COOPERATIVE EXTENSION

College of Agriculture, Forestry and Life Sciences

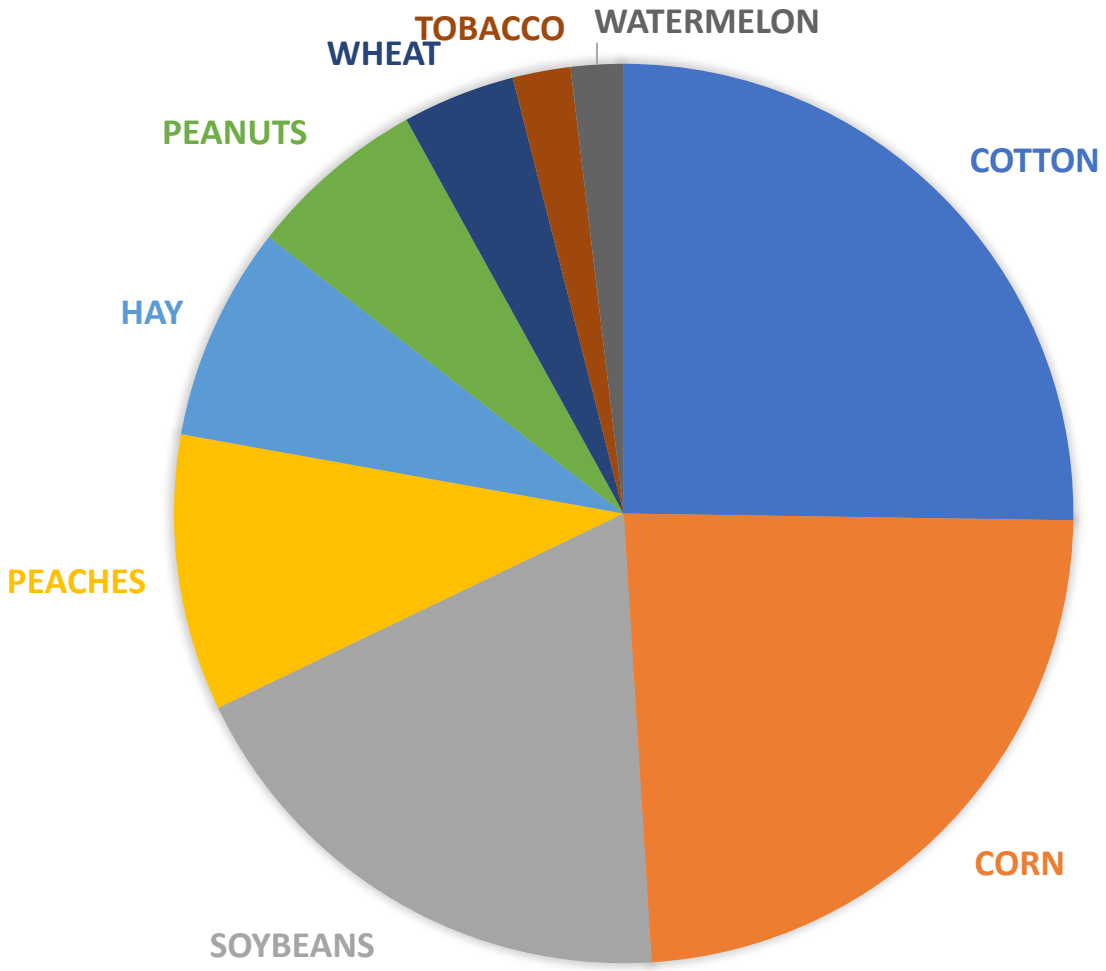
PEE DEE RIVER BASIN AGRICULTURE OVERVIEW

Dr. Nathan Smith & Trey Buckelew

South Carolina Agriculture

- 2017 Ag Census counted 24,600 farms on 4.8 million acres of farmland.
- Poultry is the top commodity in cash value, chickens, eggs and turkey totaling over billion in production value. Beef, dairy, swine, horses, aquaculture, goats, bees, and specialty animals are all vitally important to South Carolina agriculture.
- The state's fruits and vegetables are a big part of the state's agricultural production with leafy greens, tomatoes and watermelon leading rankings and South Carolina peaches ranked 2nd nationally. The diversity of the state's produce revenues is growing.
- Field crops including corn, cotton, soybeans, peanuts, tobacco and wheat are grown on over 1.3 million acres.
- The state's green industry including ornamental horticulture, floriculture, nursery, and turf grass ranks 2nd as South Carolina's second largest agricultural industry cluster in cash value.

SC MAJOR CROPS BY VALUE OF PRODUCTION, 2022



COTTON	$285,639,000
CORN	$269,010,000
SOYBEANS	$213,564,000
PEACHES	$112,480,000
HAY	$87,318,000
PEANUTS	$72,828,000
WHEAT	$45,885,000
TOBACCO	$23,548,000
WATERMELON	$21,376,000

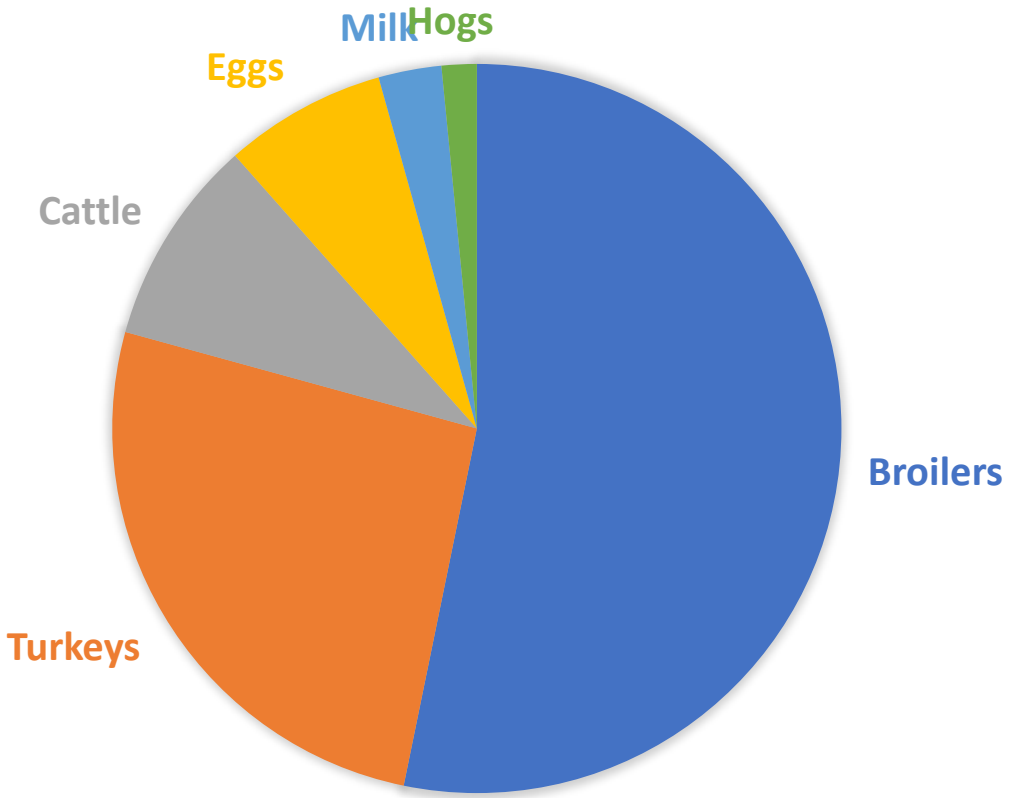
Source: USDA National Agricultural Statistics Service, (Peaches Value estimated using previous 2 years price)

SC FARM & LIVESTOCK OVERVIEW

Farms Operations†	
Farm Operations - Area Operated, Measured in Acres / Operation	195
Farm Operations - Number of Operations	24,600
Farm Operations - Acres Operated	4,800,000
Livestock Inventory †	
Cattle, Cows, Beef - Inventory (First of Jan. 2023)	159,000
Cattle, Cows, Milk - Inventory (First of Jan. 2023)	9,000
Cattle, Incl Calves - Inventory (First of Jan. 2023)	315,000
Goats, Meat & Other - Inventory (First of Jan. 2023)	33,000
Goats, Milk - Inventory (First of Jan. 2023)	3,200
Hogs - Inventory (First of Dec. 2022)	158,000
Chickens, Broilers - Production, Measured in Head (2020)	243,500,000
Turkeys - Production, Measured in Head* (2020)	11,000,000
Milk Production †	
Milk - Production, Measured in Lb / Head	17,8890
Milk - Production, Measured in Lb	161,000,000

