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Land Use in the Great Plains

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ABSTRACT

Methods for developing a regional inventory of agricultural land use, including characteristics of major data sources, are documented. Current land use of the 10-State Great Plains is presented.

CONTENTS

SUMMARY

This paper presents the land use component of the data base developed in 1982 by the Natural Resource Economics Division, Economic Research Service, to analyze land and water issues stemming from Great Plains agricultural production. Major data files consulted and selectively merged are those of the Statistical Reporting Service and its State cooperators, Soil Conservation Service, and Bureau of Census. In addition, State irrigation surveys and the 1978 Missouri River Basin Hydrology Study, a cooperative Federal-State effort, were used. In order to establish a baseline to which future conditions could be compared, this paper develops estimates to represent land use that would exist under normal weather and economic conditions during the 1978-81 period.

The Great Plains is a 452-million-acre (706,000 square miles) region covering all or parts of 10 States: Montana, Wyoming, Colorado, New Mexico, North and South Dakota, Nebraska, Kansas, Oklahoma, and Texas. Over half the region is in pasture/range. Other major land uses are harvested cropland (one-fifth); other cropland such as summer fallow, crop failure, cover crops, cropland pasture, and idle (one-tenth); nonagricultural and Federal uses (one-tenth); and forest.

Winter wheat is the most extensive crop with 31 million acres. Together with spring wheat (14 million acres) and land held fallow following wheat (23 million acres), all wheat accounts for 55 percent of the region's harvested and fallow cropland. Grain sorghum, corn for grain, alfalfa hay, and other hays are the next most extensive crops.

Nearly one-fifth of harvested cropland (19 million acres) is irrigated. The Texas High Plains and the southern half of Nebraska account for 28 percent and 22 percent, respectively, of this total. Other major irrigated areas, in order, are western Kansas, eastern Colorado, central Kansas, and northern Nebraska.

Corn for grain is by far the most widely irrigated crop with 7 million acres; over half of this is in southern Nebraska. Cotton, grain sorghum, wheat, and alfalfa hay account for 2 million irrigated acres each.

Pasture/range is the most widespread of major land uses. Southern Texas and the High Plains of Texas, eastern New Mexico, and the southern half of Montana are the most important areas in this regard. Forest, the smallest of the major land use categories, is found primarily along the eastern slopes of the Rocky Mountains and in east-central Oklahoma.

INTRODUCTION

This paper presents the land use component of an Economic Research Service (ERS) data base developed for the Great Plains and highlights of major data sources used. ERS' Natural Resource Economics Division developed the data base in 1982 as part of an effort to analyze land and water issues relating to Great Plains agriculture. Resource issues of major interest were: (1) the capability of the region's farm production subsector to respond to growth in domestic and foreign commodity demands, and (2) impacts that such production response might have on longrun productivity of its land and water resources (Landgren). This paper should be of value both to those who are interested in further development of national/regional data bases and analytical capability and in descriptive analyses of resource use in this major agricultural region.

The land use inventory and procedures to create it were largely a consequence of study objectives and available secondary data sources. In general, 1980 crop area and production statistics produced by the Statistical Reporting Service (SRS) in cooperation with each State and permanent pasture/range, forest, and 1977 nonagricultural area estimates of the Soil Conservation Service's National Resources Inventory (NRI) were used to develop a total accounting of land use and area under "current normal" conditions in 1980 for each of the 10 States and 18 Resource Areas (RA). State irrigation surveys in Texas, Oklahoma, New Mexico, Kansas, and Colorado and State-Federal estimates from the 1978-1980 Missouri River Basin Hydrology Study (MRBHS) were used to develop irrigated crop area data. Average yields for major crops were estimated from SRS, the 1978 Agricultural Census, and State sources. Multiplication of average yields by "normal" acre estimates resulted in production estimates that could be easily compared with 1980 figures published by SRS for possible acre or yield revisions.

The "current normal" concept was used to establish baseline conditions for a proposed interregional profit-maximizing linear programming model. Land use, crop yield, and production that would have occurred in 1980 given normal weather and economic conditions were estimated. Linear regression estimates for 1980 area harvested, production, and yield were calculated by crop and RA from SRS 1969-80 data.[1] In addition, simple averages for 1976-80 and 1978-80 were calculated. When selecting the normal level, and except for irrigated acre estimates, we gave priority to the regression estimate since that procedure smooths out yearly fluctuations and establishes

[1]The only independent variable considered in the regression routine is time. The routine requires at least 6 years of data, ignores years with no data entries, and prints a 1980 estimate, intercept, slope, standard error, T-statistic, and correlation coefficient.

a trend line that may be useful for making projections.[1] When comparison of regression estimates with the time series revealed gaps or apparent errors in the computer file of SRS data or if regressed estimates were higher than historical levels, either the 3-year or the 5-year level was studied for reasonableness. Missouri River Basin estimates for 1978 or State survey estimates for areas outside of the basin were considered first for normal irrigated crop areas.

STUDY AREA

The Great Plains study area includes the following SCS Land Resource Regions (LRR): Northern Great Plains Spring Wheat, Western Great Plains Range and Irrigated, Central Great Plains Winter Wheat and Range, Southwestern Plateaus and Plains Range and Cotton, Southwestern Prairies Cotton and Forage (SCS, 1978). These broadly defined physiographic regions reflect identifiable patterns of soils, climate, water resources, and land uses.

Budget and time considerations, limitations of computer capacity to run the linear programming model, and need to subdivide the study area's resources into useful analytical parts led to identification of 18 RAs (table 1). See Figure 1.

Table 1 -- Great Plains resource areas by State and land resource region[2]

RA	State part	Land resource region part
1	Northern Montana	Western Great Plains Range & Irrigated
2	Southern Montana	Western Great Plains Range & Irrigated
3	Western N. Dakota	Northern Great Plains Spring Wheat
4	Central/east N. Dakota	Northern Great Plains Spring Wheat
5	East/north S. Dakota	Northern Great Plains Spring Wheat
6	Central/west S. Dakota	Western Great Plains Range & Irrigated
7	Eastern Wyoming	Western Great Plains Range & Irrigated
8	Northern Nebraska	Western Great Plains Range & Irrigated
9	Southern Nebraska	Central Great Plains Winter Wheat & Range
10	Eastern Colorado	Western Great Plains Range & Irrigated
11	Western Kansas	Central Great Plains Winter Wheat & Range
12	Central Kansas	Central Great Plains Winter Wheat & Range
13	Central/east Oklahoma	Southwestern Prairies Cotton & Forage
14	Western Oklahoma	Central Great Plains Winter Wheat & Range
15	Eastern New Mexico	Western Great Plains Range & Irrigated
16	Texas High Plains	Central Great Plains Winter Wheat & Range
17	Southern Texas	Southwestern Plateaus/Plains Range & Cotton
18	Eastern Texas	Southwestern Prairies Cotton & Forage

[2]Counties comprising each resource area are in Appendix 2.

[1]The exercise to identify both statistically significant trend lines together with an acceptable degree of correlation ($r^2 \geq 0.75$) was generally unsuccessful (see app. 1).

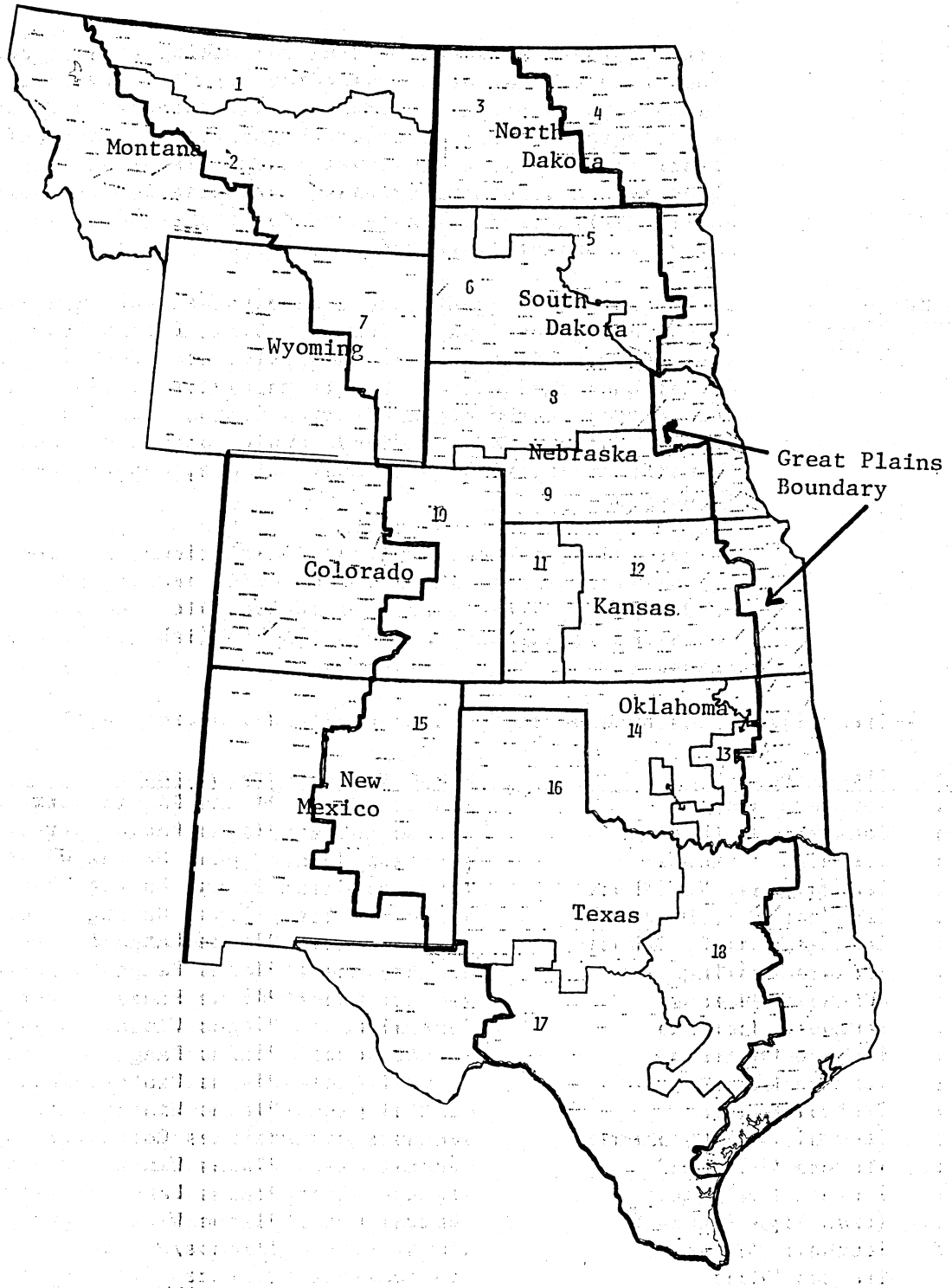


Figure 1. States and Resource Areas of the Great Plains.

LAND USE DATA SOURCES

The nature and level of land use detail is a function of study purpose, computer capabilities, current cropping patterns, and secondary data sources. The study's focus on crop production capabilities suggested a use division between land not readily available and land available for agriculture. Use categories of the three major national county-level data sources--the National Resources Inventory, the 1978 Census of Agriculture and cooperative Federal-State crop statistics for each of the 10 States--are consistent with that broad division.

National Resources Inventory of 1977

Two sets of 1977 NRI data are available, although neither have been formally published. The first data set, called county base data, records land area essentially not available for agriculture. It includes public agency estimates of total land and water area, Federal, urban, and transportation use areas. Subtraction of water and these nonagricultural uses from county land area results in nonfederal agricultural land area.[1] The Inventory and Monitoring Division of SCS provided additional unpublished and tentative detail on water bodies and urban areas (see App. 3).

The second NRI data set, called expanded point sample data, was generated using an area sample frame designed to make land use estimates by soil class-subclass. SCS staff observed and recorded land use data at two to three randomly selected points within each of 70,000 randomly selected primary sampling units (PSU). The survey was designed to provide statistically reliable estimates of major agricultural land use at the State level of detail. Estimated acres of cultivated cropland (standard errors of the estimates given in parentheses) for the 10 Great Plains States in units of 1,000 acres are:

Montana	13,413	(625)	South Dakota	15,858	(390)
Wyoming	1,786	(199)	Nebraska	18,930	(402)
Colorado	9,809	(491)	Kansas	27,582	(417)
New Mexico	1,797	(161)	Oklahoma	11,129	(316)
North Dakota	25,184	(377)	Texas	28,744	(636)

For example, the 95-percent confidence interval for cultivated cropland in Nebraska is approximately from 18.1 million acres to 19.7 million acres. Standard errors of the estimates for more detailed data, either in terms of geographic coverage or land use, are not available but would be increasingly larger as detail increases (Goebel, 1982). NRI land use categories published by SCS are presented in Appendix 4.

Minor reconciliation of the several NRI data sources was necessary. An example of the reconciliation process is shown in Appendix 5.

[1] Some 211,000 acres of Federal land in the study area are classified as cropland. Since there is no crop detail for this relatively minor area, this agricultural use is combined with nonagricultural uses.

Agricultural Census of 1978

Census data are detailed by county, crop and whether irrigated fully, partially or not at all for land-in-farms, largely a nonfederal concept.[1] The Census was relied upon for data on crop failure, cropland pasture, cropland in cover crops, and idle cropland. Limitations of Census land use data include: (1) suppression of data in a county when one or two farms account for nearly all of an item, (2) no explicit consideration of double-cropping, (3) underestimation of irrigated and other acres, and (4) timeliness. An estimate of double-cropping derived from Census data is presented in Appendix 6.

Statistical Reporting Service

In cooperation with each State, SRS prepares annual estimates of acres, production, and yield of major crops. These data are statistically reliable State estimates. County estimates are based on historical shares as estimated from the 5-year Census, ASCS records, and State-sponsored surveys. The sum of county data from SRS's computerized county estimates file (CEF) may not exactly match official State estimates.

