A PRELIMINARY LOOK AT STATE RANKINGS FOR COVER CROP ACREAGE BASED ON CENSUS OF AGRICULTURE INFORMATION

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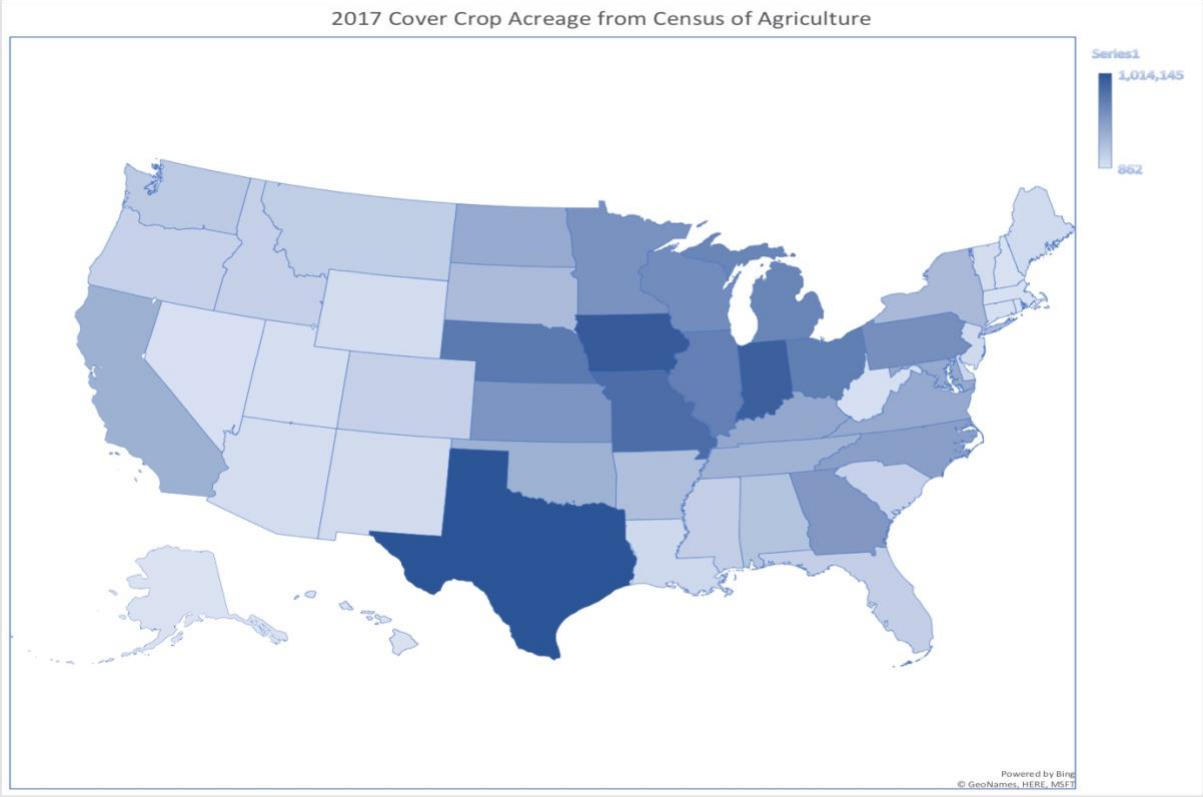

Figure 1. Map representation of the cover crop acres planted by state in 2017 based on Census of Agriculture data. Specific numbers for each state are shown in Table 1 below.

Table 1. Planted cover crop acres reported in the Census of Agriculture for 2017 and 2012, ranked by the 2017 acreage and showing percent increase for 2017 over 2012.

Rank	State	2017 Acres	2012 Acres	Percent Increase
1	Texas	1,014,145	911,061	11.3%
2	Iowa	973,112	379,614	156.3%
3	Indiana	936,118	596,062	57.1%
4	Missouri	842,178	390,114	115.9%
5	Nebraska	747,903	357,264	109.3%
6	Ohio	717,759	357,292	100.9%
7	Illinois	708,105	318,636	122.2%
8	Michigan	673,205	437,200	54.0%
9	Wisconsin	611,231	553,005	10.5%
10	Pennsylvania	595,309	446,295	33.4%