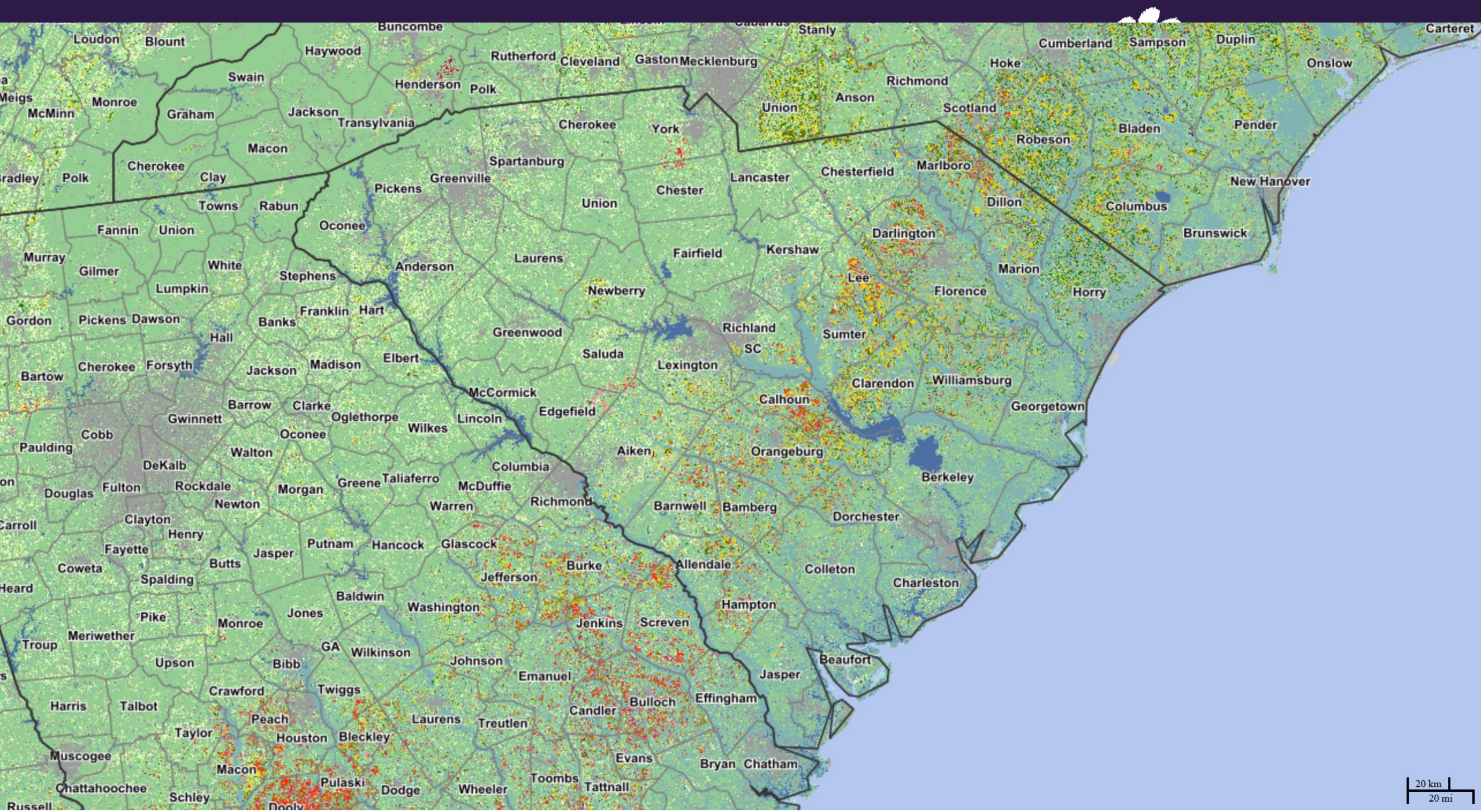
NASS estimates, *Non-NASS estimate

SC LIVESTOCK BY VALUE, 2021



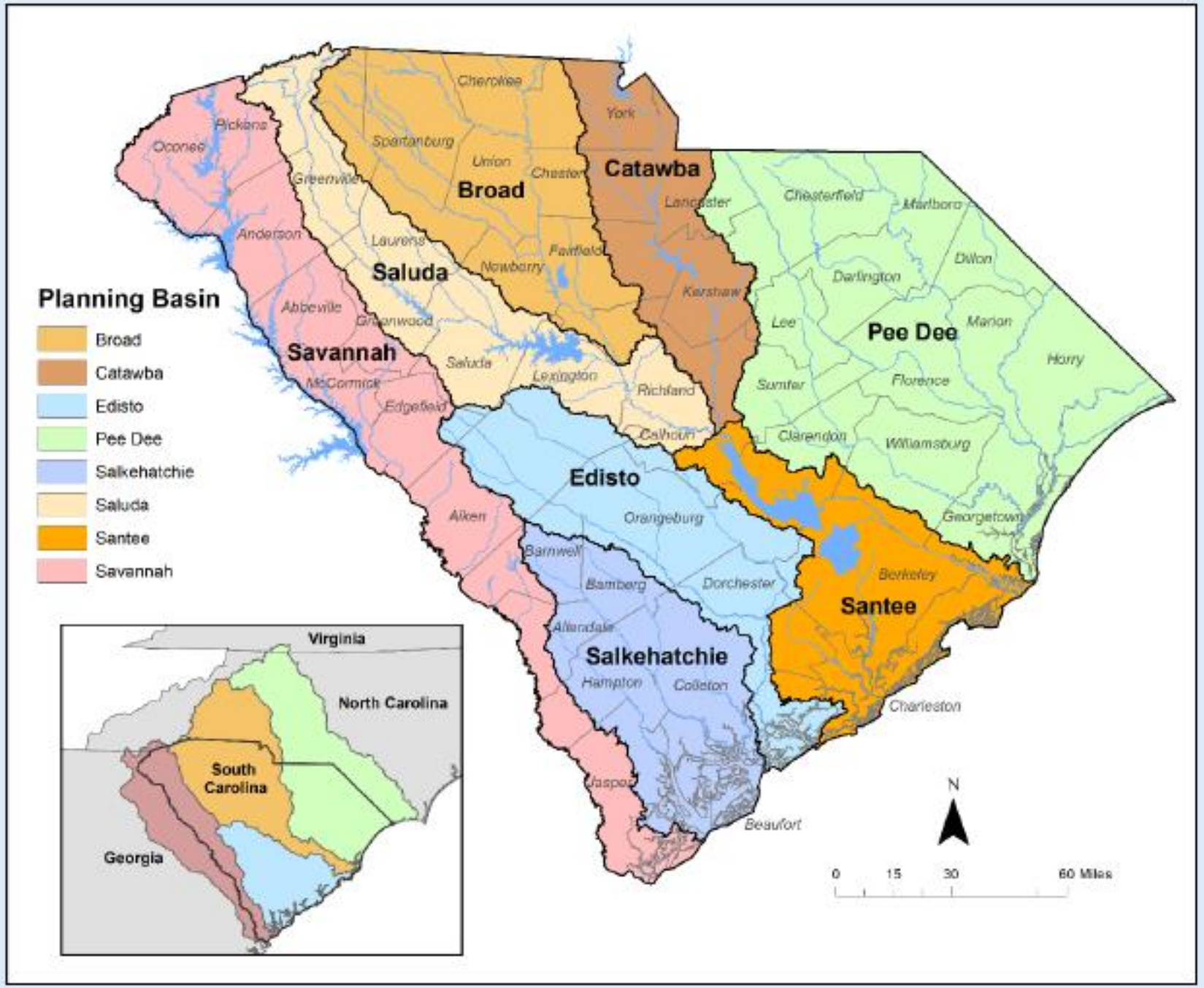
Broilers	$1,008,353,000
Turkeys	$500,000,000
Cattle	$123,954,000
Eggs	$92,559,000
Milk	$35,512,000
Hogs	$23,128,000

Source: USDA National Agricultural Statistics Service, (Turkeys estimated by Nathan Smith, Clemson University)


Buncombe
Loudon
Blount
Haywood
Rutherford
Cleveland
Gaston
Mecklenburg
Stanly
Cumberland
Sampson
Duplin
Carteret
Onslow
Hoke
Richmond
Anson
Union
Scotland
Swain
Henderson
Polk
Monroe
McMinn
Graham
Jackson
Transylvania
Cherokee
York
Bladen
Pender
Robeson
Macon
Spartanburg
Chesterfield
Marlboro
Clay
Greenville
Lancaster
New Hanover
Pickens
Chester
Towns
Rabun
Union
Dillon
Columbus
Oconee
Darlington
Brunswick
Fannin
Union
Fairfield
Kershaw
Murray
Gilmer
White
Stephens
Anderson
Laurens
Marion
Lee
Lumpkin
Newberry
Florence
Horry
Franklin
Hart
Gordon
Pickens
Dawson
Banks
Greenwood
Richland
Sumter
Hall
SC
Saluda
Elbert
Bartow
Cherokee
Forsyth
Jackson
Madison
Lexington
Clarendon
Williamsburg
McCormick
Calhoun
Barrow
Clarke
Edgefield
Georgetown
Gwinnett
Oglethorpe
Lincoln
Wilkes
Cobb
Oconee
Paulding
Aiken
Orangeburg
Walton
DeKalb
Columbia
Berkeley
Taliaferro
Greene
Douglas
Fulton
Rockdale
Morgan
McDuffie
Newton
Warren
Richmond
Barnwell
Bamberg
Dorchester
Clayton
Carroll
Henry
Fayette
Putnam
Hancock
Glascock
Jasper
Coweta
Butts
Burke
Allendale
Colleton
Spalding
Jefferson
Charleston
Heard
Baldwin
Washington
Hampton
Pike
Jones
Jenkins
Screven
Monroe
Meriwether
Troup
GA
Wilkinson
Johnson
Beaufort
Upson
Bibb
Emanuel
Jasper
Crawford
Twiggs
Effingham
Harris
Talbot
Bulloch
Candler
Peach
Laurens
Treutlen
Taylor
Houston
Bleckley
Muscogee
Evans
Bryan
Chatham
Macon
Toombs
Chattahoochee
Pulaski
Dodge
Wheeler
Tattnall
Schley
Russell
Dooly
20 km
20 mi

Forestry

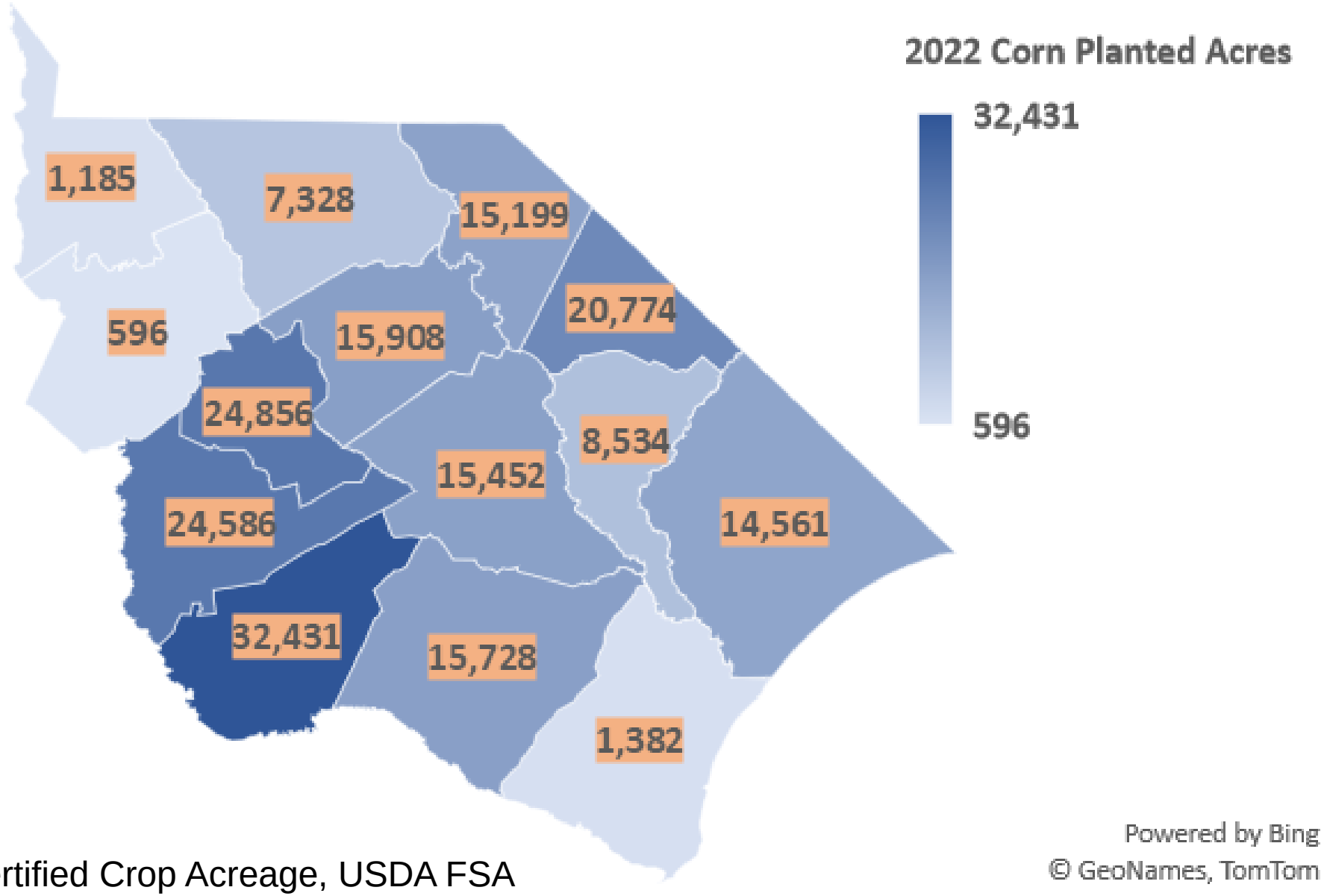
- Forestland makes up nearly 70% of the state's total land area.
- Private owners hold a combined 88% of the state's timberland area with private individuals controlling over half of those acres.
- Forestry is #1 among manufacturing industries in the state with a total economic impact of around $17 billion annually.
- South Carolina exports $1.4 billion in forest products each year. Timber is the state's #1 renewable commodity at $759 million annually.