Since SRS data collection is the product of a cooperative Federal-State effort, crops inventoried and the amount of information about a specific crop is tailored to State needs and financial resources.

SRS, as part of its national program, annually prepares the CEF which includes crops in which SRS has a Federal interest; wheat is one of these, hay is not. Absence of a crop on the CEF for a particular State does not mean the crop is not grown there or even that the amount grown is necessarily nominal.

In order to better meet ERS needs, NRED has annually added crop data to the CEF which are found in the cooperative SRS/State publications but not on the CEF. For example, data on hay crops, some forages, and sweet potatoes have been added. Furthermore, summary totals for crops for which CEF has only varietal detail, namely dry beans, tobacco, and cotton, are included.

The primary source of SRS estimates for this study is NRED's expanded version of the Federal CEF. SRS State publications were consulted when the CEF was incomplete or in apparent error. SRS irrigated-acre estimates were used where data from the 1978 Missouri River Basin Hydrology Study (Missouri River Basin Commission, 1980) or from wholly State-sponsored surveys were not available. The following section provides more detail on irrigation.

Missouri River Basin Hydrology Study (MRBHS)

In 1978-79, State and Federal agencies in this basin developed estimates of irrigated acres, by crop, distribution

[1] "Land-in-farms" is not strictly a "nonfederal concept." It includes 15-20 million acres of Federal rangeland and a small acreage of Federal cropland.

system, and water source. The area included all or nearly all of the Great Plains portions of Montana, Wyoming, both Dakotas, Nebraska, the northern half of Kansas, and the northeast quadrant of Colorado. Because estimates of irrigated acreage vary widely, as shown in Appendix 7, and are politically sensitive, MRBHS estimates were used wherever possible. Because the MRBHS does not also provide estimates of dryland acreage, SRS estimates of dryland acreage were adjusted as necessary to maintain consistency with the total (irrigated plus dryland) SRS acreage for a crop. For non-MRBHS areas (southern Kansas, Colorado, Oklahoma, Texas, and New Mexico), wholly sponsored State surveys and the SRS publications were relied upon for estimates of irrigated acres, by crop.

MAJOR LAND USE

Development of "current normal" major land use estimates was an iterative process involving the following general steps:

1. Estimate land and water area and nonagricultural uses from the 1977 NRI for each Resource Area and for each State.
2. Estimate acres harvested (or in fallow) of major crops[1] primarily from State SRS; crop failure, cropland pasture, cover crops, and idle cropland from the 1978 Agricultural Census and the NRI; pasture/rangeland and forest from the NRI.
3. Estimate acres irrigated and dryland for all crops and pasture/range from the MRBHS for areas in the Missouri Basin and from State irrigation surveys for other areas. Maintain consistency with crop area estimates of step 2.
4. Estimate "current normal" crop yields for major crops. First priority was given to the estimate calculated by dividing SRS regression estimates of 1980 production by those of acres harvested. When either an irrigated or dryland estimate was required for the linear programming model, but SRS did not differentiate between them, the SRS yield (a composite irrigated-dryland yield) was used for the desired yield if over 90 percent of the crop (as determined from Census data) was either irrigated or was dryland. The SRS regressed 1980 estimate was rejected if it was greater than that of recent years; either the simple 1978-80 average or else the 1976-1980 average was then chosen if reasonable. If the 90-percent rule could not be applied (because both an irrigated and dryland yield were required or less than 90 percent was in one of the two categories), Census was relied upon for an estimate. After all yields were initially estimated, they were reviewed for reasonableness between Resource Areas.

5. Multiply acres harvested by yields in order to compare the resulting production with published SRS production figures.

[1]Major crops were those expected to be endogenous to the linear programming model. They were corn for grain, corn for silage, cotton, grain sorghum, soybeans, winter wheat, spring wheat, small grains (oats, barley), alfalfa, and other hays.

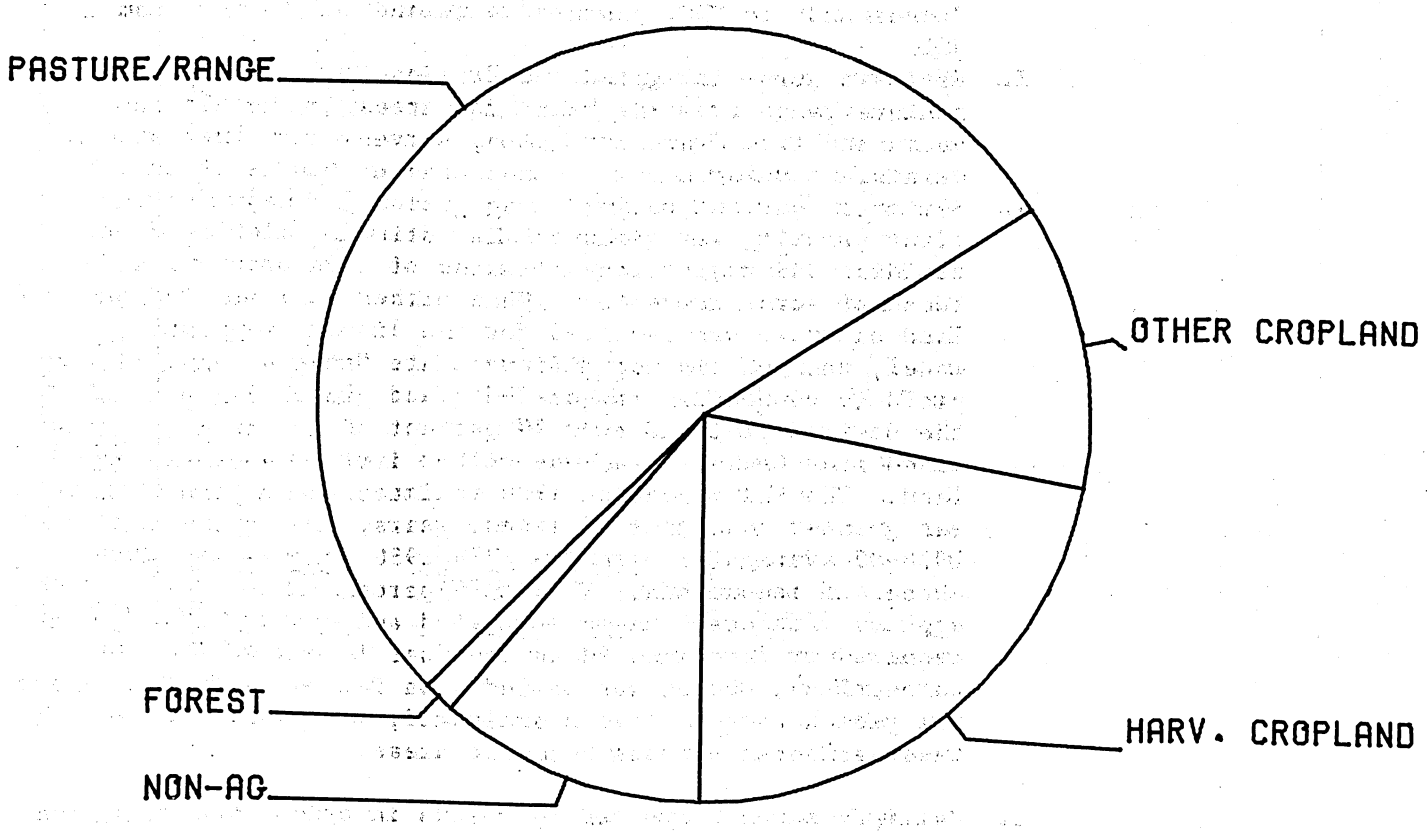
Where appropriate, revise either acres harvested or crop yield.[1]

6. Sum categories to major land use categories as presented in table 2 below.

For expository purposes, major land use for the region will be presented before acres harvested of individual crops. As stated, this does not follow the actual work sequence.

The Great Plains covers 451.9 million acres (706,000 square miles). This is nearly two-thirds of the entire 10-State area (table 2).[2] In "current normal" terms, over 53.5 percent of the Great Plains, 241.6 million acres, is in pasture/range (Fig. 2). Harvested cropland (22.1 percent), other cropland (11.9 percent),[3] nonagricultural and Federal uses (11 percent), and forest (1.3 percent) are other major land uses. When one considers the entire 10-State region, nonagricultural uses which include all Federal lands become much more significant, expanding to 22.4 percent of total acreage.

Figure 2 -- Great Plains Current Normal Major Land Use



[1]"Current normal" yield estimates are in Appendix 8.

[2]Full area detail is in Appendix 9.

[3]Summer fallow, crop failure, cover crops, cropland pasture, and idle cropland.

Table 2 -- Current normal major land use by Resource Area

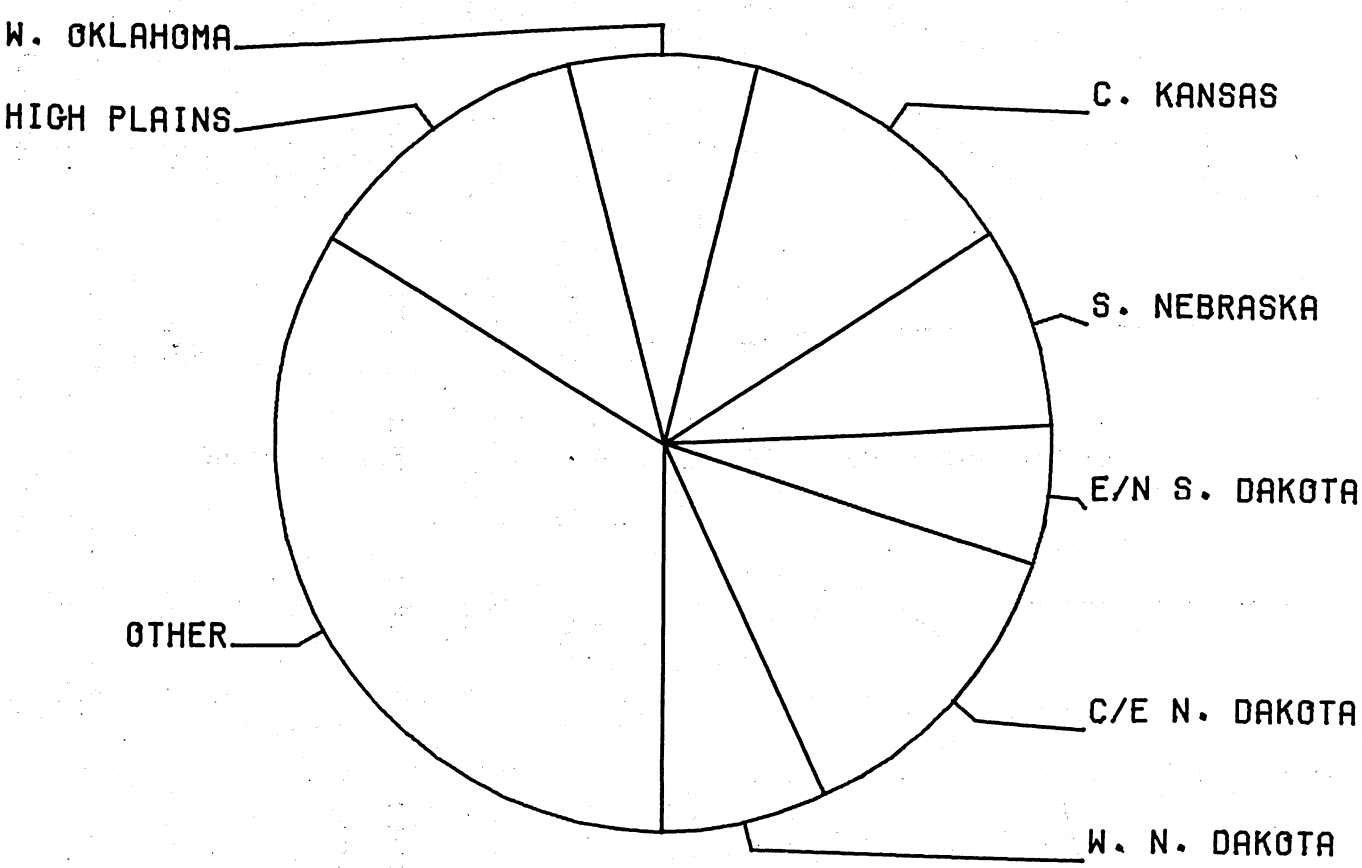
State/Resource Area[1]	Harvested cropland			Other cropland[2]	Pasture/ range	Forest	Nonagricultural area	Total area
	Irrigated	Nonirrigated	Total					
	1,000 acres							
Montana:								
1 (N)	320.8	4,357.6	4,678.4	4,303.7	10,346.1	243.0	4,862.8	24,433.9
2 (S)	427.3	3,012.9	3,440.2	2,203.8	21,317.1	957.0	7,070.7	34,988.8
North Dakota:								
3 (W)	83.6	6,850.0	6,933.6	4,127.0	8,307.6	38.0	3,401.1	22,807.4
4 (CE)	77.3	13,030.3	13,107.6	4,486.7	2,036.1	328.0	2,460.8	22,419.2
South Dakota:								
5 (EN)	136.0	5,632.1	5,768.1	1,958.6	6,738.2	0	1,537.6	16,002.6
6 (CW)	189.0	2,574.1	2,763.0	1,323.8	15,670.4	308.0	3,454.2	23,519.4
Wyoming:								
7 (E)	328.2	563.6	891.7	557.9	14,187.0	608.0	3,422.6	19,667.2
Nebraska:								
8 (N)	1,003.8	2,493.1	3,496.8	1,151.5	14,272.7	113.0	1,047.1	20,081.1
9 (S)	4,227.0	4,184.8	8,411.8	2,843.7	6,269.1	185.0	1,300.3	19,009.9
Colorado:								
10 (E)	1,673.3	3,041.2	4,714.5	3,676.9	13,916.1	410.0	2,146.9	24,864.0
Kansas:								
11 (W)	1,796.2	2,981.9	4,778.1	3,288.9	3,056.4	8.0	526.3	11,657.6
12 (C)	1,117.7	10,856.1	11,973.8	5,778.6	9,918.7	242.0	2,131.6	30,044.8
Oklahoma:								
13 (CE)	68.7	786.0	854.7	1,091.6	3,799.7	1,114.0	926.2	7,786.2
14 (W)	552.3	7,211.2	7,763.5	2,767.8	10,316.0	263.0	1,613.5	22,728.6
New Mexico:								
15 (E)	503.3	498.1	1,001.5	640.4	23,603.8	1,415.0	4,800.5	31,461.4
Texas:								
16 (HP)	5,230.9	7,084.6	12,315.5	6,491.9	28,050.5	0	2,499.6	49,357.4
17 (S)	935.2	1,760.9	2,696.1	2,464.2	35,513.3	0	2,987.9	43,661.4
18 (E)	150.1	4,135.6	4,285.8	4,858.3	14,317.0	38.0	3,914.7	27,413.8
Great Plains	18,820.6	81,054.2	99,874.8	54,015.1	241,635.9	6,270.0	50,104.3	451,900.0
10 States	23,780.2	102,238.0	126,018.2	67,286.4	328,694.0	30,373.0	159,336.5	711,708.1

[1]Letters in parentheses after RA indicates the State part: N = northern, S = southern, E = eastern, W = western, C = central, HP = High Plains.