11	Minnesota	579,147	408,190	41.9%
12	Kansas	556,439	322,454	72.6%
13	Georgia	530,888	370,137	43.4%
14	North Carolina	482,934	393,002	22.9%
15	Kentucky	417,284	353,831	17.9%
16	Maryland	410,849	327,689	25.4%
17	Virginia	409,862	301,959	35.7%
18	North Dakota	404,267	213,810	89.1%
19	California	350,436	340,532	2.9%
20	Oklahoma	342,564	227,541	50.6%
21	Tennessee	340,525	183,638	85.4%
22	New York	295,433	215,297	37.2%
23	South Dakota	281,649	149,383	88.5%
24	Arkansas	250,274	136,859	82.9%
25	Alabama	229,097	199,215	15.0%
26	Washington	175,909	178,401	-1.4%
27	Montana	151,523	128,183	18.2%
28	Florida	141,848	137,830	2.9%
29	Mississippi	139,639	66,069	111.4%
30	Colorado	129,820	126,293	2.8%
31	Idaho	128,963	103,467	24.6%
32	South Carolina	120,511	78,705	53.1%
33	Oregon	120,390	92,796	29.7%
34	Delaware	88,122	70,126	25.7%
35	Louisiana	72,646	59,206	22.7%
36	New Jersey	63,607	50,893	25.0%
37	Maine	55,462	29,379	88.8%
38	New Mexico	53,617	72,241	-25.8%
39	Wyoming	40,725	46,298	-12.0%
40	Vermont	40,555	20,120	101.6%
41	Arizona	39,518	17,704	123.2%
42	Utah	32,273	30,283	6.6%
43	West Virginia	22,417	16,747	33.9%
44	Connecticut	21,998	20,453	7.6%
45	Massachusetts	17,390	17,085	1.8%
46	Nevada	13,999	10,526	33.0%
47	New Hampshire	8,326	5,025	65.7%
48	Hawaii	7,533	7,021	7.3%
49	Rhode Island	2,308	2,537	-9.0%
50	Alaska	862	3,325	-74.1%

Table 2. Ranking of states based on percent increase in cover crop acres from 2012 to 2017 based on Census of Agriculture data.

Rank	State	Percent Increase
1	Iowa	156.3%
2	Arizona	123.2%
3	Illinois	122.2%
4	Missouri	115.9%
5	Mississippi	111.4%
6	Nebraska	109.3%
7	Vermont	101.6%
8	Ohio	100.9%
9	North Dakota	89.1%
10	Maine	88.8%
11	South Dakota	88.5%
12	Tennessee	85.4%
13	Arkansas	82.9%
14	Kansas	72.6%
15	New Hampshire	65.7%
16	Indiana	57.1%
17	Michigan	54.0%
18	South Carolina	53.1%
19	Oklahoma	50.6%
20	Georgia	43.4%
21	Minnesota	41.9%
22	New York	37.2%
23	Virginia	35.7%
24	West Virginia	33.9%
25	Pennsylvania	33.4%
26	Nevada	33.0%
27	Oregon	29.7%
28	Delaware	25.7%
29	Maryland	25.4%
30	New Jersey	25.0%
31	Idaho	24.6%
32	North Carolina	22.9%
33	Louisiana	22.7%
34	Montana	18.2%
35	Kentucky	17.9%
36	Alabama	15.0%
37	Texas	11.3%
38	Wisconsin	10.5%
39	Connecticut	7.6%
40	Hawaii	7.3%
41	Utah	6.6%
42	Florida	2.9%
43	California	2.9%
44	Colorado	2.8%
45	Massachusetts	1.8%
46	Washington	-1.4%
47	Rhode Island	-9.0%
48	Wyoming	-12.0%
49	New Mexico	-25.8%
50	Alaska	-74.1%

Table 3. Percent of corn, soybean and cotton acres in relation to cover crop acres by state in 2017 based on Census of Agriculture data. Commodity acres shown are acres harvested (does not include corn silage). Only states with significant acres of corn, soybeans, and/or cotton are shown; if a table cell is blank, the Census did not report data for that commodity in that state. Note that in most states, cover crops are likely planted on some fields that have other crops besides corn, soybeans or cotton, so percent of "commodity acres" is just an approximate evaluation of cover crops on commodity acres.