Planning Basin
Broad
Catawba
Edisto
Pee Dee
Salkehatchie
Saluda
Santee
Savannah
Broad
Catawba
Saluda
Savannah
Edisto
Pee Dee
Santee
Salkehatchie
Cherokee
York
Spartanburg
Union
Chester
Greenville
Pickens
Oconee
Anderson
Laurens
Fairfield
Newberry
Lancaster
Chesterfield
Marlboro
Dillon
Darlington
Kershaw
Lee
Marion
Horry
Florence
Sumter
Clarendon
Williamsburg
Georgetown
Abbeville
Greenwood
McCormick
Edgefield
Saluda
Lexington
Richland
Calhoun
Aiken
Orangeburg
Barnwell
Bamberg
Dorchester
Berkeley
Allendale
Hampton
Colleton
Charleston
Jasper
Beaufort
Virginia
North Carolina
South Carolina
Georgia
N
0
15
30
60 Miles

Pee Dee River Basin Area of Interest

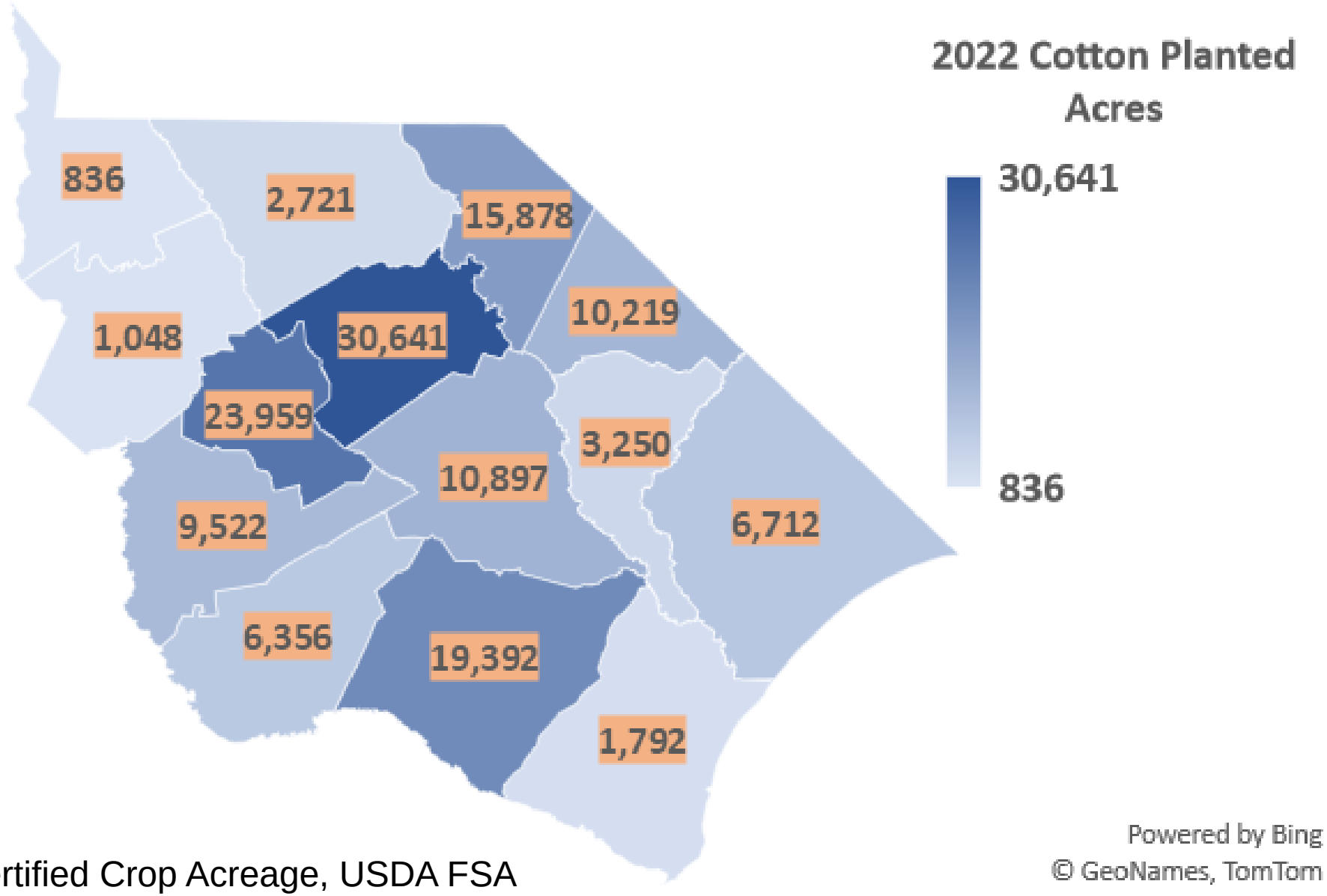
Source: 2022 CropScape, USDA NASS

2022 Corn Planted Acres from FSA



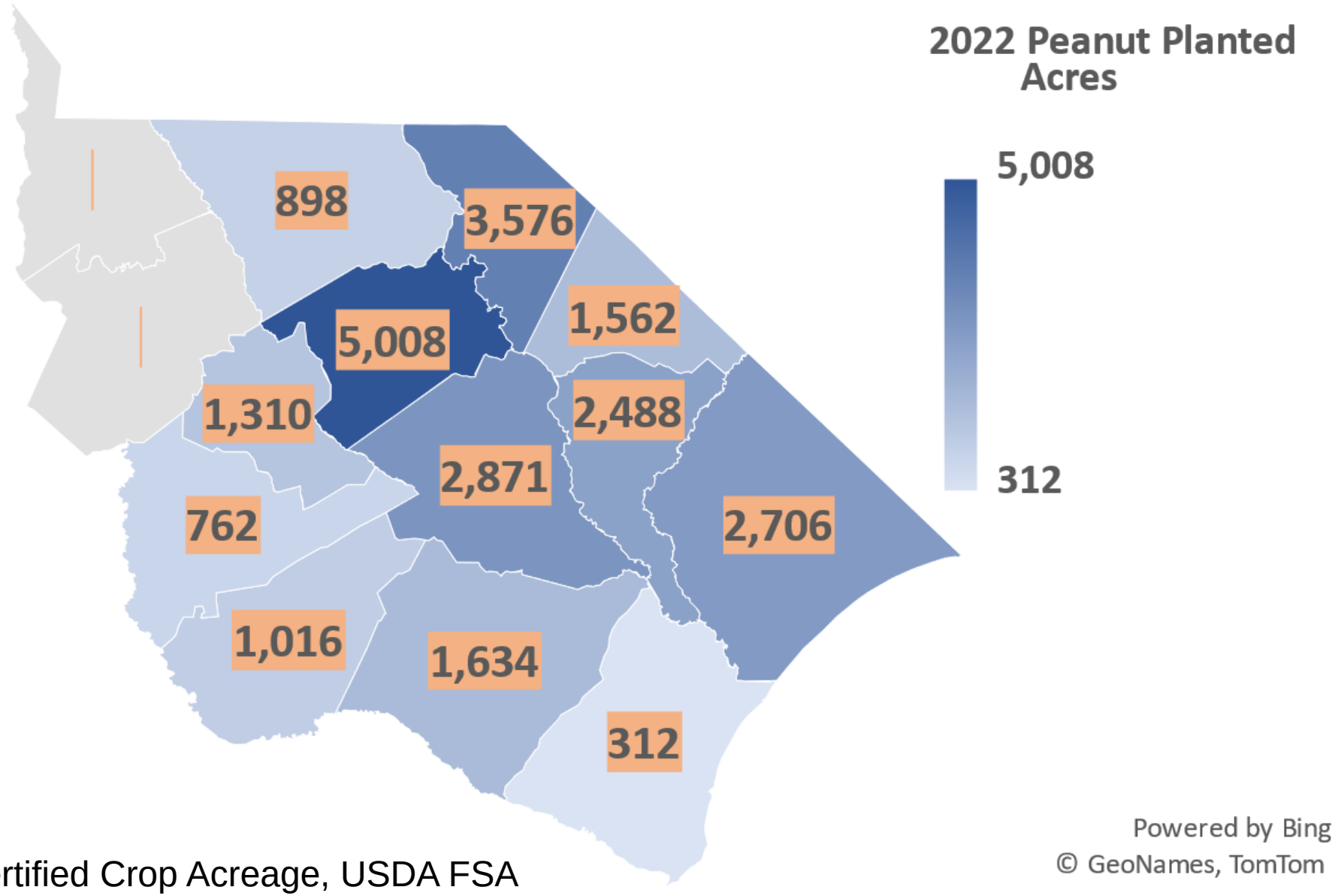
Source: 2022 Certified Crop Acreage, USDA FSA

2022 Cotton Planted Acres from FSA



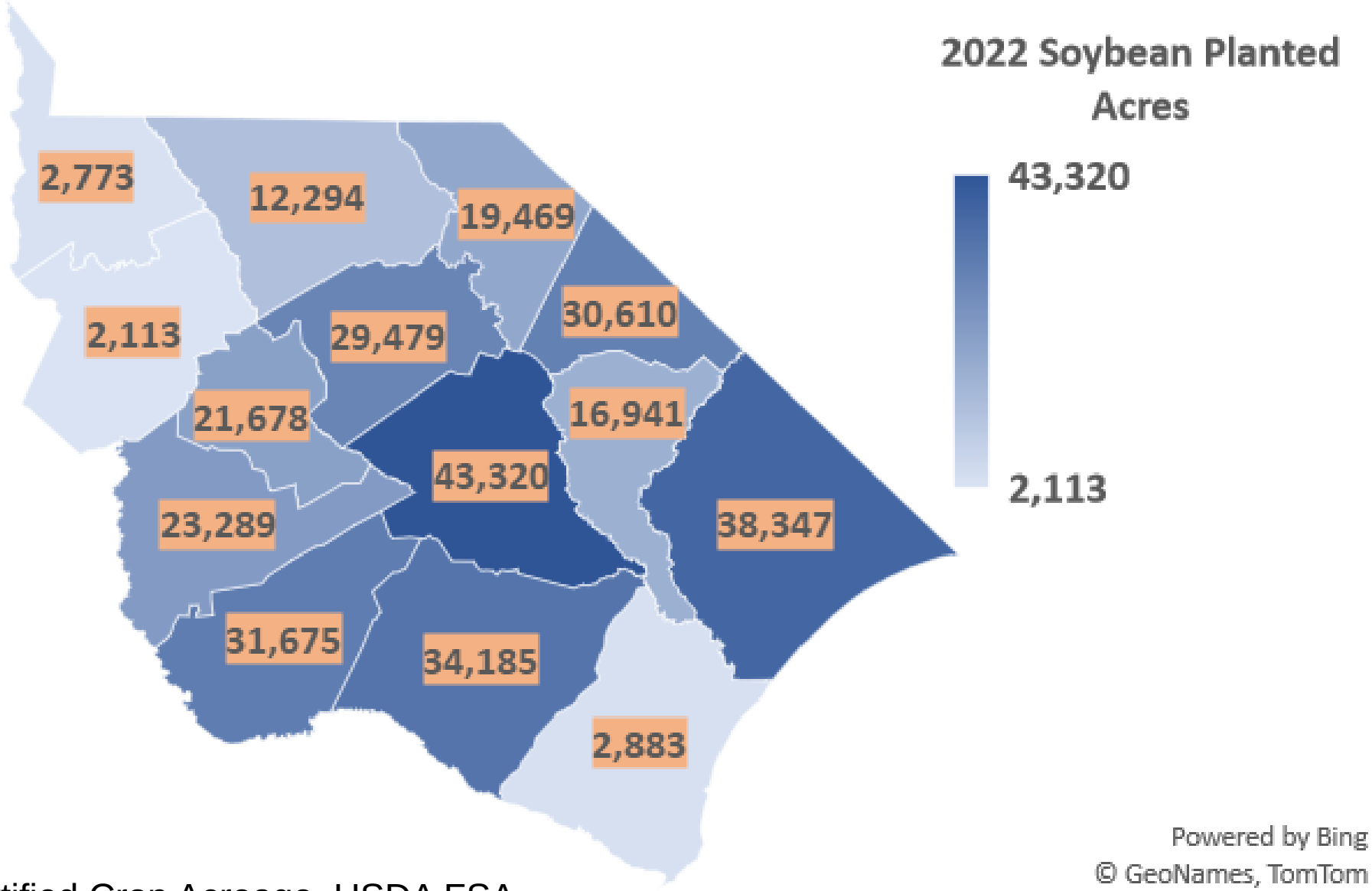
Source: 2022 Certified Crop Acreage, USDA FSA