[2]"Other cropland" includes summer fallow, crop failure, cropland pasture, cropland in cover soil improvement crops, and idle.

As figure 3 shows, central/east North Dakota (13.1 percent), the Texas High Plains (12.3 percent), and central Kansas (12.0 percent) have the greatest areas of harvested cropland. Other important RAs are western North Dakota (6.9 percent), eastern/ northern South Dakota (5.8 percent), the southern half of Nebraska (8.4 percent), and western Oklahoma (7.7 percent).

Figure 3 -- Great Plains Current Normal Harvested Cropland



Some 18.8 million acres of the nearly 100 million acres of harvested cropland are irrigated. As figure 4 indicates, the Texas High Plains (27.8 percent) and southern Nebraska (22.5 percent) have the most extensive areas. Other RAs with large expanses of irrigated land are western Kansas (9.5 percent), eastern Colorado (8.9 percent), central Kansas (5.9 percent), and northern Nebraska (5.3 percent). The greatest acreages of nonirrigated cropland are in central/east North Dakota (16.1 percent) and central Kansas (13.4 percent). See figure 5.

Figure 4 -- Great Plains Current Normal Irrigated Cropland

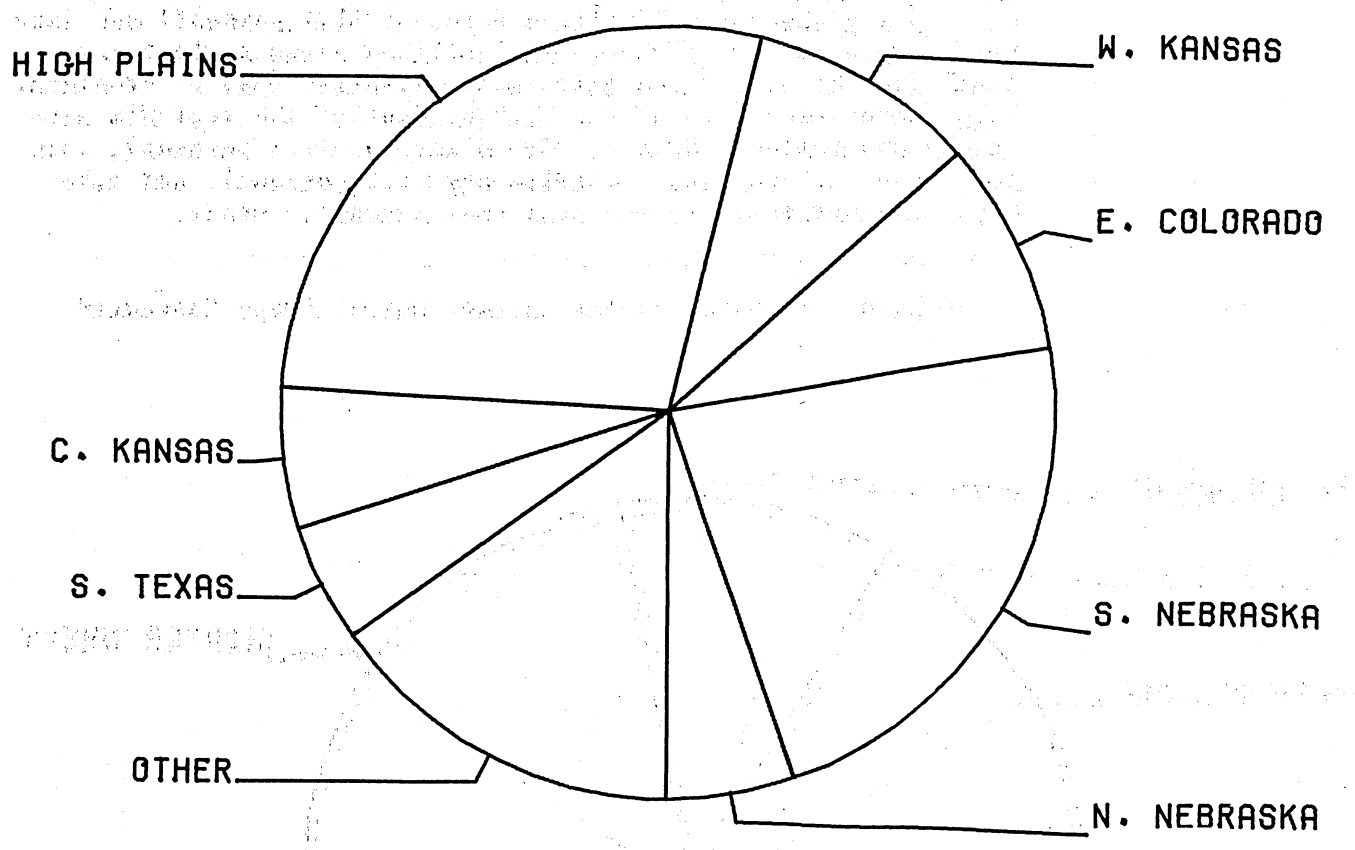
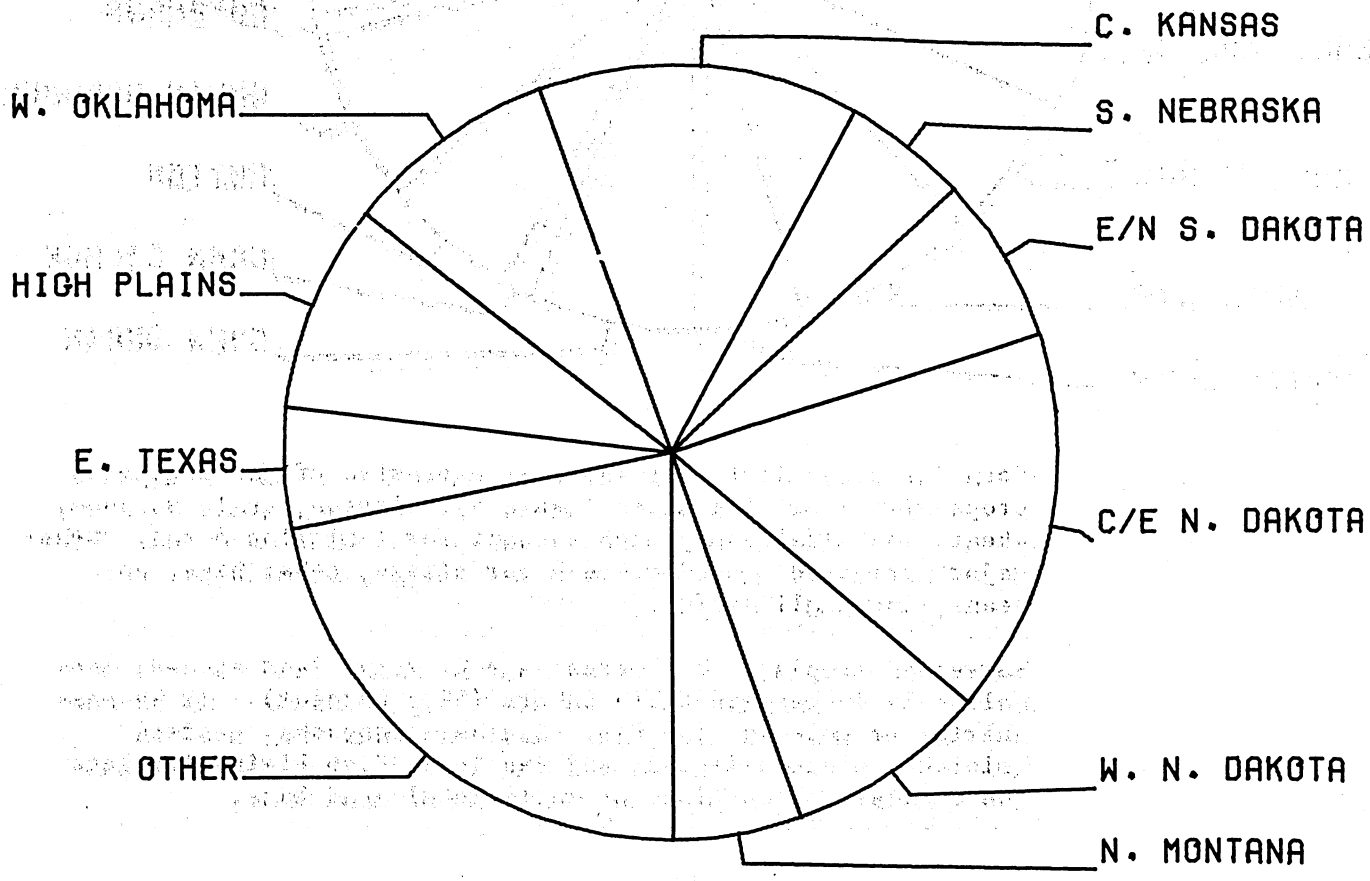
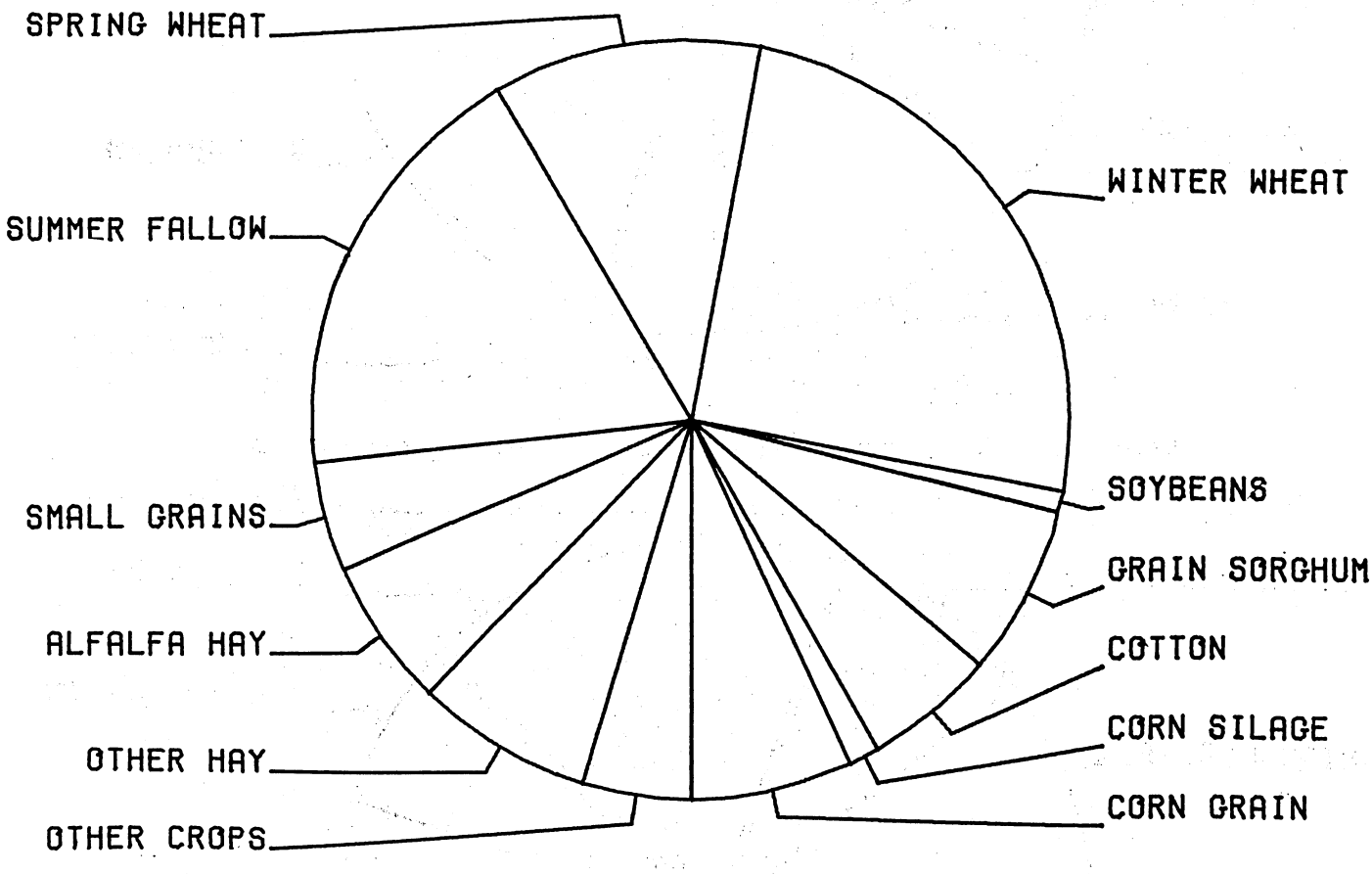


Figure 5 -- Great Plains Current Normal Nonirrigated Cropland



Winter wheat is the most widespread harvested crop with 30.8 million acres or 25.1 percent of total crops harvested (fig. 6). Spring wheat (14.0 million acres or 11.4 percent) and land held fallow following wheat (22.7 million acres or 18.5 percent) are the second and third most extensive uses of cropland. These three uses account for 55.0 percent of the region's harvested and fallow cropland. Grain sorghum (7.2 percent), corn for grain (6.9 percent), alfalfa hay (6.2 percent), and other hays (7.4 percent) are the next most extensive crops.