State	Corn Acres	Soybean Acres	Cotton Acres	Combined acres of corn, beans, & cotton	Cover crop acres in 2017	Percent of commodity acres with cover crops
Maryland*	439,538	512,697		952,235	410,849	43.1%
Virginia	378,073	600,310	87,242	1,065,625	409,862	38.5%
Pennsylvania	949,375	650,111		1,599,486	595,309	37.2%
New York	524,481	282,453		806,934	295,433	36.6%
West Virginia	35,322	25,984		61,306	22,417	36.6%
New jersey	74,795	104,411		179,206	63,607	35.5%
Georgia	259,315	150,222	1,270,652	1,680,189	530,888	31.6%
Delaware	187,963	178,342		366,305	88,122	24.1%
Oklahoma	301,070	638,816	552,521	1,492,407	342,564	23.0%
Alabama	243820	347,037	431,089	1,021,946	229,097	22.4%
Arizona	30,526		182,175	212,701	39,518	18.6%
North Carolina	843,969	1,740,536	368,821	2,953,326	482,934	16.4%
Michigan	2,168,204	2,487,343		4,655,547	673,205	14.5%
Kentucky	1,255,146	1,886,601		3,141,747	417,284	13.3%
Tennessee	716,733	1,643,153	343,114	2,703,000	340,525	12.6%
Texas	2,212,502	181,579	5,778,244	8,172,325	1,014,145	12.4%
South Carolina	337,849	390,234	248,887	976,970	120,511	12.3%
Wisconsin	3,074,502	2,214,985		5,289,487	611,231	11.6%
Colorado	1,306,283	18,989		1,325,272	129,820	9.8%
Missouri	3,365,392	5,868,690	304,196	9,538,278	842,178	8.8%
Ohio	3,286,205	5,090,532		8,376,737	717,759	8.6%

Indiana	5,402,922	5,981,372		11,384,294	936,118	8.2%
Arkansas	594,773	3,498,157	439,582	4,532,512	250,274	5.5%
Kansas	5,232,355	5,120,305		10,352,660	556,439	5.4%
Nebraska	9,455,031	5,664,225		15,119,256	747,903	4.9%
Iowa	12,969,645	9,949,724		22,919,369	973,112	4.2%
Mississippi	499,944	2,170,472	627,212	3,297,628	139,639	4.2%
North Dakota	3,276,548	7,085,740		10,362,288	404,267	3.9%
Louisiana	488,581	1,250,093	216,670	1,955,344	72,646	3.7%
Minnesota	7,790,541	8,142,472		15,933,013	579,147	3.6%
Illinois	11,080,510	10,607,911		21,688,421	708,105	3.3%
South Dakota	5,274,250	5,631,742		10,905,992	281,649	2.6%

*The Maryland Department of Agriculture has reported cover crop acreage of over 500,000 acres per year in recent years, which would make the percent of cropland in covers over 50%.