2022 Peanut Planted Acres from FSA



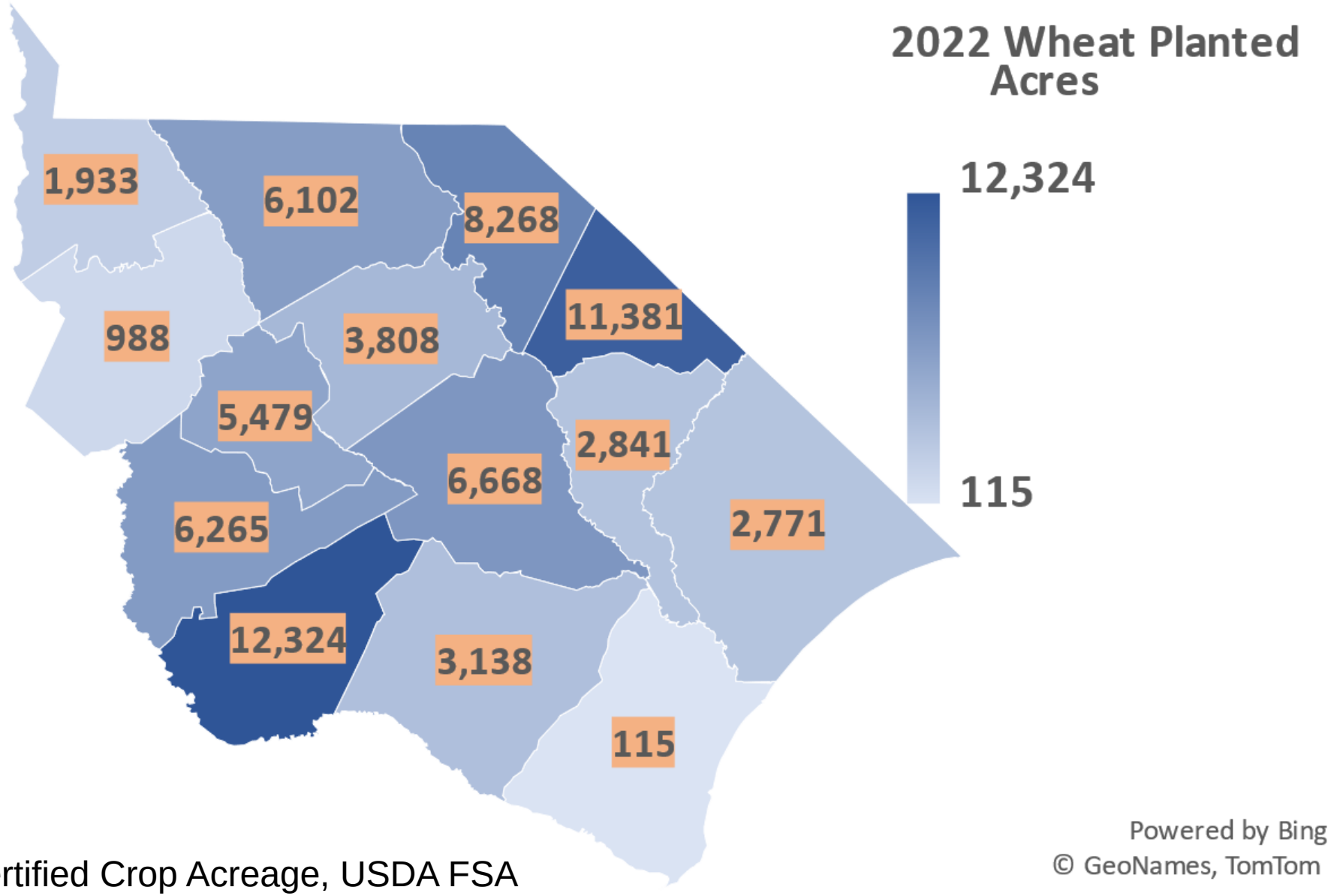
Source: 2022 Certified Crop Acreage, USDA FSA

2022 Soybean Planted Acres from FSA



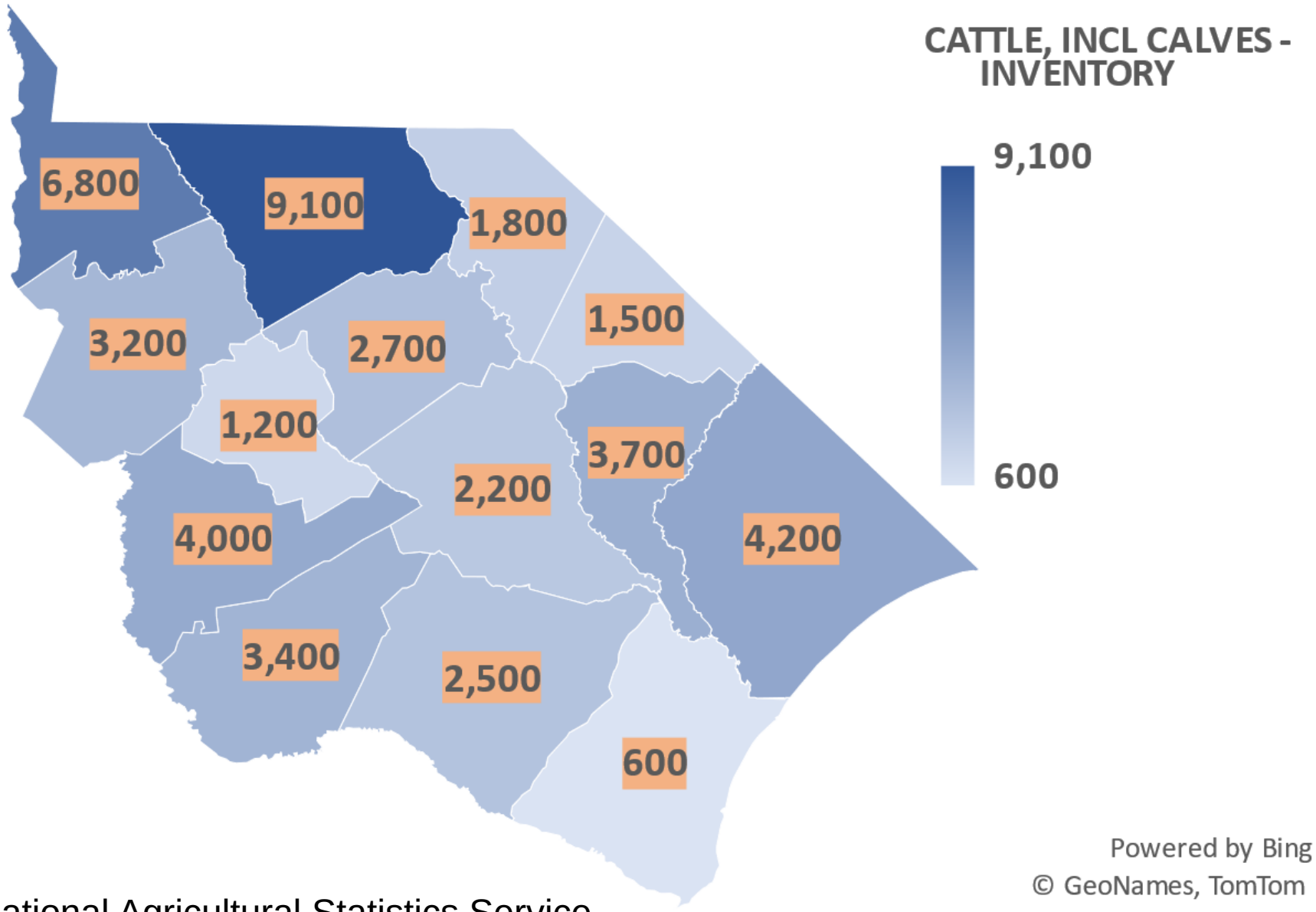
Source: 2022 Certified Crop Acreage, USDA FSA

2022 Wheat Planted Acres from FSA



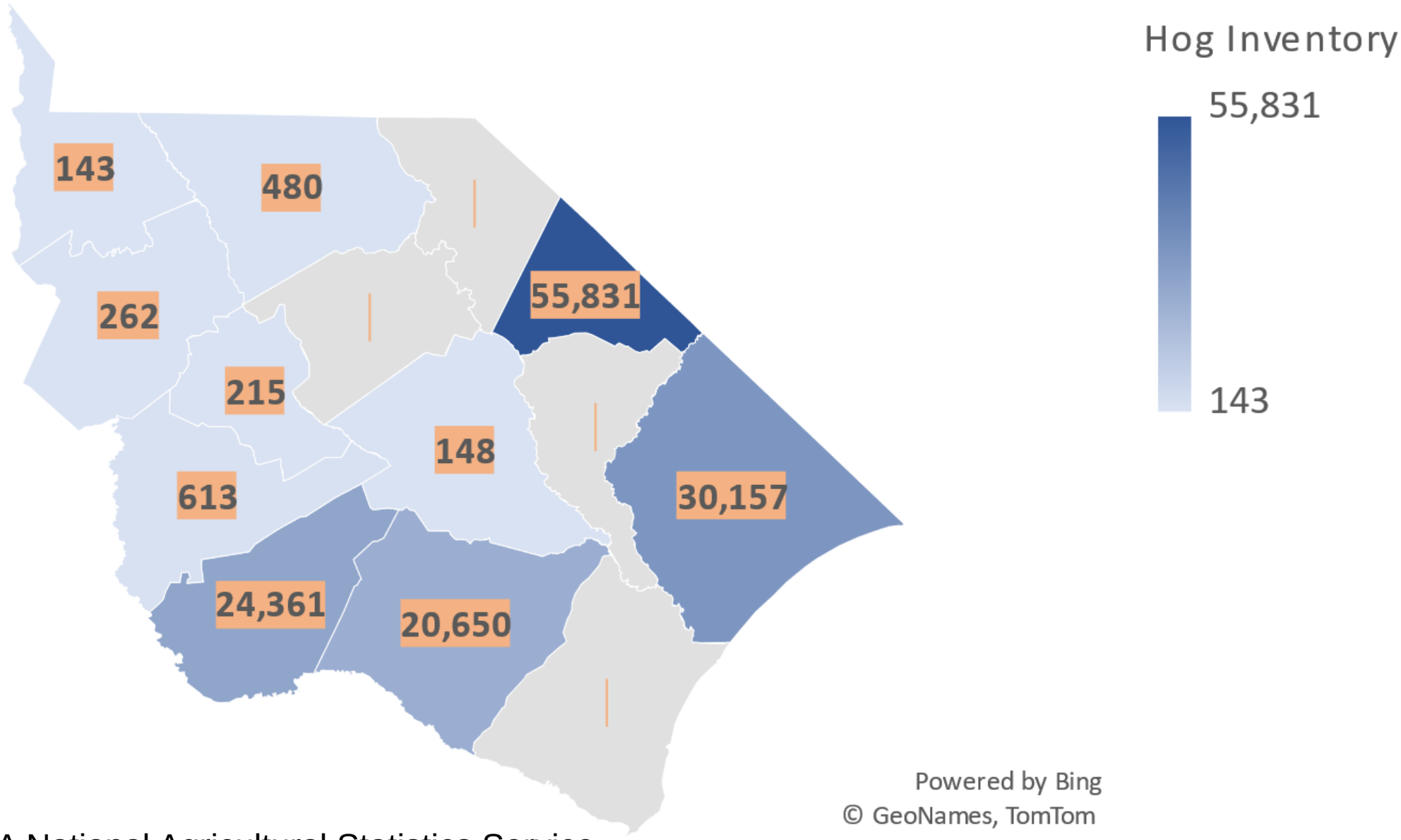
Source: 2022 Certified Crop Acreage, USDA FSA