Figure 6 -- Great Plains Current Normal Crops Harvested



Corn for grain is by far the most extensive of the irrigated crops with 7 million acres (table 4). Cotton, grain sorghum, wheat, and alfalfa hay each account for 2 million acres. Other major irrigated crops are corn for silage, other hays, soybeans, and small grains.

Harvested cropland as a percentage of total land exceeds one-half only in eastern North Dakota (58.5 percent). It is one-quarter or more in nine RAs. Southern Nebraska, eastern Colorado, western Kansas, and the Texas High Plains irrigate the greatest proportions of their total land base.

Table 3 -- Current normal land use, by State and resource area

State/resource area	Total	Water, urban and rural transport	Other	Federal	
				Cropland	Other
			1,000 acres		
Montana:					
1 (N)	24,434	601	359	3	3,899
2 (S)	34,989	913	639	3	5,515
North Dakota:					
3 (W)	22,807	1,385	582	25	1,409
4 (CE)	22,419	1,197	975	12	277
South Dakota:					
5 (EN)	16,003	713	499	16	309
6 (CW)	23,519	574	479	1	2,399
Wyoming:					
7 (E)	19,667	323	211	*	2,888
Nebraska:					
8 (N)	20,081	426	111	*	510
9 (S)	19,010	789	401	22	89
Colorado:					
10 (E)	24,864	850	484	2	812
Kansas:					
11 (W)	11,658	256	162	0	108
12 (C)	30,045	1,218	438	76	301
Oklahoma:					
13 (CE)	7,786	656	163	3	104
14 (W)	22,724	1,028	224	29	333
New Mexico:					
15 (CE)	31,461	530	210	2	4,059
Texas:					
16 (HP)	49,357	1,829	483	7	180
17 (S)	43,661	2,086	640	2	260
18 (E)	27,414	2,673	683	9	549
Great Plains	451,899	18,147	7,753	212	24,001
10 States	711,705	30,514	14,426	272	114,125

* = fewer than 500 acres. Note: See footnote 1 of table 2 for explanation of letters in parentheses.

Table 4 -- Current normal major crop acres harvested, by State and resource area

State/resource area	Corn grain[1]			Corn silage[1]			Cotton[1]			Grain sorghum[1]		
	Irr.	Nirr.	Total	Irr.	Nirr.	Total	Irr.	Nirr.	Total	Irr.	Nirr.	Total
	1,000 harvested acres											
Montana:												
1 (N)	1	0		16	0	16	0	0	0	3	0	3
2 (S)	1	0		56	0	56	0	0	0	*	0	0
North Dakota:												
3 (W)	23	11	34	1	151	152	0	0	0	0	0	0
4 (CE)	35	229	264	3	146	149	0	0	0	0	0	0
South Dakota:												
5 (EN)	60	548	608	24	314	338	0	0	0	3	131	134
6 (CW)	40	55	95	6	35	41	0	0	0	5	141	146
Wyoming:												
7 (E)	8	1	9	34	1	35	0	0	0	1	0	1
Nebraska:												
8 (N)	529	59	588	61	16	77	0	0	0	3	14	17
9 (S)	3,523	273	3,796	146	51	197	0	0	0	159	1,100	1,259
Colorado:												
10 (E)	684	22	706	177	6	183	0	0	0	91	240	331
Kansas:												
11 (W)	707	5	712	106	0	106	0	0	0	398	407	805
12 (C)	347	42	889	78	23	101	0	0	0	330	1,621	1,951
Oklahoma:												
13 (CE)	1	4	5	*	3	3	11	30	41	3	33	36
14 (W)	37	20	57	17	14	31	110	423	533	118	300	418
New Mexico:												
15 (CE)	61	*	61	21	5	26	43	9	52	70	149	219
Texas:												
16 (HP)	866	0	866	91	0	91	1,931	3,236	5,167	725	714	1,439
17 (S)	90	100	190	3	2	5	269	267	536	119	911	1,030
18 (E)	8	112	120	*	1	1	23	456	479	8	1,079	1,087
Great Plains	7,021	1,481	8,502	840	768	1,608	2,387	4,421	6,808	2,036	6,840	8,876
10 States	8,083	5,368	13,451	957	1,310	2,266	2,528	4,696	7,224	2,105	9,601	11,705

See footnote at end of table.

Continued--

Table 4 -- Current normal major crop acres harvested, by State and resource area--Continued

State/resource area	Alfalfa[1]			Other hays[1]		
	Irr.	Nirr.	Total	Irr.	Nirr.	Total
	1,000 harvested acres					
Montana:						
1 (N)	127	93	220	68	176	244
2 (S)	194	374	568	30	700	730
North Dakota:						
3 (W)	52	1,137	1,189	0	675	675
4 (CE)	19	765	784	0	788	788
South Dakota:						
5 (EN)	25	963	988	0	765	765
6 (CW)	102	683	785	21	590	611
Wyoming:						
7 (E)	140	134	274	72	88	160
Nebraska:						
8 (N)	167	277	444	48	1,430	1,478
9 (S)	155	448	603	24	343	367
Colorado:						
10 (E)	309	47	356	51	153	204
Kansas:						
11 (W)	90	43	133	46	22	68
12 (C)	84	614	698	41	435	476
Oklahoma:						
13 (CE)	0	88	88	0	230	230
14 (W)	48	201	249	31	430	461
New Mexico:						
15 (CE)	122	0	122	50	0	50
Texas:						
16 (HP)	148	0	148	95	218	313
17 (S)	10	0	10	50	266	316
18 (E)	0	11	11	26	1,232	1,258
Great Plains	1,792	5,878	7,670	653	8,541	9,194
10 States	2,880	7,512	10,392	1,640	11,205	12,845

See footnote at end of table.

Continued--

Table 4 -- Current normal major crop acres harvested, by State and resource area--Continued

State/resource area	Soybeans[1]			Wheat[1]				Small grains[1]		
	Irr.	Nirr.	Total	Irr.	Nif.	Nic.	Total	Irr.	Nirr.	Total
	1,000 harvested acres									
Montana:										
1 (N)	0	0	0	30	3,360	153	3,543	55	530	585
2 (S)	0	0	0	22	1,372	106	1,500	87	394	481
North Dakota:										
3 (W)	1	0	1	0	2,692	1,081	3,773	0	572	572
4 (CE)	4	173	177	0	2,604	3,359	5,963	0	2,103	2,103
South Dakota:										
5 (EN)	13	5	18	7	531	1,149	1,687	3	836	839
6 (CW)	1	1	2	1	644	176	821	11	191	202
Wyoming:										
7 (E)	*	*	*	8	286	12	306	31	37	68
Nebraska:										
8 (N)	2	3	5	21	592	26	639	13	56	69
9 (S)	147	125	272	32	1,248	525	1,805	2	53	55
Colorado:										
10 (E)	2	*	2	124	2,409	98	2,631	55	30	85
Kansas:										
11 (W)	17	3	20	396	2,438	57	2,891	2	0	2
12 (C)	74	184	258	148	2,858	4988	7,994	6	68	74
Oklahoma:										
13 (CE)	1	18	19	8	4	285	297	1	21	22
14 (W)	7	30	37	176	292	5,430	5,898	1	36	37
New Mexico:										
15 (CE)	1	0	1	106	66	264	436	15	3	18
Texas:										
16 (HP)	200	14	214	1,027	301	2,433	3,761	21	108	129
17 (S)	7	1	8	31	*	56	87	10	65	75
18 (E)	3	50	53	18	0	786	804	0	224	224
Great Plains	480	607	1,087	2,155	21,697	20,984	44,836	313	5,327	5,640
10 States	606	4,419	5,025	2,277	22,262	23,261	27,795	727	7,292	8,019

* = fewer than 500 acres.

[1]Irr. = irrigated; Nirr. = nonirrigated; Nif. = nonirrigated following fallow; Nic. = nonirrigated continuous crop. See footnote 1 of table 2 for explanation of letters in parentheses.

Pasture/range is the most widespread land use in the region. RAs with the largest shares are southern Texas (14.7 percent), the High Plains (11.6 percent), eastern New Mexico (9.8 percent), and southern Montana (8.8 percent). Forestland, the smallest of the major land use categories, is found primarily along the eastern slopes of the Rockies and in east-central Oklahoma.

CROP DISTRIBUTION

Corn for Grain

Corn grain acreage is 8.5 million acres of which 82.6 percent is irrigated. Southern Nebraska has by far the most corn with 3.8 million acres, 44.6 percent of the total. The Texas High Plains is a distant second with 0.9 million acres, 10.2 percent of the total. Eastern South Dakota, northern Nebraska, eastern Colorado, and western Kansas each have 7-8 percent of the total.

Irrigated acreage is even more concentrated (fig. 7). Southern Nebraska accounts for 3.5 million acres or 50.2 percent of irrigated corn grain acreage. Of the additional areas cited in the previous paragraph, only east/northern South Dakota, where most (90 percent) corn for grain is dryland, drops from the list of most important. Figure 8 shows east/northern South Dakota nonirrigated corn grain acreage with 37 percent of the total. East/central North Dakota and southern Nebraska have 15.5 percent and 18.4 percent of the total, respectively.

Figure 7 -- Distribution of Irrigated Corn For Grain

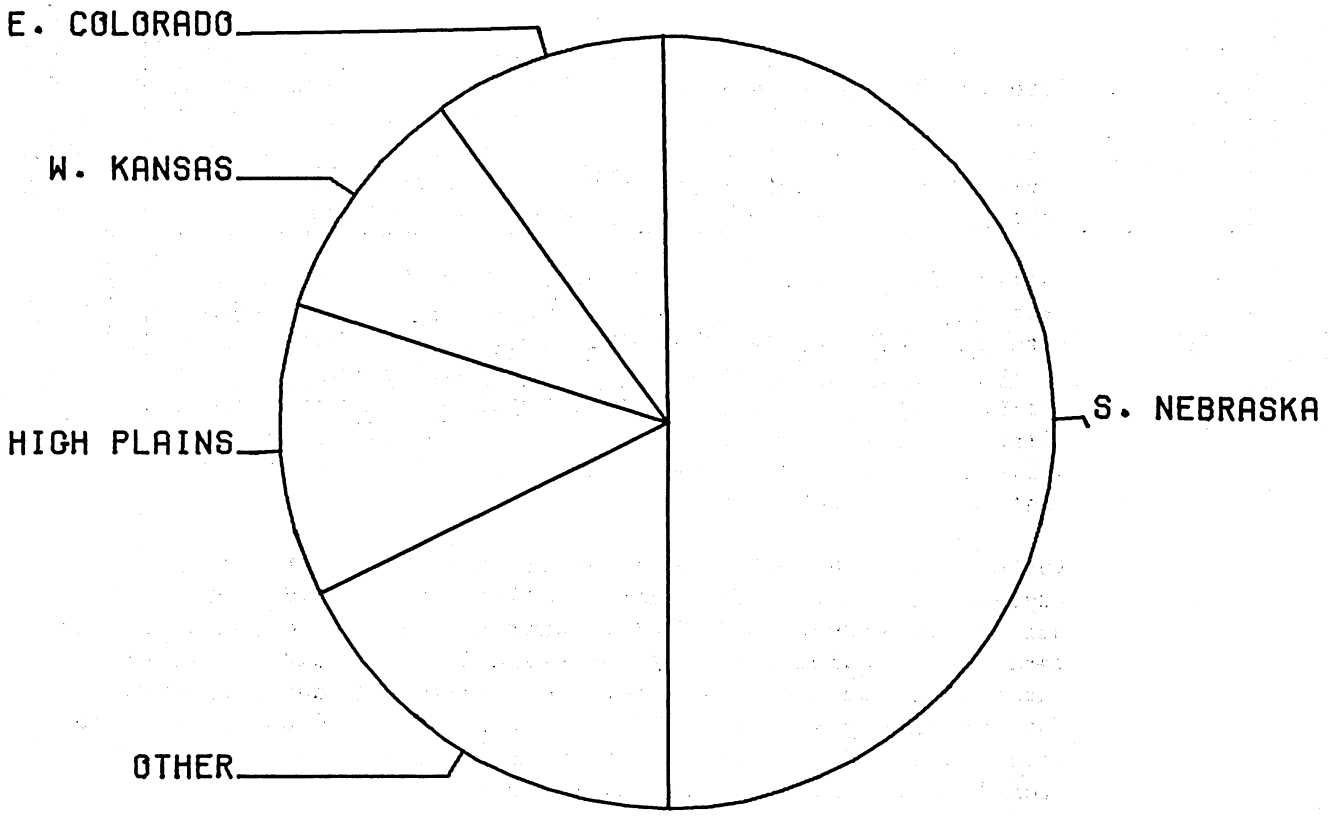
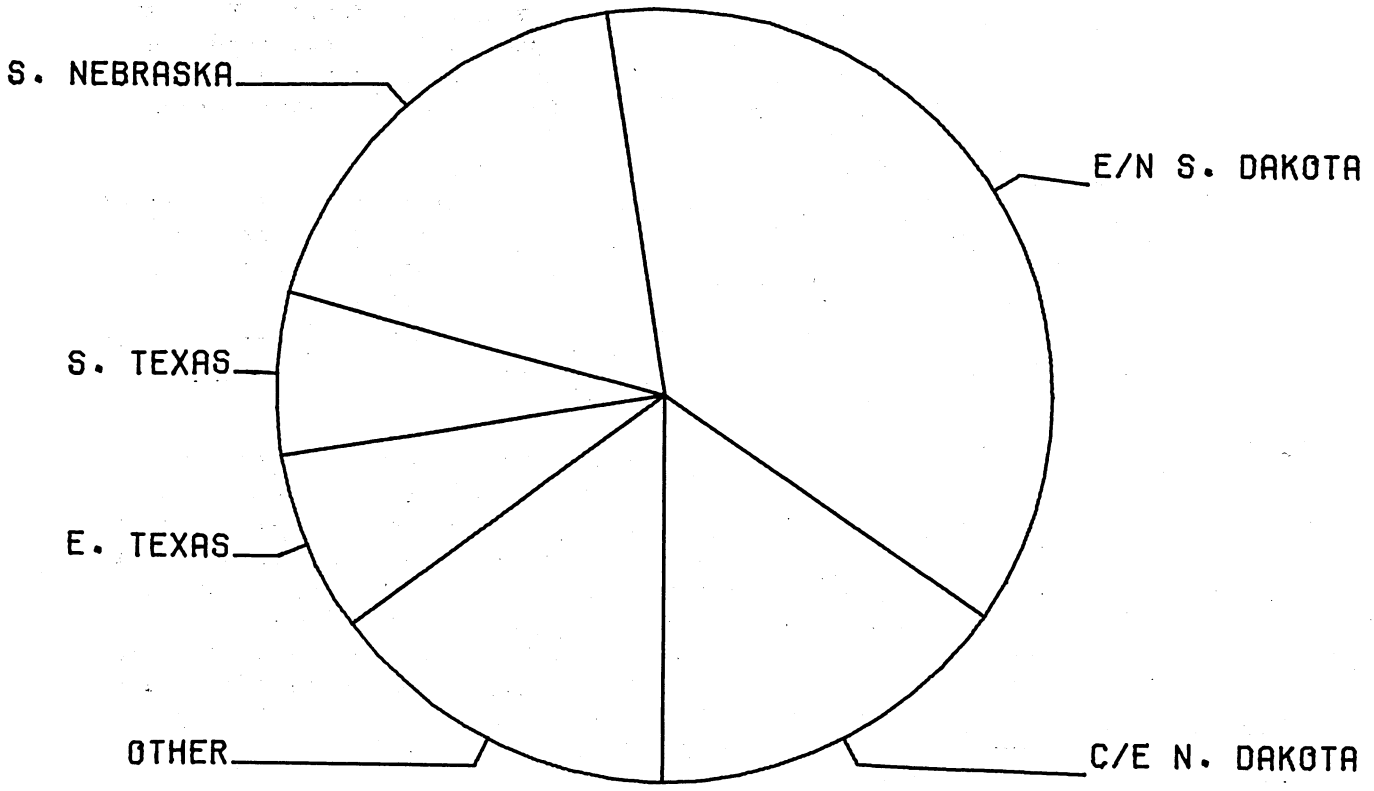


