---	---	---	---	0.5	100

¹Due to rounding, may not total to exactly 100%.

Source: Data from South Dakota Agricultural Statistics Service.

Figure 6. Proportion of Acres Planted to Different Crops: Moody County



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Minnehaha County

The evolution of crop systems in Minnehaha County is very similar to that of Moody County. Corn and oats covered 96 percent of Minnehaha County's planted acreage (other than hay) in 1954, and corn and soybeans covered nearly 95 percent in 1992 (Table 7 and Figure 7). The growth in soybean acreage and the decline in oat acreage in Minnehaha County over the past half century followed pretty much the same pattern as in Moody County. However, corn acreage generally has constituted a slightly higher proportion of Minnehaha County's acreage, and soybean acreage generally has been a slightly lower proportion. For example, in the late 1950s and early 1960s, corn reached around 65 percent of Minnehaha's acreage, when it reached around 60 percent of Moody County's. In the early 1990s, corn was around 56 percent of Minnehaha's acreage and 51 percent of Moody's. Soybeans had grown to 39 percent of Minnehaha's acreage by 1992, but they covered 44 percent of Moody County's acreage by then.

Oats covered about 4 percent of planted acres in Minnehaha County in 1992, compared to approximately 46 percent in 1954. Barley acreage was as high as 4 percent of the total at one point (1978) in the time period examined, but no barley was reported in 1992. Wheat was never very important in Minnehaha County during the decades examined, and it covered only 1 percent of the crop acreage in 1992.

Table 7. Percentage of Acres Planted to Different Crops: Minnehaha County, SD.

Year	Percent in Different Crops									Total ¹
	Corn	Soybeans	Wheat	Oats	Barley	Flax	Rye	Sorghum	Sunflower	
1954	49.9	2.2	0.1	46.4	0.2	1.2	---	---	---	100
1959	65.2	2.4	0.3	28.9	1.7	0.5	---	0.9	---	100
1964	65.6	8.7	0.1	23.8	0.2	0.5	---	1.0	---	100
1969	63.5	7.4	---	27.6	0.8	0.2	---	0.5	---	100
1974	64.0	10.0	0.5	22.5	2.7	0.2	---	0.4	---	100
1978	57.2	12.0	0.6	25.5	4.2	---	---	0.5	---	100
1982	54.0	23.8	1.9	18.0	1.9	---	---	0.3	---	100
1987	51.0	36.6	0.9	11.0	0.4	---	0.2	---	---	100
1992	55.5	39.4	1.0	3.9	---	---	---	0.2	---	100

¹Due to rounding, may not total to exactly 100%.

Source: Data from South Dakota Agricultural Statistics Service.

Figure 7. Proportion of Acres Planted to Different Crops: Minnehaha County