2022 Cattle Inventory, Including Calves, from NASS



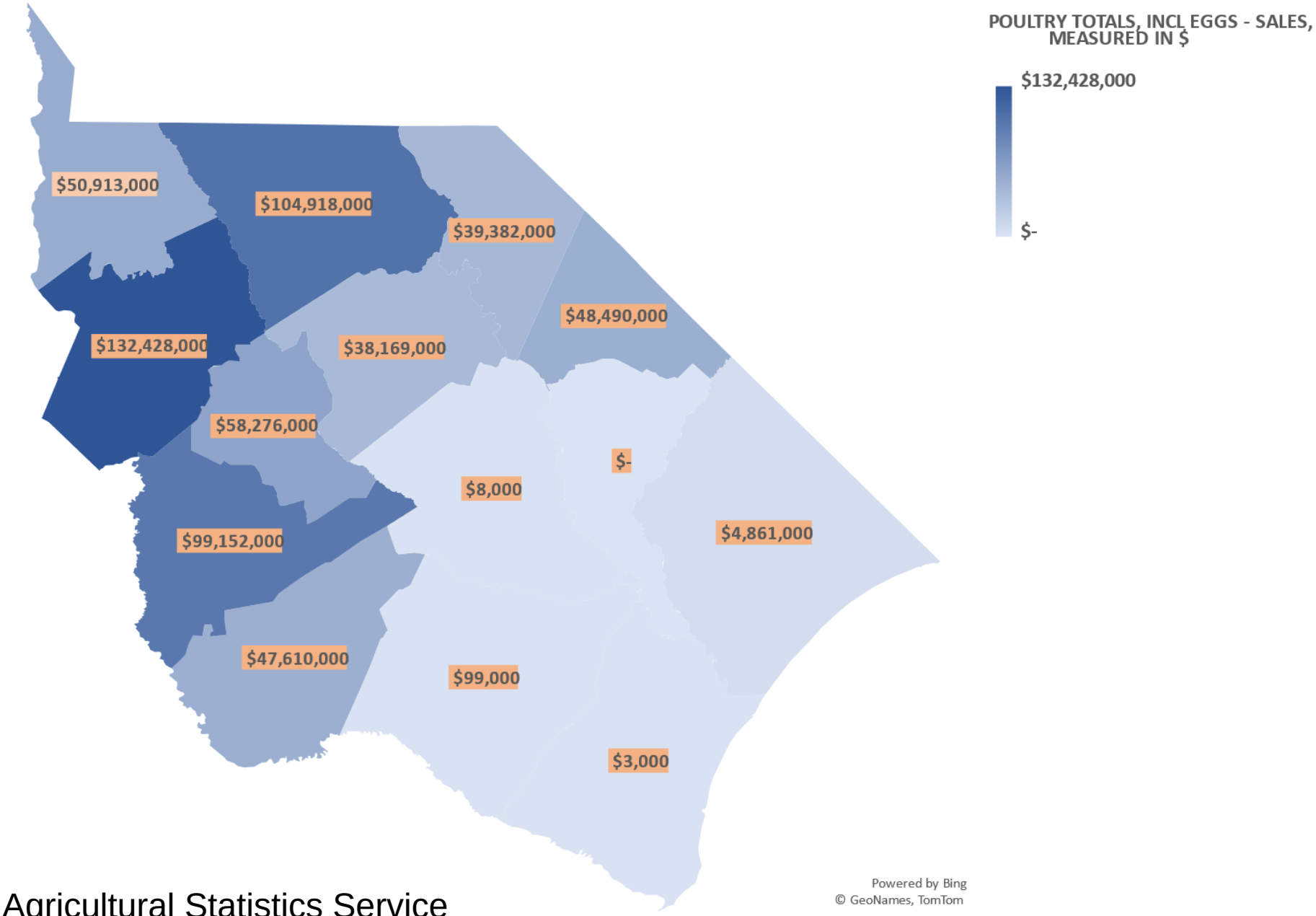
Source: USDA National Agricultural Statistics Service

2017 Hog Inventory from NASS



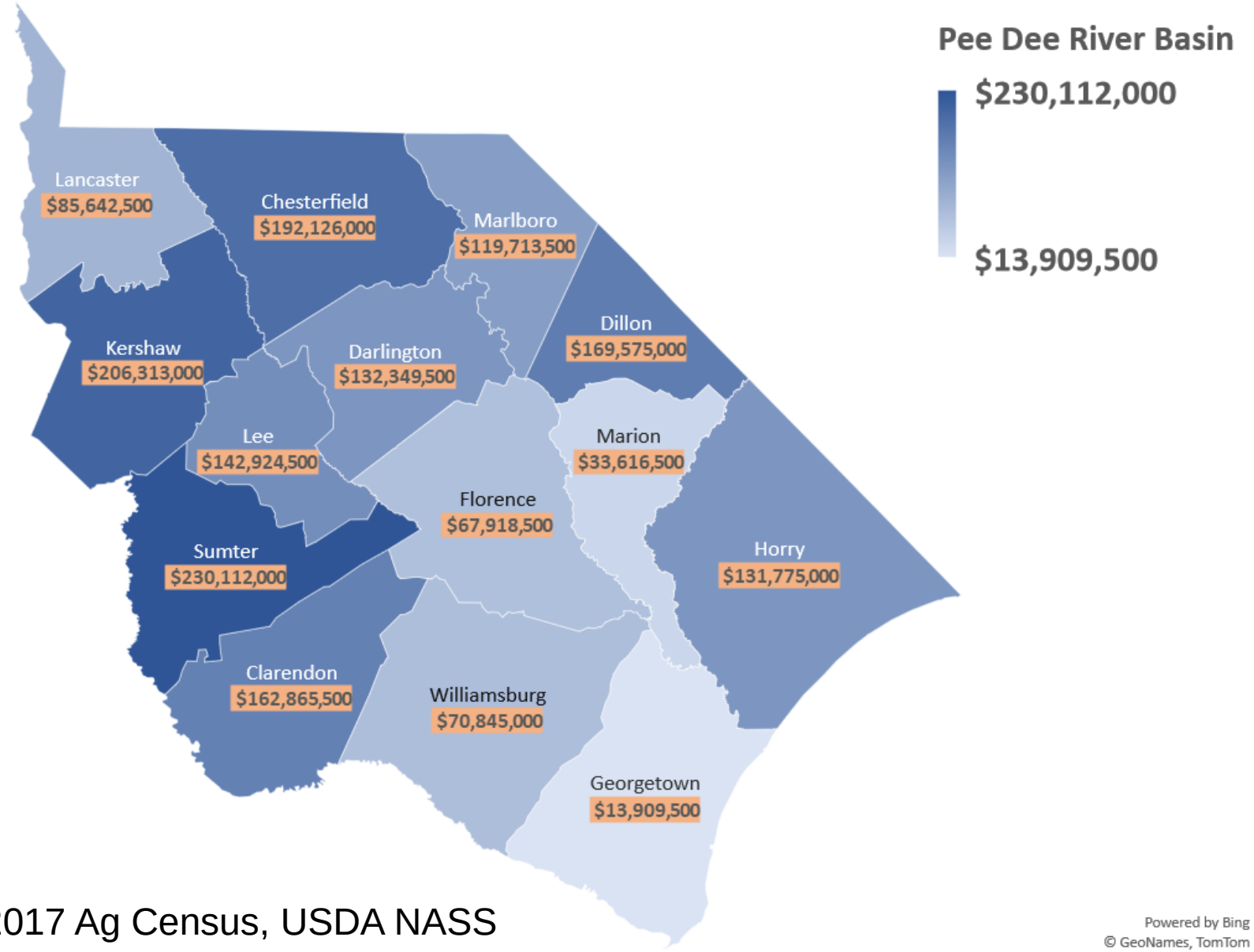
Source: USDA National Agricultural Statistics Service

2017 Poultry Sales, Including Eggs, in $ from NASS



Source: USDA National Agricultural Statistics Service

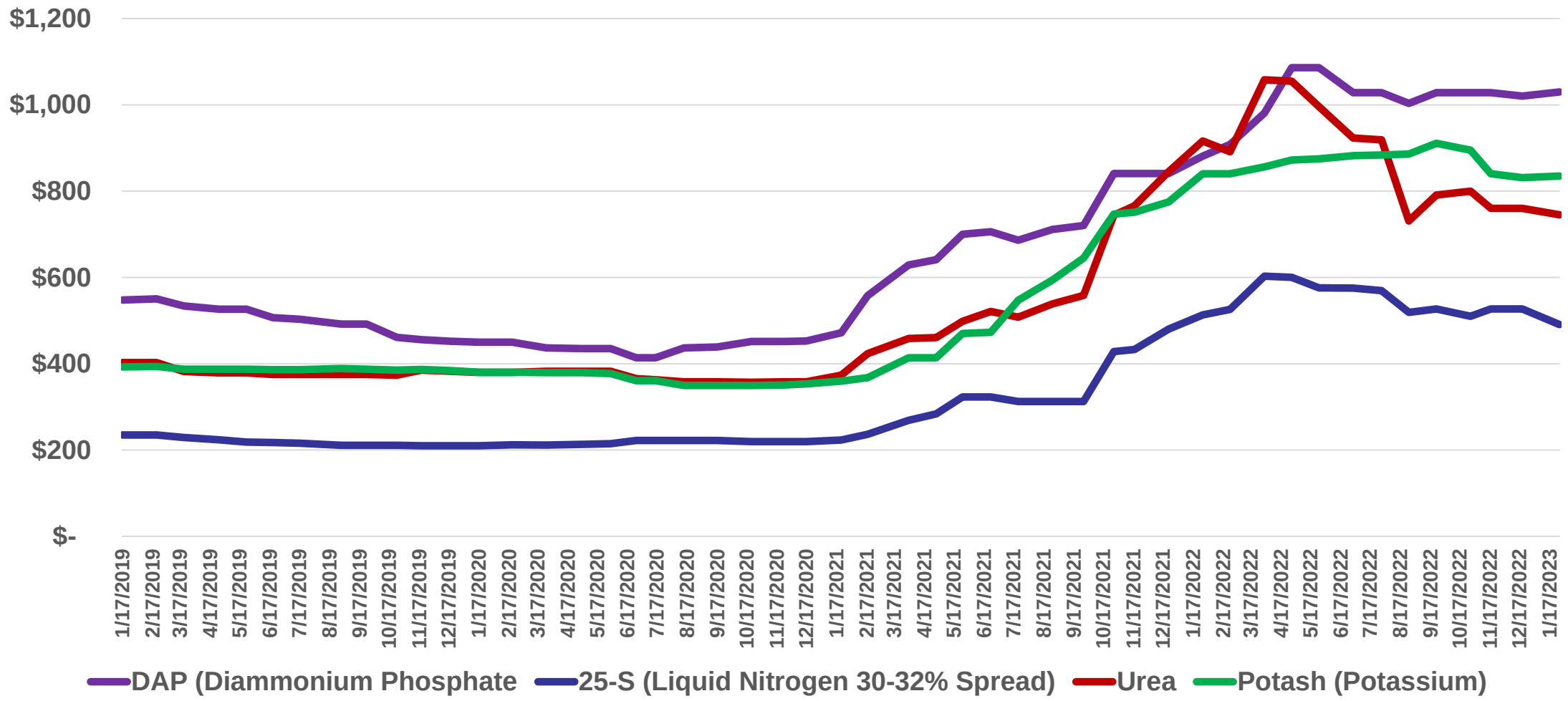
Pee Dee River Basin 2017 Market Value of Products Sold by County
Total Value X 1.5 Multiplier: $1,759,686,000