Figure 8 -- Distribution of Nonirrigated Corn For Grain



Corn for Silage

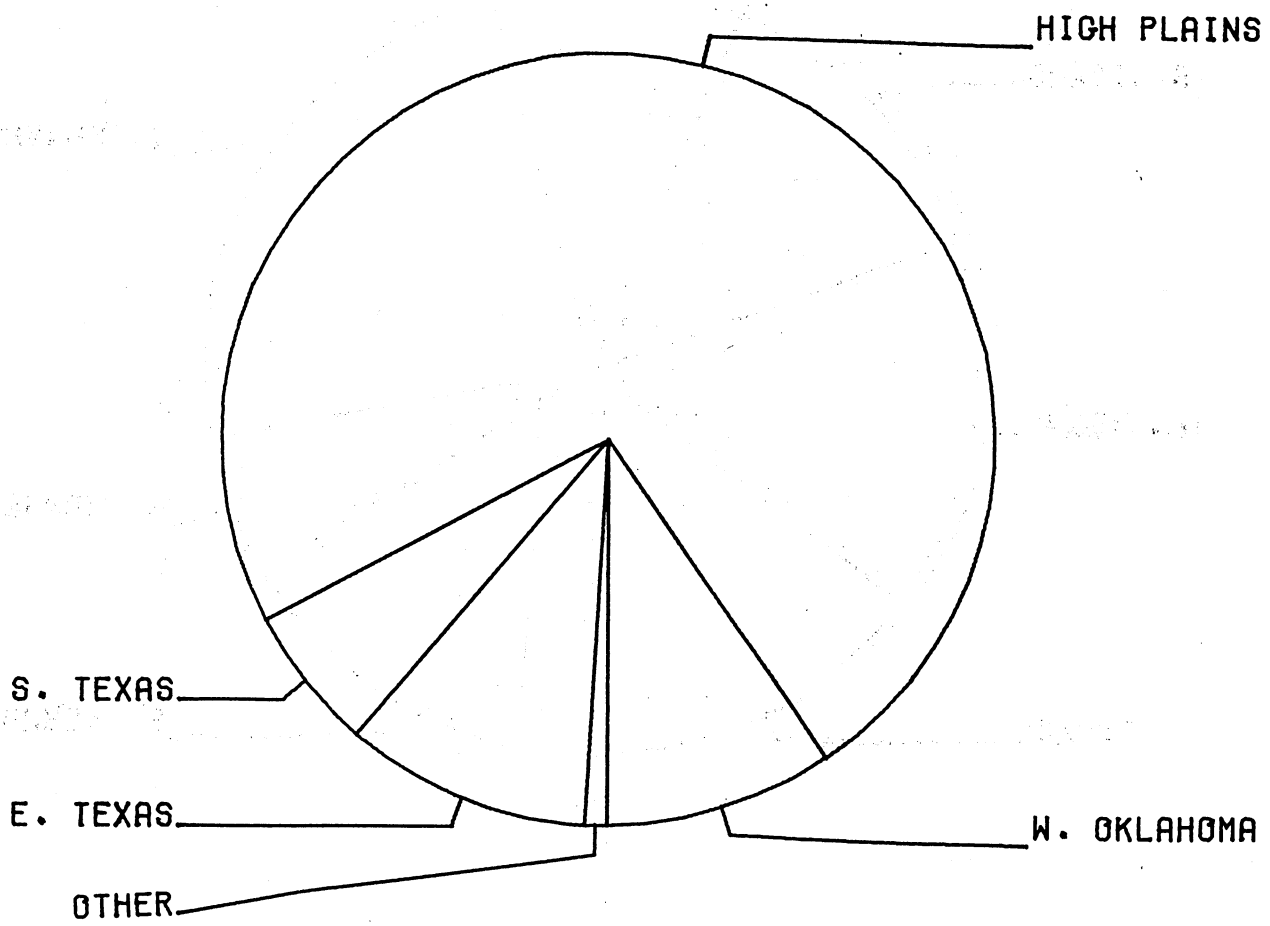
Corn for silage covers 1.6 million acres of which just over half is irrigated (table 4). Not nearly as concentrated as corn for grain, one-fifth of silage acreage is in east/northern South Dakota and one-tenth each in eastern Colorado, southern Nebraska, and both resource areas of North Dakota.

Eastern Colorado has 180,000 acres of irrigated silage, 21 percent of the total (table 4). This area, southern Nebraska and both Kansas resource areas combined, account for 60.3 percent of the total. Irrigated silage is also important in the High Plains (10.8 percent of the Great Plains total). Dryland silage is heavily concentrated in east/northern South Dakota (40.8 percent of the Great Plains) and North Dakota (38.6 percent of the Great Plains.

Cotton

Cotton covers 6.8 million acres of which 65.0 percent is dryland (table 4). The most localized crop, 75.9 percent of all cotton acreage and 73.2 percent of dryland cotton is in the Texas High Plains (fig. 9). Western Oklahoma and the other two Texas resource areas each have 7-8 percent of total acreage. Not surprisingly, most (80.8 percent) irrigated cotton is also found in the High Plains. Southern Texas accounts for an additional 11.3 percent of irrigated cotton.

Figure 9 -- Distribution of Nonirrigated Cotton



Grain Sorghum

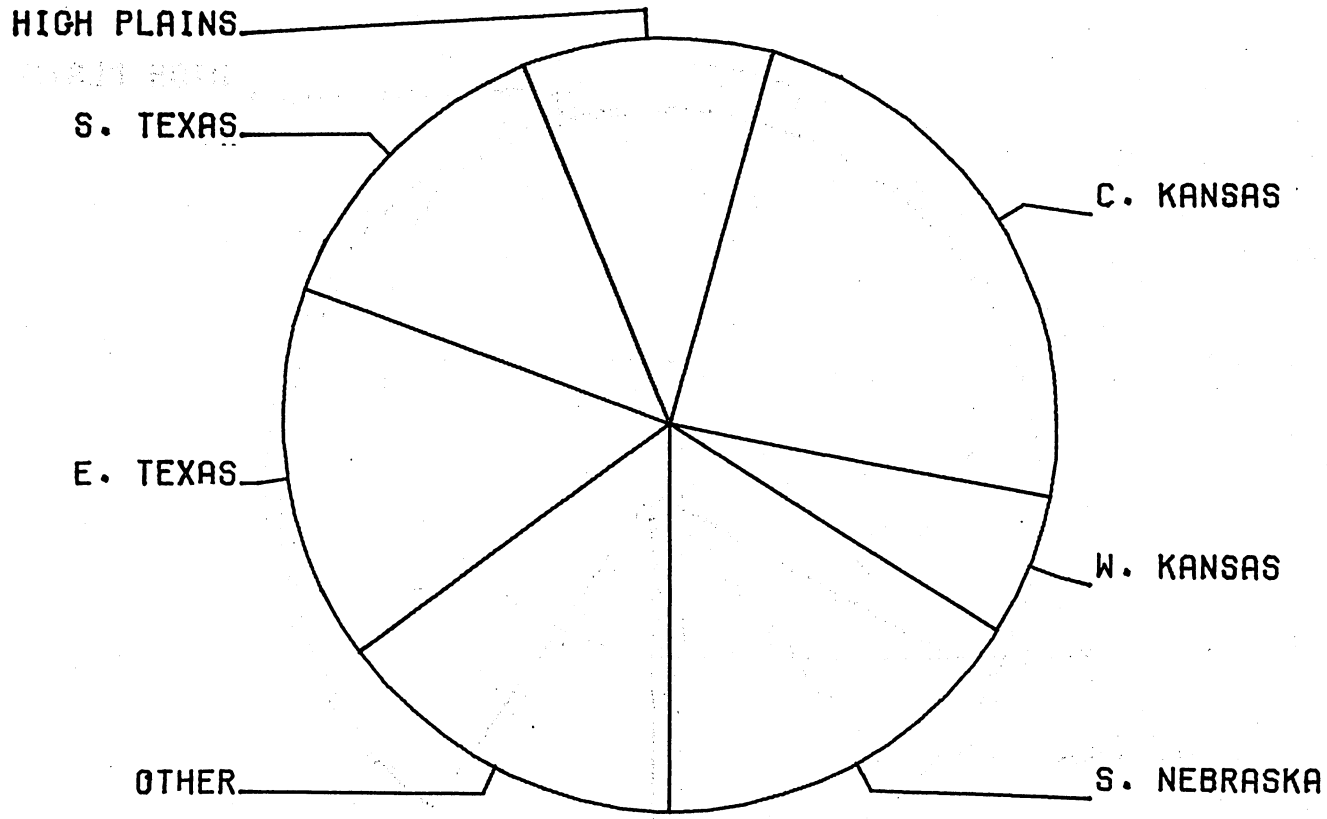
Grain sorghum is estimated at 8.9 million acres, of which 77.1 percent is dryland. The largest nonirrigated acreages are in central Kansas (23.7 percent), southern Nebraska (16.1 percent), and Texas (east with 15.8 percent, south with 13.3 percent, and High Plains with 10.4 percent) (fig. 10). Little sorghum is found north of southern Nebraska.

Some 36 percent of the crop's 2 million irrigated acres are found in the Texas High Plains. Kansas is also significant in this regard (western Kansas has 19.5 percent and central Kansas has 16.2 percent).

Wheat

Total spring wheat acreage in 1980 "current normal" terms is 14 million acres, of which 8.2 million acres are in a summer fallow rotation and 5.8 million acres are in continuous wheat. Only 0.3 percent of the acreage is irrigated. In addition, another 5-8 million acres are in the fallow part of the summer fallow rotation.

Figure 10 -- Distribution of Nonirrigated Grain Sorghum



Spring wheat including durum wheat is found largely in the northern Great Plains. Western and central/eastern North Dakota account for 31.9 percent and 31.8 percent, respectively, of that in a fallow rotation (fig. 11). Northern Montana accounts for another 25.0 percent. Central/eastern North Dakota has the most nonirrigated spring wheat in continuous rotation with 57.7 percent (fig. 12). Western North Dakota and east/central South Dakota constitute 18.4 percent and 19.0 percent, respectively.

Some 31 million acres of winter wheat are cultivated throughout the Great Plains. Less than 10 percent is irrigated and that primarily in the Texas High Plains and also in western Kansas. A bit more winter wheat is grown in continuous rotation (15.2 million acres) than in rotation with a summer fallow (13.5 million acres).