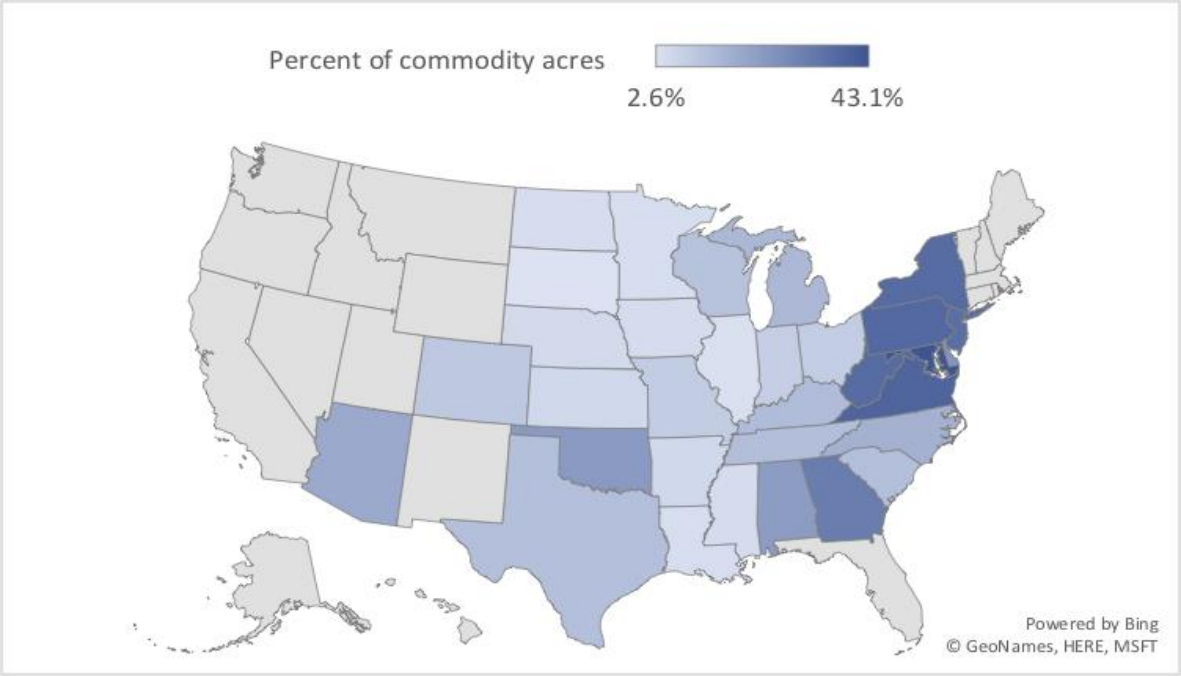

Figure 2. Map representation of the data from Table 3 above, showing percent of corn, soybean and cotton acres planted to cover crops in 2017 based on Census of Agriculture data. Note that only states with significant acreage of those three commodities were plotted. It's also important to note that in most of these states, cover crops are likely planted on some fields that have crops other than corn, soybeans, or cotton, such as small grains, sorghum, vegetables, vineyards, orchards, or other crops.

A few interpretative notes on the data presented above

The above tables and figures are an initial "hot off the press" look at data on cover crop acres from the Census of Agriculture. I expect to do further analysis of this data and related information in the coming weeks, and will send out an updated and more complete evaluation of cover crop acres by mid-summer. If you don't receive that update this summer, please email me at myersrob@missouri.edu and I'll send you a copy.

From looking at both the new Census of Agriculture data and study the earlier 2012 Census of Agriculture data, in combination with national SARE/CTIC data, there are a few preliminary conclusions I can make.

1) The overall increase of cover crop acreage from 2012 to 2017 is 49.7%. That works out to an annual growth rate of about 8.4% compounded annually. If we kept on that exact growth rate we'd get to 19.6 million acres in 2020, hit 25 million acres in 2023, and 40 million acres in 2029. I actually believe that we could end up beating that projected growth rate. For evidence, I'd point to several of the big Corn Belt states that more than doubled their cover crop acres in the last 5 years.

2) More analysis is needed to determine how accurate the Census reporting of cover crop acres is. I believe in most states it's probably pretty good, and it's certainly the most complete set of numbers we have for U.S. cover crop acreage. However, by other measures, in some of the states where cover crop acres have been tracked closely, the Census numbers are a little on the low side, such as a detailed Indiana transect that reported 970,000 acres of covers vs. 936,118 acres in the Census. An even bigger disparity is in Maryland, where the Maryland Department of Agriculture routinely reports over 500,000 acres versus 410,849 by the Census. I'd attribute part of this to a lack of explanation in the Census for what a cover crop is. The Census simply asks "How many acres of cover crops did you plant?" without defining what should be counted as a cover crop. Some farmers have also been cautious about reporting cover crop acres for fear of it affecting their crop insurance eligibility (cover crop use does not prevent farmers from getting crop insurance, but it's a misperception that's out there).

3) People often comment that "I don't see many cover crops in my area." In typing up all this data, it really struck me just how widespread cover crop use is across the country, even in many of the drier western states. However, it's true that national cover crop acreage is still well below where most of us would like it to be. There were 320 million acres of "cropland" reported in the 2017 Census of Agriculture. If you take out land used for hay production, that leaves 263 million acres of non-hay crops, most of which in theory could have a cover crop associated with them (winter cereals, however, are by their nature not used with winter annual cover crops). Even if about 33 million acres of winter wheat is removed from the baseline of cropland that could be cover cropped, leaving 230 million acres, the 15.4 million acres of cover crops represents only 6.7% of that 230 million acres. On the positive side, we are making progress. Ten states have cover crop acreage equivalent to 20% or more of their corn, soybean, and cotton acreage (arguably the three biggest commodities

used with covers), and 6 states have the equivalent of over 35% of the acreage of that commodity area planted in cover crops (some caution is called for in using these calculations due to use of cover crops with other cash crops in those states, but in most of the relevant states, that other cash crop acreage would be minor). Bottomline, it is feasible to get cover crops on a third or more of commodity cropland.

4) It's notable that some states more than doubled their cover crop acreage and others had only minor changes in cover crop use in five years. I hope to do some further analysis of why this is the case. Probably multiple factors are involved, including cropping systems, extent of education and cover crop incentive programs, and other factors. I also found it interesting that percent change in number of farm operations using cover crops did not appear to be highly correlated with percent change in cover crop acreage. Overall, growth in acreage (49.7%) exceeded the growth in number of farm operations using cover crops (15.2%). This indicates that farmers using cover crops in 2012 were increasing their acreage of cover crops even faster than new farms were starting to adopt them, a trend that fits with SARE/CTIC survey data.

Census of Agriculture data can be found at: https://www.nass.usda.gov/AgCensus/

The SARE/CTIC survey data for five years of national surveys can be found at: https://www.sare.org/Learning-Center/Topic-Rooms/Cover-Crops/Cover-Crop-Surveys