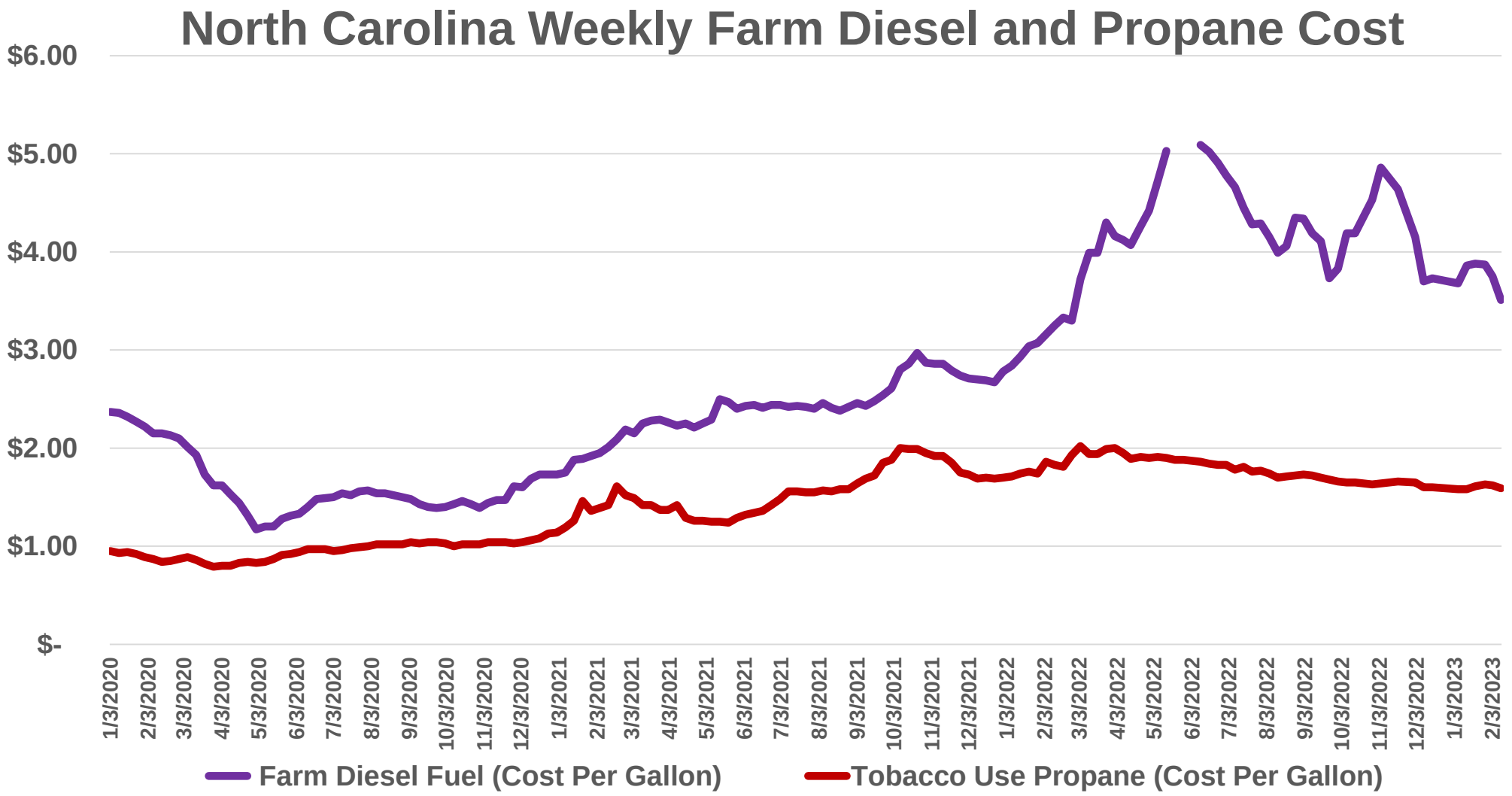
Source: 2017 Ag Census, USDA NASS

2023 CROP COST AND RETURNS

SC Fertilizer Prices Per Ton



Source: South Carolina Dept of Ag-USDA Market News, Columbia, SC
803-737-4491. www.ams.usda.gov/mnreports/CO_GR210.txt



SOURCE: North Carolina Dept of Ag-USDA Market News Service, Raleigh NC
http://www.ncagr.gov/markets/mktnews/RA_GR210.TXT

	CORN-NI	COTTON-NI	PEANUTS-RU-NI	SOYBEANS-NI
REVENUE				
PROJECTED YIELD	**125**	**900**	**3,800**	**35**
FUTURES PRICE	$5.70	$0.85	$0.2500	$13.45
HARVEST BASIS	$0.50	-$0.01	$0.00	$0.10
EXPECTED CROP REVENUE	**$775.00**	**$756.00**	**$950.00**	**$474.25**
COTTONSEED		168.75		
MARKETING	$0.00	-$23.06	-$5.70	$0.00
CHECKOFF	$0.00	-$1.88	-$3.80	-$2.37
EXPECTED CROP REVENUE	**$775.00**	**$899.81**	**$940.50**	**$471.88**
DIRECT EXPENSE				
SEED	$71.50	$99.18	$130.50	$50.00
FERTILIZER	$261.70	$258.32	$85.19	$120.80
CROP PROTECTION	$92.35	$154.73	$257.38	$113.26
CROP INSURANCE	$11.07	$12.49	$6.73	$6.63
DRYING OR GINNING	$26.63	$108.00	$27.17	$1.49
IRRIGATION ENERGY				
CUSTOM HIRE	$53.75	$10.00	$21.40	$22.25
SUPPLIES	$0.00	$17.81	$0.00	$0.00
LABOR	$6.08	$8.36	$17.67	$7.15
MACHINERY OPERATING	39.45	$83.07	$92.22	$43.43
INTEREST ON OP. CAP.	$19.39	$25.83	$21.52	$12.41
TOTAL DIRECT EXPENSES	**$573.52**	**$763.72**	**$636.38**	**$367.12**
RETURN AVAILABLE FOR OVERHEAD, DEBT SERVICE, & MANAGEMENT	**$201.48**	**$136.09**	**$304.12**	**$104.76**

FINANCIAL EFFICIENCY BY CROP

	CORN-NI	COTTON-NI	PEANUTS-RU-NI	SOYBEANS-NI
EXPECTED CROP REVENUE	$775.00	$899.81	$940.50	$471.88
TOTAL DIRECT EXPENSES	$573.52	$763.72	$636.38	$367.12
RETURN AVAILABLE FOR OVERHEAD, DEBT SERVICE, & MANAGEMENT	$ 201.48	$ 136.09	$ 304.12	$ 104.76
DIRECT EXPENSE TO REVENUE RATIO	74%	85%	68%	78%
OPERATING PROFIT MARGIN	26%	15%	32%	22%
Futures Price Required for:				
40% Operating Profit Margin	$6.57	$1.10	$0.27	$15.85
25% Operating Profit Margin	$5.64	$0.95	$0.23	$13.83
10% Operating Profit Margin	$4.71	$0.80	$0.19	$11.81

	CORN-IRR	COTTON-IRR	PEANUTS-RU-IRR	SOYBEANS-IRR
REVENUE				
PROJECTED YIELD	**210**	**1250**	**4,800**	**65**
FUTURES PRICE	$5.70	$0.85	$0.25	$13.45
HARVEST BASIS	$0.50	-$0.01	$0.00	$0.10
EXPECTED CROP REVENUE	**$1,302.00**	**$1,050.00**	**$1,200.00**	**$880.75**
COTTONSEED		168.75		
MARKETING	$0.00	-$32.03	-$7.20	$0.00
CHECKOFF	$0.00	-$2.60	-$4.80	-$4.40
EXPECTED CROP REVENUE	**$1,302.00**	**$1,184.11**	**$1,188.00**	**$876.35**
DIRECT EXPENSE				
SEED	$104.00	$99.18	$130.50	$55.00
FERTILIZER	$372.50	$239.17	$85.19	$146.00
CROP PROTECTION	$95.52	$154.73	$289.06	$128.22
CROP INSURANCE	$8.63	$8.57	$5.94	$6.76
DRYING OR GINNING	$44.73	$150.00	$34.32	$2.77
IRRIGATION ENERGY	$54.00	$27.00	$27.00	$27.00
CUSTOM HIRE	$83.50	$10.00	$24.40	$32.75
SUPPLIES	$0.00	$24.74	$0.00	$0.00
LABOR	$6.08	$8.36	$17.67	$7.15
MACHINERY OPERATING	39.45	$83.07	$92.22	$43.43
INTEREST ON OP. CAP.	$27.99	$27.68	$23.80	$15.31
TOTAL DIRECT EXPENSES	**$827.72**	**$818.43**	**$703.82**	**$452.73**
RETURN AVAILABLE FOR OVERHEAD, DEBT SERVICE, & MANAGEMENT	**$474.28**	**$365.68**	**$484.18**	**$423.62**

FINANCIAL EFFICIENCY BY CROP

	CORN-IRR	COTTON-IRR	PEANUTS-RU-IRR	SOYBEANS-IRR
EXPECTED CROP REVENUE	$1,302.00	$1,184.11	$1,188.00	$876.35
TOTAL DIRECT EXPENSES	$827.72	$818.43	$703.82	$452.73
RETURN AVAILABLE FOR OVERHEAD, DEBT SERVICE, & MANAGEMENT	$ 474.28	$ 365.68	$ 484.18	$ 423.62
DIRECT EXPENSE TO REVENUE RATIO	64%	69%	59%	52%
OPERATING PROFIT MARGIN	36%	31%	41%	48%
Futures Price Required for:				
40% Operating Profit Margin	$6.42	$0.93	$0.2481	$12.43
25% Operating Profit Margin	$5.49	$0.78	$0.2110	$10.40
10% Operating Profit Margin	$4.56	$0.64	$0.1739	$8.38

South Carolina Major Row Crop Yields

Yield per Acre

	2016	2017	2018	2019	2020	2021	2022
Corn (Bushels)	127	136	127	106	132	139	122
Cotton (Pounds)	656	910	747	809	802	986	960
Peanuts (Pounds)	3,200	4,000	3,400	3,800	3,700	4,200	4,200
Soybeans (Bushels)	31	38	29	26	35	38	37
Tobacco (Pounds)	1,900	2,100	1,800	1,900	1,200	1,800	2,000
Wheat (Bushels)	43	49	54	48	51	53	57

Compiled by Dr. Nathan Smith & Trey Buckelew, Clemson University
Source: NASS USDA, QuickStats & Southern Region News Release Annual Crop Production Report

South Carolina Major Row Crops Planted Acres

(1,000 Acres)

	2016	2017	2018	2019	2020	2021	2022
Corn	375	350	340	380	390	400	320
Cotton	190	250	300	300	190	210	270
Peanuts	110	122	87	65	84	69	71
Soybeans	420	400	390	335	310	395	405
Tobacco (harv	13	12	12.3	8.3	5.5	7	6
Wheat	60	90	80	70	110	125	120
Total	1168	1224	1209.3	1158.3	1089.5	1206	1192

Compiled by Dr. Nathan Smith & Trey Buckelew, Clemson University
Source: NASS USDA, QuickStats & Southern Region News Release Annual Crop Production Report

Major Row Crop Water Use

Irrigation is used to supplement rainfall and produce optimal yields for major row crops and specialty crops.

The major row crops that are irrigated in SC are corn, cotton, soybean, and peanut.

A question that comes up when considering irrigation is how much water would a crop such as corn use or need on average?

Dr. Michael Plumblee assembled research-based information on water use for corn, cotton, soybean and peanut.

Annual Water Needed by Major Crop

Crop	Inches/Acre/Season	Gallons/Acre Inch	Gallons/Acre/Season
Corn	38	27,200	1,033,600
Cotton	16	27,200	435,200
Peanut	18.78	27,200	510,816
Soybean	18.5	27,200	503,200

Of the four major row crops, corn needs the most water per season followed by peanut, soybean, and cotton.

The crop water need may change due to yield goal, variety, and environment.

Pee Dee River Basin FSA Certified Crop Acres

	Non-Irr	Irr	Total	Non-Irr %	Irr%
Corn	157056	41463	198520	79%	21%
Cotton	129697	13526	143223	91%	9%
Peanuts	21436	2961	24398	88%	12%
Soybeans	294251	14803	309054	95%	5%
Wheat	66872	5210	72081	93%	7%

Crop Water Use

- Crop curves in the following slides are developed base on average ET values and do not represent individual years.

- Rainfall will make up some of the total water needed, therefore, irrigation totals will be lower than total use needed values in curves.

- The following information was obtained from Univ. of Georgia, Univ. of Nebraska, and others. If more information is needed on a specific crop or curve let me know.