Figure 11 -- Distribution of Nonirrigated Spring Wheat After Fallow

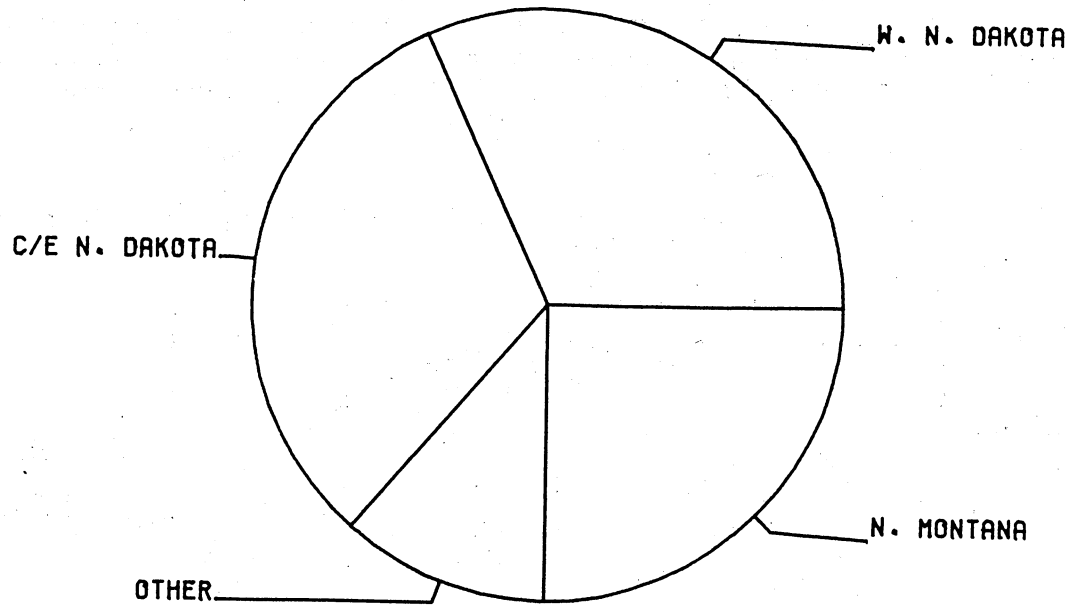
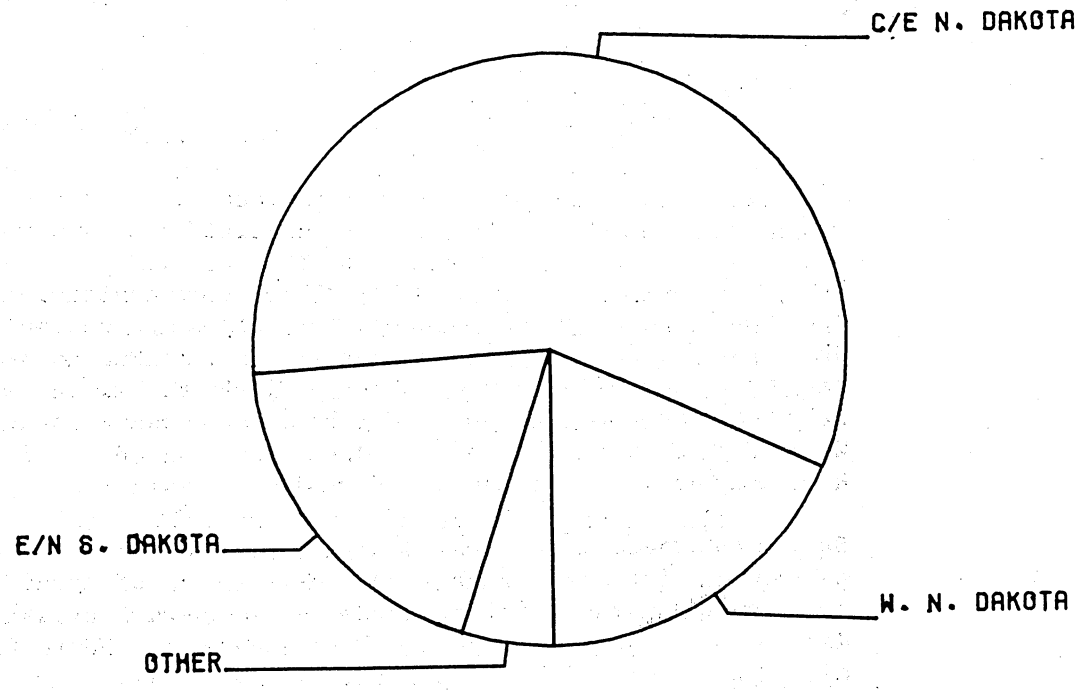
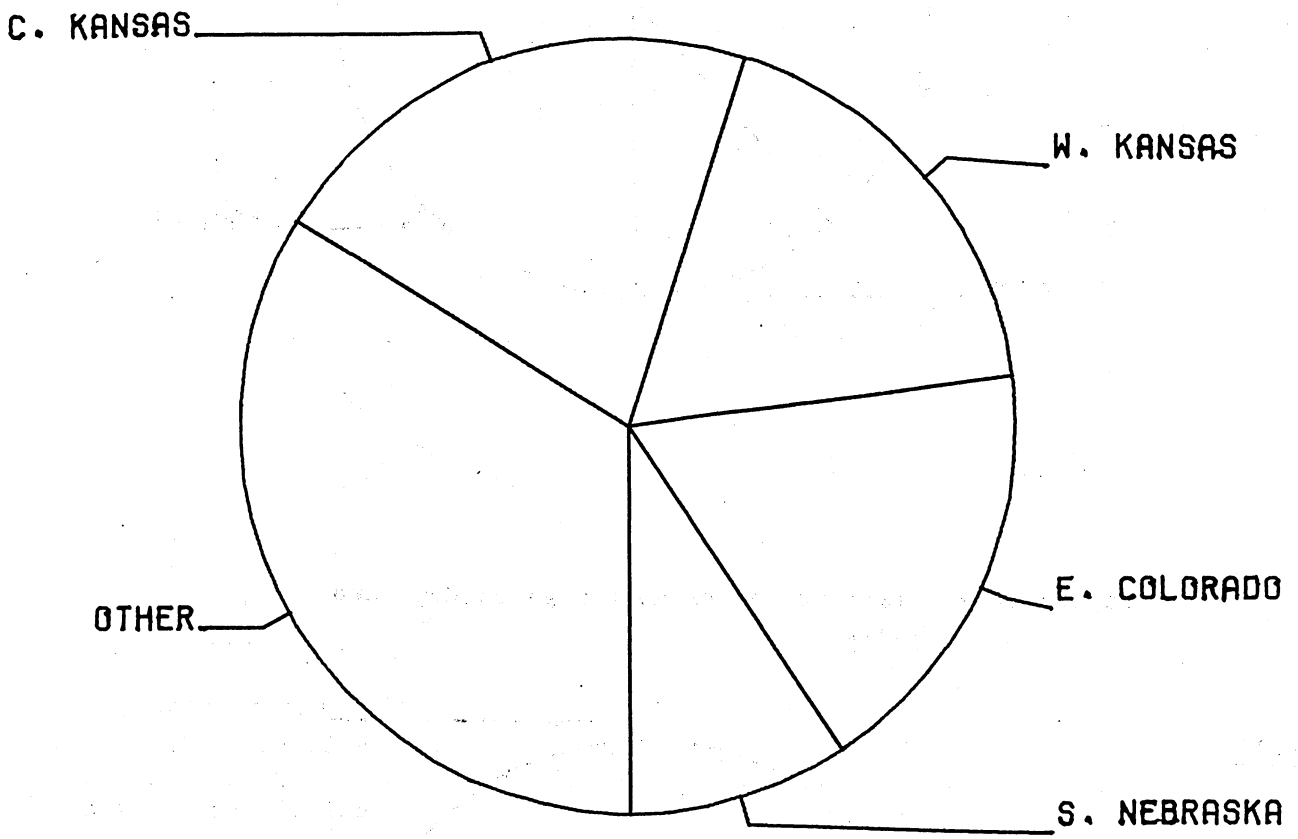


Figure 12 -- Distribution of Nonirrigated Continuous Spring Wheat



Two-thirds of winter wheat following summer fallow is concentrated in the central Great Plains (southern Nebraska, 9.2 percent; eastern Colorado, 17.8 percent; western Kansas, 18 percent; central Kansas, 21.1 percent) (fig. 13). Over one-third of continuous winter wheat is located in western Oklahoma, another one-third in central Kansas, and one-sixth in the High Plains (fig. 14). Another concentration is found in Montana (16.9 percent).

Figure 13 -- Distribution of Nonirrigated Winter Wheat After Fallow

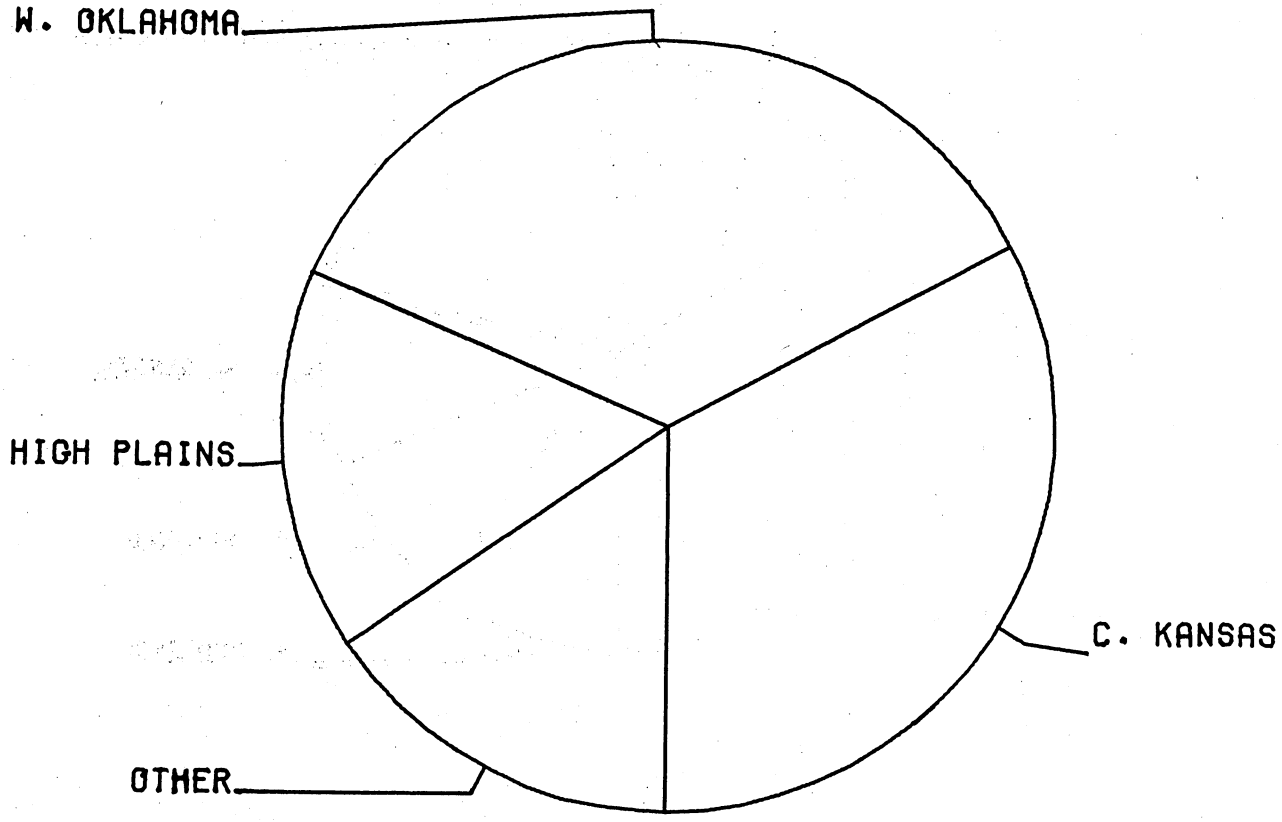


When considering all wheat, one finds a concentration in eastern North Dakota (13.3 percent), Kansas (24.2 percent), western Oklahoma (13.2 percent), and the Texas High Plains (8.4 percent). Relatively little is found in South Dakota, Wyoming, Nebraska, New Mexico, and the other two Texas Resource Areas. What little irrigation exists there is located mainly in the High Plains (47.7 percent) and western Kansas (18.4 percent).

Soybeans

Soybean acreage is estimated at 1.1 million acres of which 44.2 percent is irrigated (table 4). Two-thirds of total acreage is cultivated in the combined areas of southern Nebraska, central Kansas, and the High Plains. Central/eastern North Dakota is also important with 16.3 percent of the total.

Figure 14 -- Distribution of Nonirrigated Continuous Winter Wheat



Nearly three-quarters of irrigated soybeans are found in the Texas High Plains and southern Nebraska. Central Kansas accounts for another 15.4 percent.

Small Grains

Small grains (oats and barley) acreage is an estimated 5.6 million acres, of which 94.5 percent is dryland. Small grains are found in the northern plains, especially central/eastern North Dakota with 37.2 percent (fig. 15).

Hay

Of an estimated 7.7 million acres of alfalfa hay, North Dakota with 25.7 percent and South Dakota with 23.1 percent have the most extensive areas (fig. 16). Nebraska and Montana each account for another 10 percent. Somewhat less than one-fourth of alfalfa acreage is irrigated. Nebraska, Montana, and Colorado each have 17-18 percent of irrigated alfalfa acreage.

Other hays are cultivated on 9.2 million acres of the Great Plains. Only 7.1 percent is irrigated. The only Resource Areas with over 10 percent of total acreage are northern Nebraska and eastern Texas (fig. 17). The Dakotas each have 14-15 percent of the Great Plain's total. Irrigated acres are fairly evenly distributed over the total region. Only northern Montana, eastern Wyoming, and the High Plains have 10 percent or more of the irrigated total.

Figure 15 -- Distribution of Oats and Barley

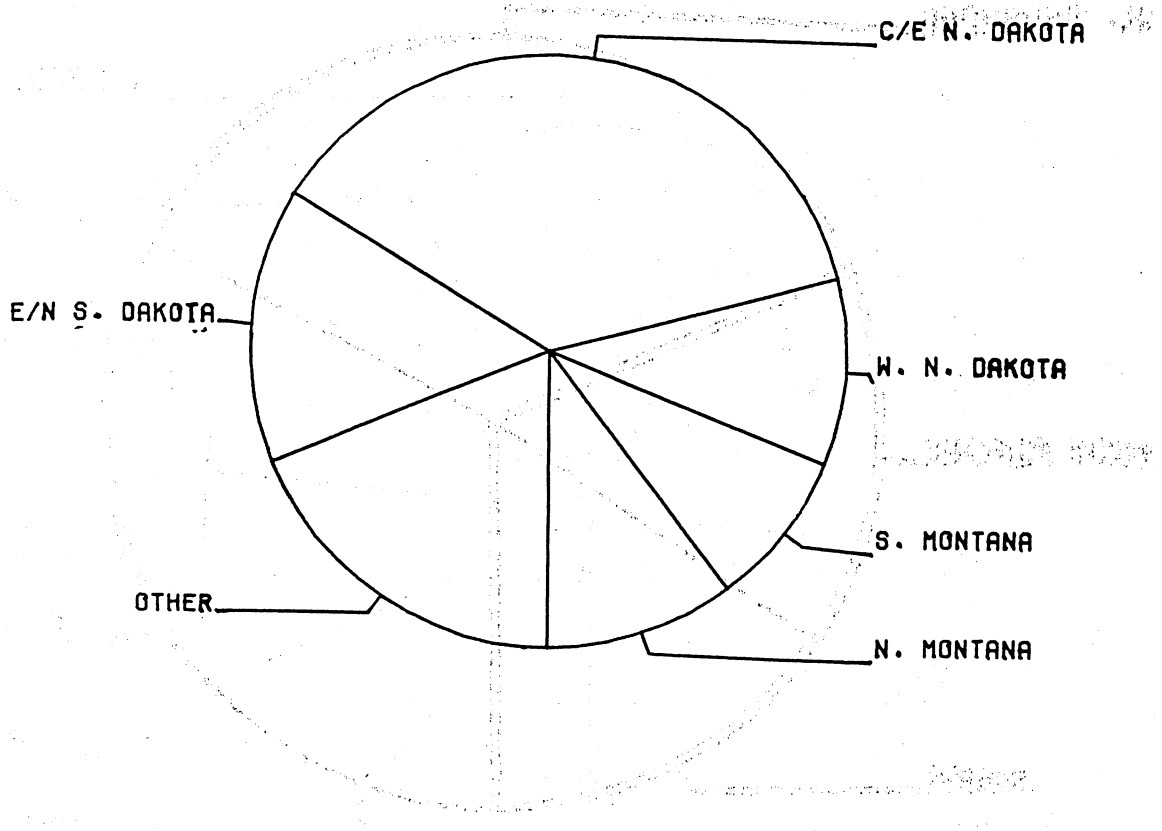


Figure 16 -- Distribution of Alfalfa Hay

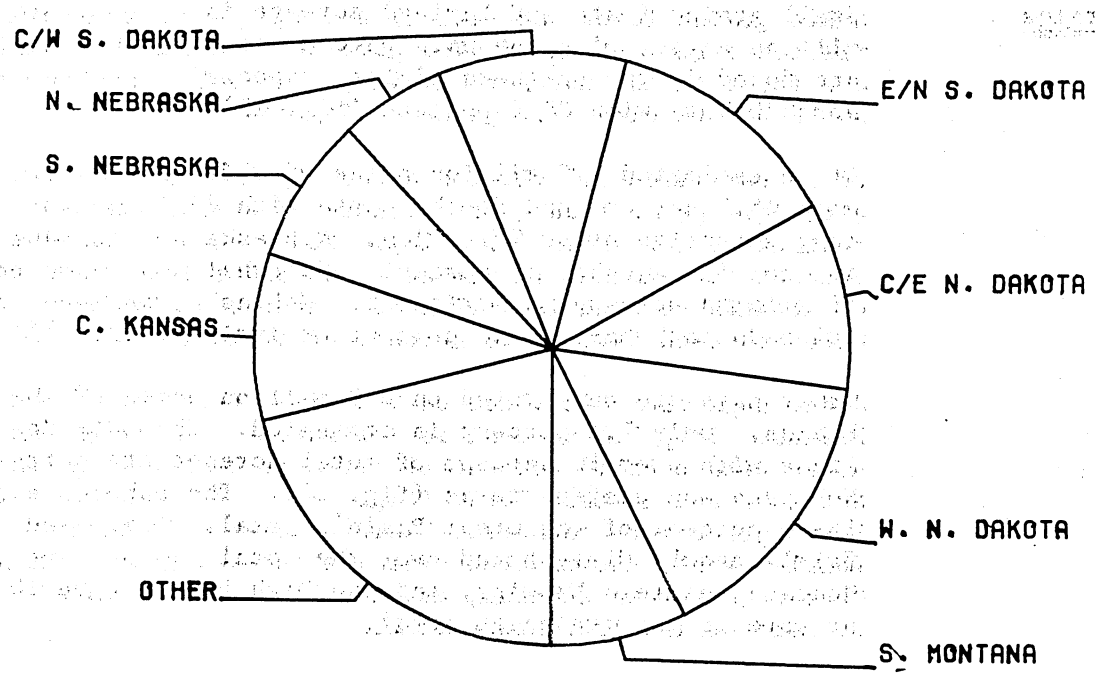
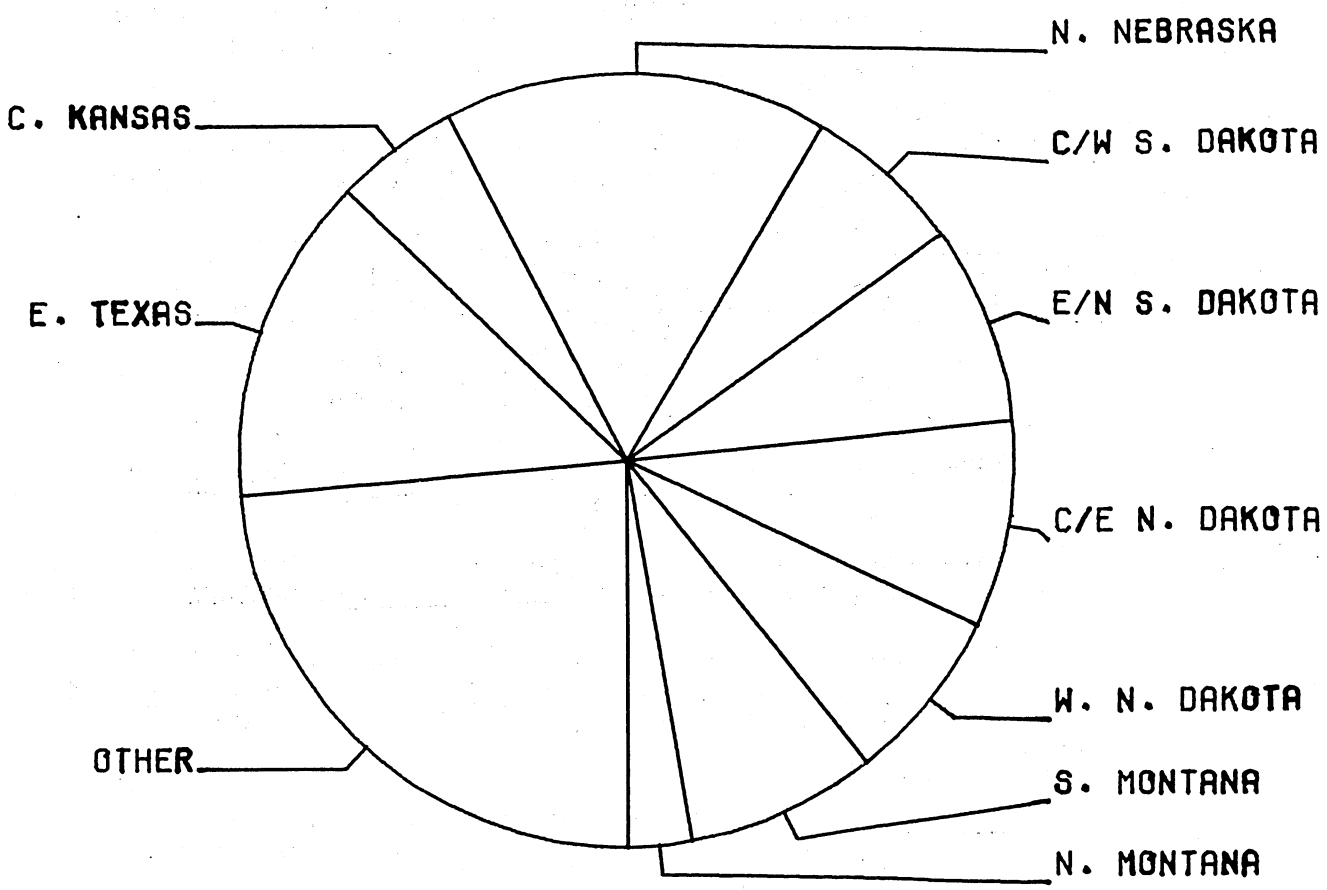


Figure 17 -- Distribution of Other Hay



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Appendix 1 -- Trend analysis of major crops by resource area

Ordinary least squares linear regression with time as the only independent variable was applied to the SRS computerized file (CEF) of 1969-1980 data for each major crop and RA. This exercise to identify statistically significant trend lines at the α = .05 level and an acceptable degree of correlation ($r^2 \geq 0.75$) was unsuccessful. The only crops and RAs where such a trend was found are:

Corn for grain - RA 9 (r^2 = .98) which represents 44.6 percent of total acres harvested; the trend is positive.

- RA 9 (r^2 = .98) which represents 50.2 percent of acres irrigated; the trend is positive.

Cotton - RA 16 (r^2 = .79) which represents 75.9 percent of total acres harvested; the trend is positive.

- RA 16 (r^2 = .80) which represents 73.2 percent of nonirrigated acres; the trend is positive.

Grain Sorghum - RA 16 (r^2 = .79) which represents 16.2 percent of total acres harvested; the trend is negative.

- RA 16 (r^2 = .79) which represents 35.6 percent of acres irrigated; the trend is negative.

Alfalfa hay - RA 3 (r^2 = .84) which represents 15.5 percent of total acres harvested; the trend is positive.

- RA 5 (r^2 = .87) which represents 12.9 percent of total acres harvested; the trend is positive.

Reasons for not finding more instances with a high r^2 and a significant "T" include:

1. Independent variables other than time such as commodity price, input costs, level of domestic and of export demand, etc. would be expected to be important.

2. The regression routine required at least 6 years of data during the 1969-80 period. Because SRS is not mandated to gather all types of data, for example acres irrigated and nonirrigated, the presence of such data on the CEF depends on whether the State SRS generated same and then whether NRED keypunched such data onto the CEF. Data on irrigated soybeans, for example, are not on the CEF even though nearly half of the crop is irrigated.

The regressed estimate for 1980 was used when available in combination with the most recent 3-year or 5-year averages to establish the most reasonable "current normal." No projections were done.

Appendix 2 -- Great Plains resource areas by county FIPS Code and State[1]

Resource area	State	County FIPS code
1	Montana	5, 15, 19, 35, 41, 51, 71, 73, 83, 85, 91, 101, 105, 109
2	Montana	3, 11, 13, 17, 21, 25, 27, 33, 37, 45, 55, 65, 69, 75, 79, 87, 99, 103, 107, 111
3	North Dakota	1, 7, 11-15, 23, 25, 29, 33, 37, 41, 47, 51-59, 65, 85-89, 101, 105
4	North Dakota	3, 5, 9, 17-21, 27, 31, 35, 39, 43, 45, 49, 63, 67-83, 91-99
5	South Dakota	3, 5, 13, 15, 21, 23, 31, 35, 43, 45, 49, 59, 65, 69, 73, 89, 97, 105, 107, 111, 115, 119, 129
6	South Dakota	7, 17, 19, 33, 41, 47, 53, 55, 63, 71, 75, 81, 85, 93, 95, 103, 113, 117, 121, 123, 131, 137
7	Wyoming	5, 9, 11, 15, 19, 21, 27, 31, 33, 45
8	Nebraska	5-9, 13-17, 31, 45, 71, 75, 89, 91, 103, 105, 113-117, 123, 149, 157, 161, 165, 171, 183
9	Nebraska	1, 19, 23, 29, 33, 35, 41, 47, 49, 57-65, 73, 93, 95, 99, 101, 111, 121, 129, 135, 137, 143, 145, 151, 159, 163, 169, 175, 181, 185
10	Colorado	1, 5, 9, 11, 17, 25, 31, 61, 63, 71-75, 87, 89, 95, 99, 101, 115, 121-125
11	Kansas	23, 55, 63, 67, 71, 75, 81, 93, 101, 109, 129, 153, 171, 175, 179, 181, 187, 189, 193, 199, 203
12	Kansas	7, 9, 15-19, 25-29, 33, 35, 39, 41, 47-53, 57, 61, 65, 69, 73, 77, 79, 83, 89, 95, 97, 105, 113, 115, 119, 123, 127, 135, 137, 141-147, 151, 155-169, 173, 183, 185, 191, 195, 197, 201
13	Oklahoma	15, 19, 37, 69, 81, 85, 95, 99, 109, 113, 123, 125, 133, 137
14	Oklahoma	3, 7-11, 17, 25, 27, 31, 33, 39, 43-59, 65, 67, 71-75, 83, 87, 93, 103, 117, 119, 129, 139, 141, 149-153
15	New Mexico	5-11, 19, 21, 25, 27, 33, 37, 41, 47, 49, 57, 59
16	Texas	3, 9, 11, 17, 23, 33, 45, 49-59, 65, 69, 75, 77-83, 87, 101, 107, 111, 115, 117, 125, 129, 133, 135, 151-155,

Continued--

Appendix 2 -- Great Plains resource areas by county FIPS code and State--Continued

Resource area	State	County FIPS code
16	Texas	165, 169, 179, 189, 191, 195, 197, 205, 207, 211, 219, 227, 233, 237, 253, 263, 269, 275, 279, 295, 303, 305, 317, 329, 335, 341, 345, 353, 357, 359, 363, 369, 375, 381, 393, 399, 415, 417, 421, 429, 433, 437, 441, 445, 447, 451, 483, 485, 487, 501, 503,
17	Texas	13, 19, 25, 31, 47, 61, 91, 95, 105, 123, 127, 131, 137, 163, 171-175, 209, 215, 235, 247, 249, 255, 259, 261, 265, 267, 271, 273, 283, 297, 299, 307, 311, 319, 323, 325, 327, 383, 385, 411, 413, 427, 431, 435, 443, 453, 461-465, 479, 489, 493, 505, 507
18	Texas	21, 27, 29, 35, 41, 51-55, 85, 93, 97, 99, 113, 119, 121, 139, 143-149, 161, 177, 181, 185, 187, 193, 217, 221, 223, 231, 251, 257, 277, 281, 285, 287, 293, 309, 313, 331, 333, 337, 349, 367, 395, 397, 425, 439, 477, 491, 497

[1]FIPS refers to Federal Information Processing Standards. They are assigned to each State and county by the U.S. Department of Commerce, National Bureau of Standards. Also available from U.S. Department of Agriculture, Economics, Statistics, and Cooperative Service. Natural Resource Economics Division, Working Paper 67. "County Identification Codes and Cross Reference Table." Compiled by Diane Giardna and Paul Dyke. January, 1979.