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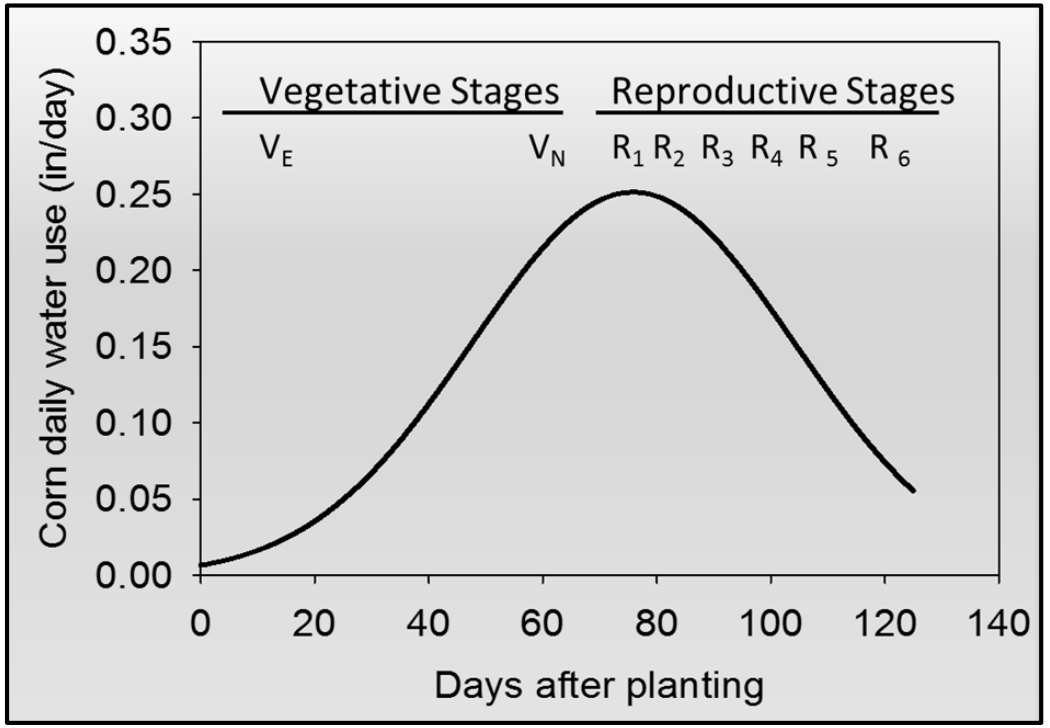
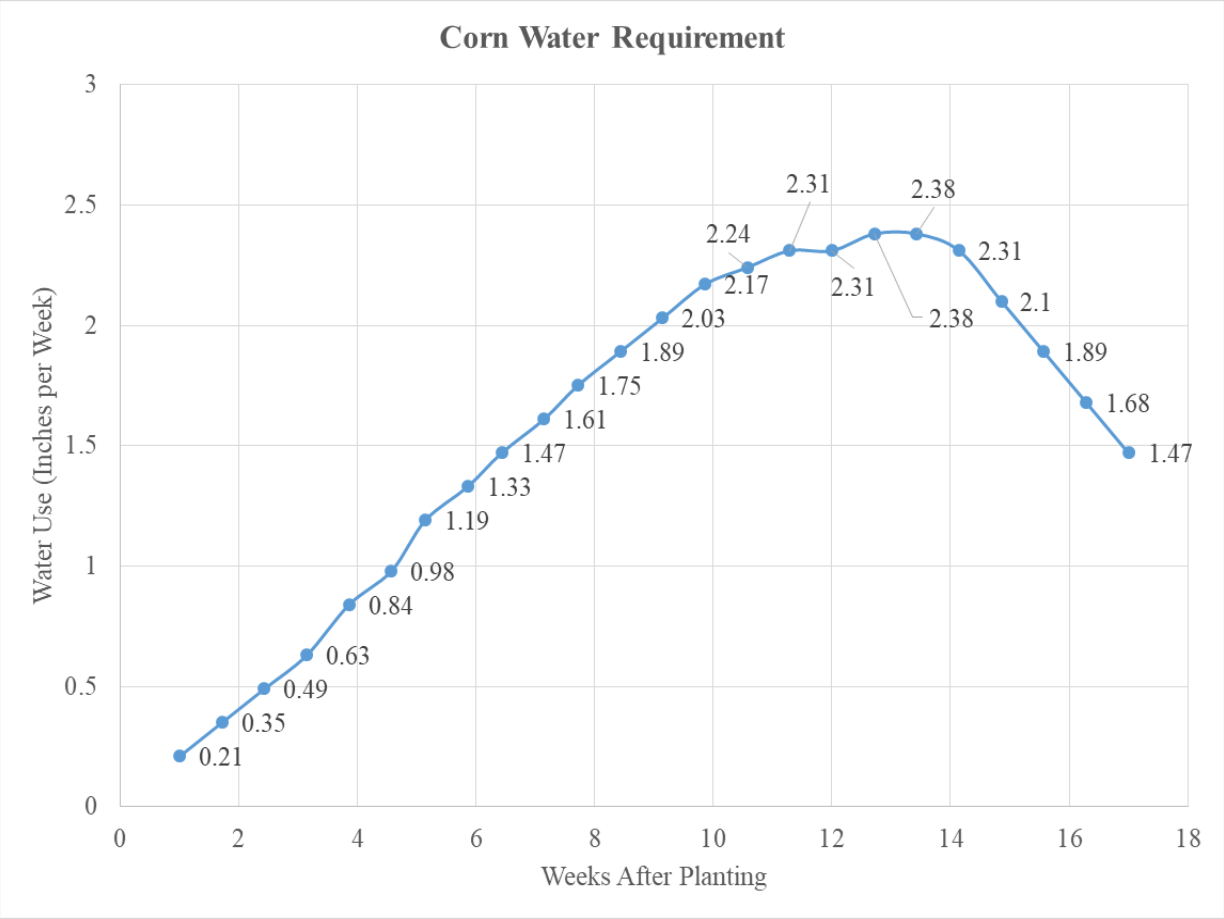
Crop Water Use - Corn

- Corn
- Low Demand ~ VN
- Peak R1
- Decline R3-R6



38 inches/season needed

Crop Water Use - Corn



CLEMSON
COOPERATIVE EXTENSION

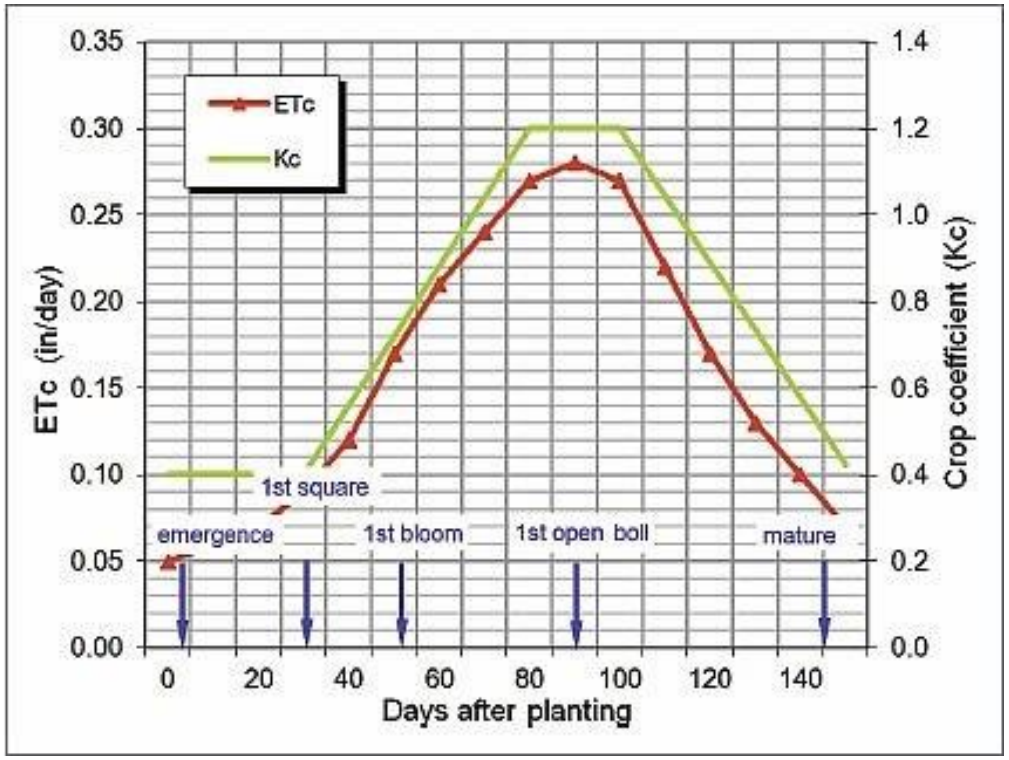
Crop Water Use - Corn

Corn Irrigation Schedule				
Growth Stage	**Days after Planting**	**Weeks**	**Inches per Day**	**Inches per Week**
Emergence and Primary Root Development	0-7	1	0.03	0.21
	8-12	2	0.05	0.35
Two leaves expaned and nodal roots forming	13-17	2	0.07	0.49
	18-22	3	0.09	0.63
Four to six leaves expanding. Growing pint near surface. Other leaves and roots developing.	23-27	4	0.12	0.84
	28-32	5	0.14	0.98
	33-36	5	0.17	1.19
Six to eight leaves. Tassel developing. Growing point above ground	37-41	6	0.19	1.33
	42-45	6	0.21	1.47
Ten to twelve leaves expanded. Bottom 2-3 leaves lost. Stalks growing rapidly. Ear shoots developing. Potential kernel row number determined	46-50	7	0.23	1.61
	51-54	8	0.25	1.75

Corn Irrigation Schedule				
Growth Stage	**Days after Planting**	**Weeks**	**Inches per Day**	**Inches per Week**
Twelve to sixteen leaves. Kernels per row and size of ear determined. Tassel not visible but about full size. Top two ear shoots developing rapidly.	55-59	8	0.27	1.89
	60-64	9	0.29	2.03
Tassel emerging, ear shoots elongating.	65-69	10	0.31	2.17
Pollination and silks emerging	70-74	11	0.32	2.24
	75-79	11	0.33	2.31
Blister Stage	80-84	12	0.33	2.31
Milk Stage, rapid starch accumulation.	85-89	13	0.34	2.38
Early dough stage, kernels rapidly increasing weight	90-94	13	0.34	2.38
Dough Stage	95-99	14	0.33	2.31
Early Dent	100-104	15	0.3	2.1
Dent	105-109	16	0.27	1.89
Beginning Black Layer	110-114	16	0.24	1.68
Black Layer (physiological maturity	115-119	17	0.21	1.47

Crop Water Use - Cotton

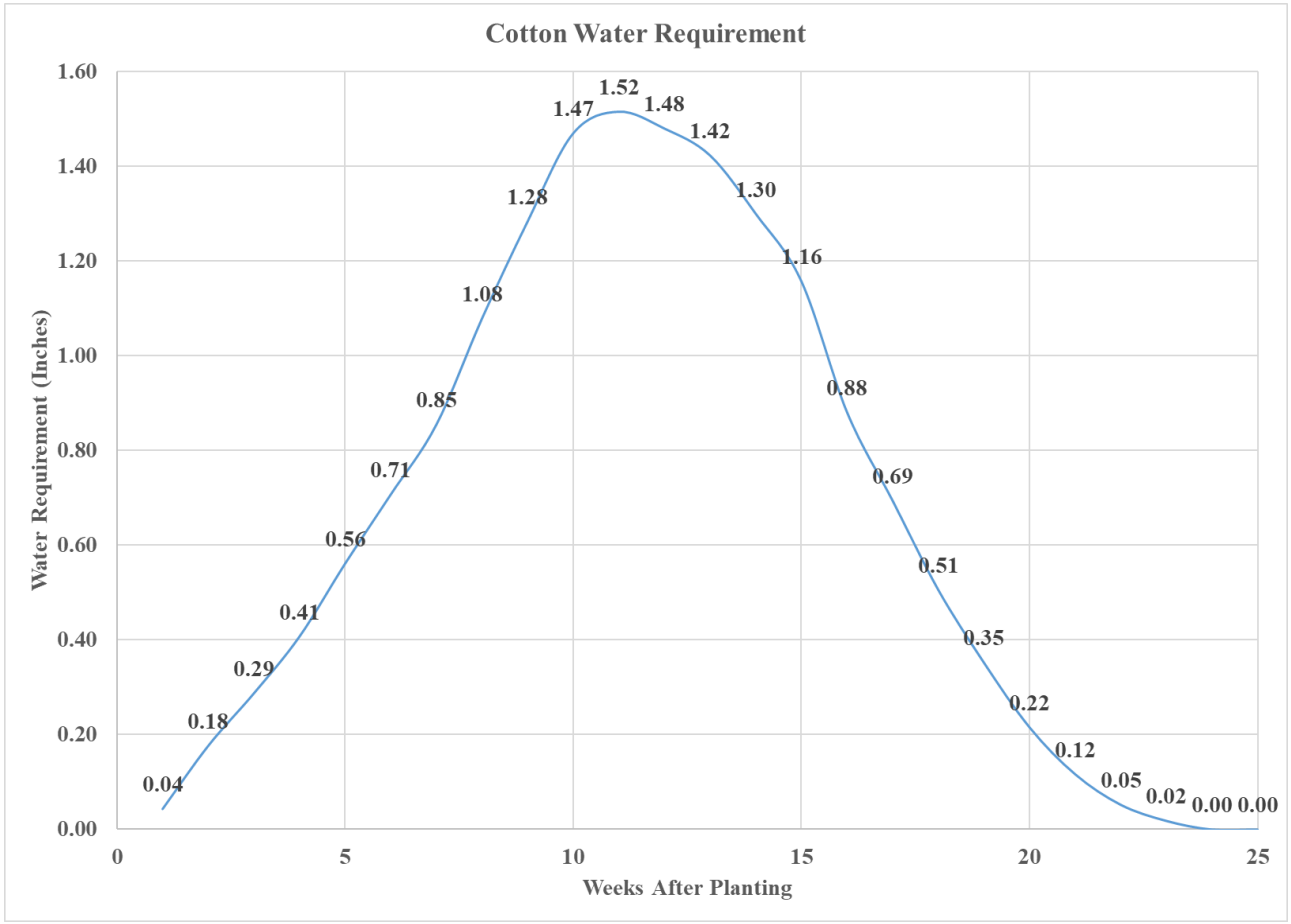
- Cotton
- Low Demand ~ pre-bloom
- Peak at Full Bloom
- Declines as bolls being to open