Appendix 3 -- 1977 National Resource Inventory unpublished table L

State	Census water	Streams under 1/8 mile	Water		Urban		
			Under 2 acres	2-40 acres	Over 40 acres	10-40 acres	Under 10 acres
			1000 acres				
Colorado	311	73	9	54	743	29	56
Kansas	295	134	66	93	627	76	43
Montana	1,040	134	18	97	410	8	19
Nebraska	451	88	27	57	404	70	35
New Mexico	149	41	5	6	507	82	69
North Dakota	923	90	18	273	205	46	18
Oklahoma	828	85	119	108	942	112	79
South Dakota	743	49	30	137	231	13	12
Texas	3,315	276	186	223	4,610	365	196
Wyoming	528	51	4	40	187	29	7

Appendix 4 -- 1977 National Resource Inventory published land use categories

Soil Class-Subclass

Row crops (irrigated, nonirrigated); close grown field crops (irrigated, nonirrigated); summer fallow; rotation hay/pasture (irrigated, nonirrigated); occasionally improved hayland (irrigated, nonirrigated); native hayland (irrigated, nonirrigated); other cropland not harvested or pastured; orchards, vineyards, bush fruit (irrigated, nonirrigated); pastureland (irrigated, nonirrigated); rangeland; forestland (grazed, nongrazed); farmsteads; other land in farms; strip mines, quarries, pits; other lands.

Rural transportation

Lakes and streams

Appendix 5 -- Reconciliation between sum of National Resource Inventory (NRI) unpublished table L, NRI county base computer tape, and NRI point sample tape to published data for Montana

	Acres	Source
Published NRI total for Montana	94,171,000	SCS Inv. & Mon. Division
Total area (99.817% of published total)	93,999,082	County base tape
- Census water (>40 ac; >1/8 mi.)	-1,039,776	County base tape
= Total land	92,959,306	County base tape
- Urban (>40 ac)	417,907	County base tape
- Urban (10-40 ac-State only)	8,000	Table L (mimeo)
- Urban (<10 ac-State only)	19,000	Table L (mimeo)
- Noncensus water (State only)	249,000	Table L (mimeo)
- Rural highways, roads, railroads (codes 810-60)	819,294	County base tape
- Federal land	26,943,333	County base tape
= Nonfederal land	64,502,772	

(Note: NRI point sample tape records 64,624,000 acres, 0.188% greater than 64,502,772 acres).

Nonfederal rural land available for agriculture:

Total land use*	64,624,000	Point sample tape
= Other land (farmsteads (code 400), other land (401), strip mines, etc (500), tundra, etc. (601-6), other roads (870)	1,447,000	Point sample tape
=	63,177,000	Point sample tape

*Row crops (tape codes 011-019, 010; closegrown (111-116); fallow (120); rotation hay/pasture (130); other hayland (131-132); other cropland (150, 160); pasture/range (241-243); forest (341-342).

Appendix 6 -- Double-cropping

Neither the Census nor SRS usually report double-cropping. A State-level estimate was made from Census data by subtracting total crops harvested (State table 25) from cropland harvested (State table 1). State SRS offices were contacted to determine which crops constituted the double-cropping. These acres were then subtracted from the land inventory.

State	Alfalfa	Other hay	Winter wheat	Dry beans	Sorghum	Soybeans	Vegetables
			1,000 acres				
Montana	134						
N. Dakota	336	17					
S. Dakota	340	11					
Wyoming	31						
Colorado			36	18	18		
Nebraska			116			116	
Kansas			216				
Oklahoma			59		29		
Texas			86		86		110

Appendix 7 -- Comparison of crop acres irrigated

There is considerable variation in estimates of crop acres irrigated among major data sources due to differences both in definitions and methods.

Comparison of irrigated area estimates

		48 States	Texas	Nebraska
			Million acres	
1977	National Resources Inventory	60.7	8.6	7.0
	Irrigation Journal	58.3	8.9	7.2
	State Surveys	N.A.	N.A.	6.4
1978	Agricultural Census	50.7	7.0	5.7
	Irrigation Journal	60.5	9.0	7.3
	State Surveys	N.A.	N.A.	6.7
1979	Census Farm & Ranch Survey	49.6	6.7	5.8
	Irrigation Journal	61.0	9.0	7.4
	State Surveys	N.A.	7.8	7.0

N.A. = Not Available

The Agricultural Census is the only nationally consistent source of county-level irrigated crop estimates. Its estimates are widely considered to be consistently low. A major reason may lie in attitudes of respondents who believe their responses will be used for tax purposes or to verify their receipts of Federal subsidies. The Census pays no attention to double-cropping.

The Census also conducts a Census of Irrigation Organizations every 10 years, but does not provide either county or crop detail. These censuses show more acreage irrigated than does the Agricultural Census. In 1979, a follow-on survey to the 1978 Agricultural Census, the 1979 Farm and Ranch Survey, developed crop detail but not at the county level.

The Irrigation Journal annually publishes State estimates of irrigated acres by crop. No attention is paid to double-cropping. Reliability cannot be determined since State experts independently develop their own definitions, methods, and estimates. In relation to total irrigated land estimates of the 1977 NRI, the journal estimates vary from 63 percent in Colorado to 168 percent in Utah, and from 100 percent of the 1974 Agricultural Census estimates for Arizona to 193 percent for Montana.

Several States obtain primary data but the periodicity of surveys, crops covered, and reliability vary. Some, for example Colorado and Kansas, survey irrigated acreage only with no crop detail. Each of the 17 Western States has an agreement with SRS to provide crop acreage and production estimates but SRS is mandated only at the State and national levels and not between irrigated and dryland. Depending on State interests, more or less detail is developed. Texas, for example, develops county estimates of irrigated (but not dryland) crop acres harvested on an annual basis for the High Plains counties and on a 5-year basis for all counties. Nebraska annually reports irrigated cropland and some irrigated crops.

The 1977 NRI provides only State irrigation estimates with attention to double-cropping. Only crop group data (for example row, close grown) are available. Reliability of even State estimates for area of an irrigated crop group is probably quite low. The NRI requires only that land be irrigated in any 3 of the years 1973-1977 to be considered irrigated. Waterspreading, common throughout the West, was not accounted for accurately.

Appendix 8 -- Current normal yield estimates, by major crop and resource area[1]

RA	Corn grain		Corn silage		Cotton		Grain sorghum		Soybeans		Winter wheat		
	I.	Ni.	I.	Ni.	I.	Ni.	I.	Ni.	I.	Ni.	I.	Nif.	Nic.
	Bu.		Ton		Lb.		Bu.		Bu.			Bu.	
1	-	-	16.1	-	-	-	-	-	-	-	-	30.0	-
2	-	-	16.6	-	-	-	-	-	-	-	-	28.0	-
3	-	-	-	5.2	-	-	-	-	-	-	-	-	-
4	112.3	58.2	-	6.7	-	-	-	-	-	23.2	-	-	-
5	110.0	50.0	13.7	5.5	-	-	-	43.0	-	20.0	-	20.4	-
6	106.0	-	11.5	7.3	-	-	-	36.0	-	-	-	22.9	-
7	94.9	-	16.2	-	-	-	-	-	-	-	-	23.3	-
8	112.1	-	17.0	-	-	-	-	49.0	33.0	28.0	-	32.8	-
9	116.7	52.0	18.5	-	-	-	83.7	64.4	39.8	35.0	-	37.0	31.1
10	119.2	-	20.1	-	-	-	72.0	22.8	-	-	44.6	26.2	19.9
11	116.9	-	15.3	-	-	-	82.6	33.5	33.8	18.0	43.3	32.4	-
12	111.8	52.7	14.6	5.5	-	-	88.2	44.8	35.0	24.0	41.3	34.4	30.1
13	-	65.3	-	-	-	280.8	-	32.7	-	20.0	-	-	32.2
14	110.6	43.1	14.5	-	533.8	256.1	74.0	25.9	-	18.0	39.4	27.7	28.9
15	108.0	-	-	-	370.5	192.2	74.0	24.6	-	-	40.5	-	12.6
16	114.0	-	16.8	-	371.8	253.0	73.4	27.9	33.0	-	36.9	23.0	18.7
17	110.0	40.0	-	-	540.0	396.2	65.0	40.5	27.0	-	32.2	-	16.1
18	-	51.1	-	-	694.2	253.2	66.3	42.6	-	18.5	-	-	30.2

	Spring wheat		Alfalfa		Other hay	
	Nif.	Nic.	I.	Ni.	I.	Ni.
	Bu.		Ton		Ton	
1	22.9	-	3.2	1.7	-	1.1
2	21.5	-	2.9	1.6	-	.9
3	22.2	16.3	3.4	1.8	-	1.0
4	26.9	24.5	3.4	1.8	-	1.2
5	17.7	17.1	3.5	1.9	-	1.3
6	17.3	15.9	3.0	1.6	-	.9
7	-	-	2.7	1.2	1.6	.7
8	-	-	4.1	1.5	-	.9
9	-	-	4.6	3.2	-	1.4
10	-	-	3.4	-	-	.6
11	-	-	4.5	-	-	.6
12	-	-	-	3.1	-	1.5
13	-	-	-	3.2	-	1.4
14	-	-	-	3.6	-	1.4
15	-	-	4.5	-	.9	-
16	-	-	4.9	-	-	1.2
17	-	-	-	-	-	1.0
18	-	-	-	2.4	-	1.3

[1]Abbreviations: I.-irrigated; Ni.-nonirrigated; Nif.-following summer fallow; Nic.-continuous, nonirrigated.

Appendix 9 -- Current normal major land use in the Great Plains and 10 States

State/ resource area[1]	Harvested cropland			Other cropland	Pasture/ range	Forest	Nonagri-cultural area
	Irrigated	Nonirrigated	Total				
	1,000 acres						
Montana:							
1 (N)	321	4,358	4,678	4,304	10,346	243	4,863
2 (S)	427	3,013	3,440	2,204	21,317	957	7,071
MT-0	517	636	1,152	1,102	8,171	5,141	19,010
Total	1,265	8,006	9,271	7,609	39,834	6,341	30,943
North Dakota:							
3 (W)	84	6,850	6,934	4,127	8,308	38	3,401
4 (CE)	77	13,030	13,108	4,487	2,036	328	2,461
Total	161	19,880	20,041	8,614	10,344	366	5,862
South Dakota:							
5 (EN)	136	5,632	5,768	1,959	6,738	0	1,538
6 (CW)	189	2,574	2,763	1,324	15,670	308	3,454
SD-0	109	5,926	6,035	1,460	1,030	22	1,241
Total	434	14,132	14,566	4,743	23,438	330	6,233
Wyoming:							
7 (E)	328	564	892	558	14,187	608	3,423
W-0	869	83	952	355	12,805	556	26,377
Total	1,197	646	1,843	913	26,992	1,164	29,800
Nebraska:							
8 (N)	1,004	2,493	3,497	1,151	14,273	113	1,047
9 (S)	4,227	4,185	8,412	2,844	6,269	185	1,300
N-0	1,116	5,635	6,752	1,589	803	146	1,044
Total	6,347	12,313	18,660	5,584	21,345	444	3,391
Colorado:							
10 (E)	1,673	3,041	4,714	3,677	13,869	410	2,147
C-0	1,097	491	1,588	970	10,941	2,933	24,859
Total	2,770	3,532	6,302	4,647	24,810	3,343	27,006
Kansas:							
11 (W)	1,796	2,981	4,778	3,289	3,016	8	526
12 (C)	1,118	10,856	11,974	5,779	9,896	242	2,132
K-0	48	4,587	4,636	1,472	2,849	538	1,452
Total	2,962	18,425	21,387	10,540	15,761	788	4,110
Oklahoma:							
13 (CE)	69	786	855	1,092	3,772	1,114	926
14 (W)	552	7,211	7,764	2,768	10,232	263	1,613
0-0	49	1,405	1,454	1,711	5,248	3,554	2,257
Total	670	9,402	10,072	5,570	19,252	4,931	4,797

See footnote at end of table

Appendix 9 -- Current normal major land use in the Great Plains and 10 States--Continued

State/resource area[1]	Harvested cropland			Other cropland	Pasture/range	Forest	Nonagricultural area
	Irrigated	Nonirrigated	Total				
	1,000 acres						
New Mexico:							
15 (E)	503	498	1,001	640	23,533	1,415	4,800
NM-0	319	34	354	360	18,620	2,011	24,990
Total	823	532	1,354	1,000	42,152	3,426	29,791
Texas:							
16 (HP)	5,231	7,085	12,315	6,492	28,006	0	2,500
17 (S)	935	1,761	2,696	2,464	35,454	0	2,988
18 (E)	150	4,136	4,286	4,858	14,288	38	3,915
T-0	835	2,387	3,222	4,252	25,954	9,202	8,003
Total	7,152	15,368	22,520	18,066	103,702	9,240	17,405
Great Plains:	18,821	81,054	99,875	54,015	240,652	6,270	451,900
10 States	23,780	102,238	126,018	67,286	326,516	30,373	711,708

[1]Resource areas ending in zero (for example, MT-0) are outside the Great Plains. Letters in parentheses after each of all other RAs indicate the State part: N = northern, S = southern, W = western, E = eastern, HP = High Plains.

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