16 inches/season needed

Cotton Incorporated

Crop Water Use - Cotton



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Crop Water Use - Cotton

Cotton Irrigation Schedule				
Growth Stage	DAP	Weeks after Planting	Inches/Week	Inches/Day
Emergence	1 - 7	1	0.04	0.01
Emergence to First Square	8 - 14	2	0.18	0.03
	15 - 21	3	0.29	0.04
	22 - 28	4	0.41	0.06
	29 - 35	5	0.56	0.08
First Square to First Flower	36 - 42	6	0.71	0.10
	43 - 49	7	0.85	0.12
	50 - 56	8	1.08	0.15
First Flower to First Open Boll	57 - 63	9	1.28	0.18
	64 - 70	10	1.47	0.21
	71 - 77	11	1.52	0.22
	78 - 84	12	1.48	0.21
	85 - 91	13	1.42	0.20
	92 - 98	14	1.30	0.19
	99 - 105	15	1.16	0.17
	106 - 112	16	0.88	0.13
	113 - 119	17	0.69	0.10

Cotton Irrigation Schedule				
Growth Stage	DAP	Weeks after Planting	Inches/Week	Inches/Day
First open boll to >60% Open Bolls	120 - 126	18	0.51	0.07
	127 - 133	19	0.35	0.05
	134 - 140	20	0.22	0.03
	141 - 147	21	0.12	0.02
	148 - 154	22	0.05	0.01
	155 - 161	23	0.02	0.00
Harvest	162 - 168	24	0.00	0.00
	169 - 175	25	0.00	0.00

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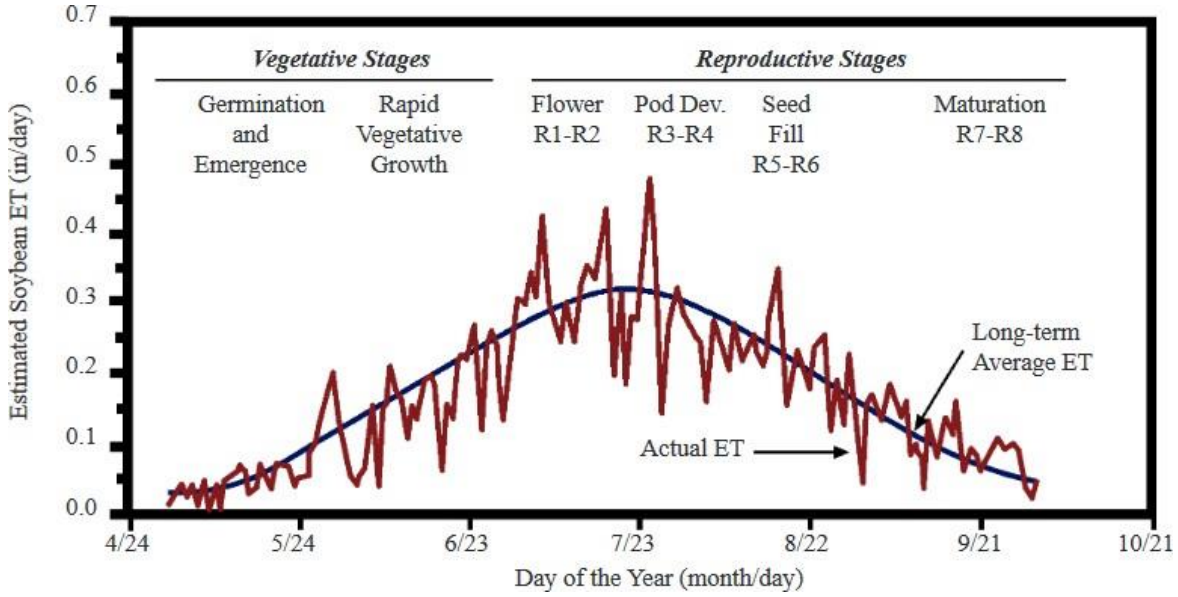
Crop Water Use - Soybean

- Soybean
- Low Demand ~Vn
- Peak R2-R3
- Decline R4-R8



18.5 inches/season needed

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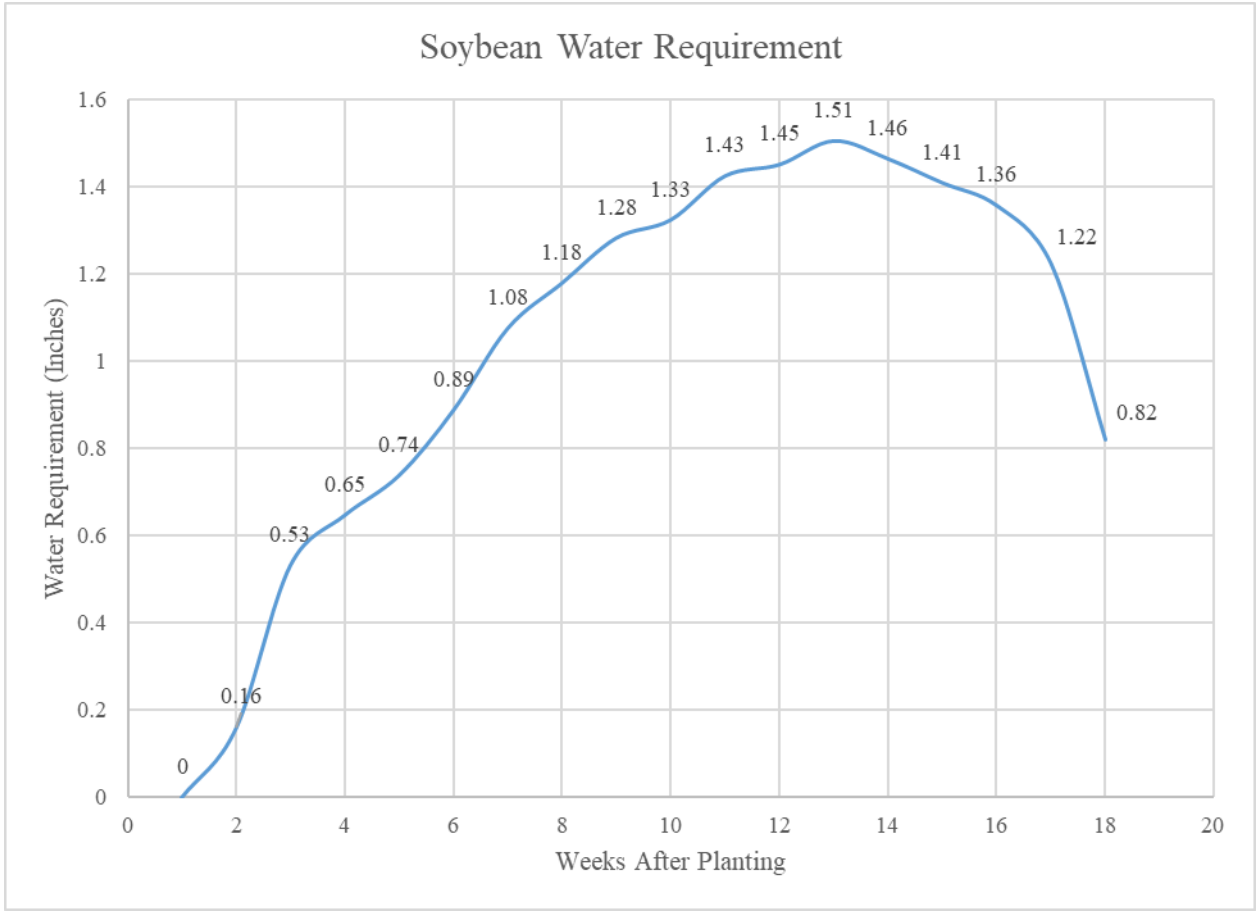
Crop Water Use - Soybean



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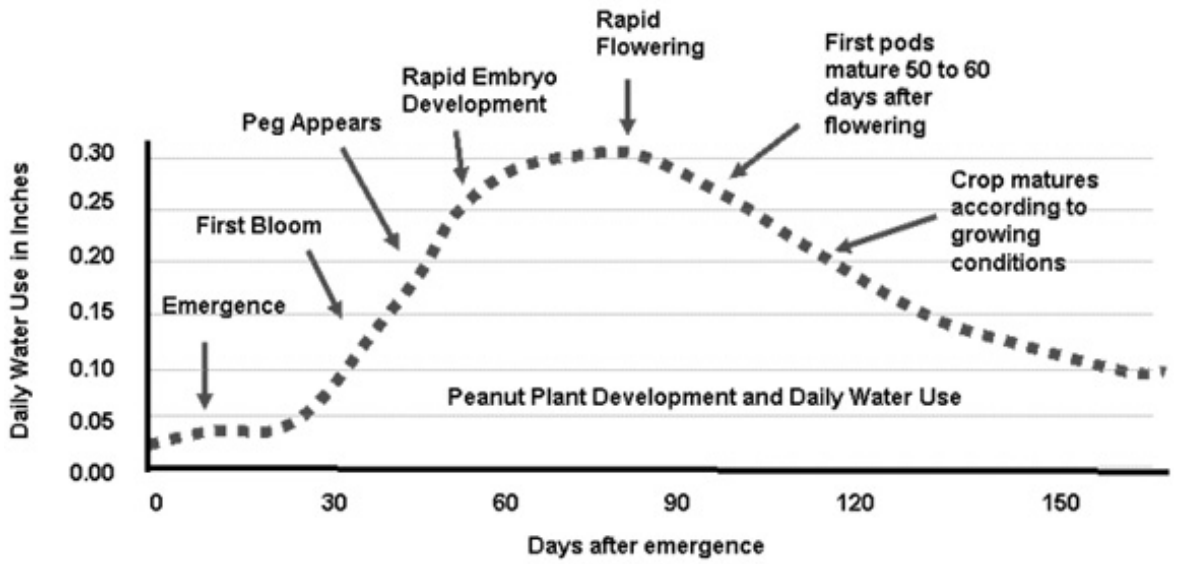
Crop Water Use - Soybean

Soybean Irrigation Schedule			
Days after Planting	Weeks after Planting	Inches per Week	Inches per Day
1 - 7	1	0.16	0.02
8 - 14	2	0.53	0.08
15 - 21	3	0.65	0.09
22 - 28	4	0.74	0.11
29 - 35	5	0.89	0.13
36 - 42	6	1.08	0.15
43 - 49	7	1.18	0.17
50 - 56	8	1.28	0.18
57 - 63	9	1.33	0.19
64 - 70	10	1.43	0.20
71 - 77	11	1.45	0.21
78 - 84	12	1.51	0.22
85 - 91	13	1.46	0.21
92 - 98	14	1.41	0.20
99 - 105	15	1.36	0.19
106 - 112	16	1.22	0.17
113 - 119	17	0.82	0.12

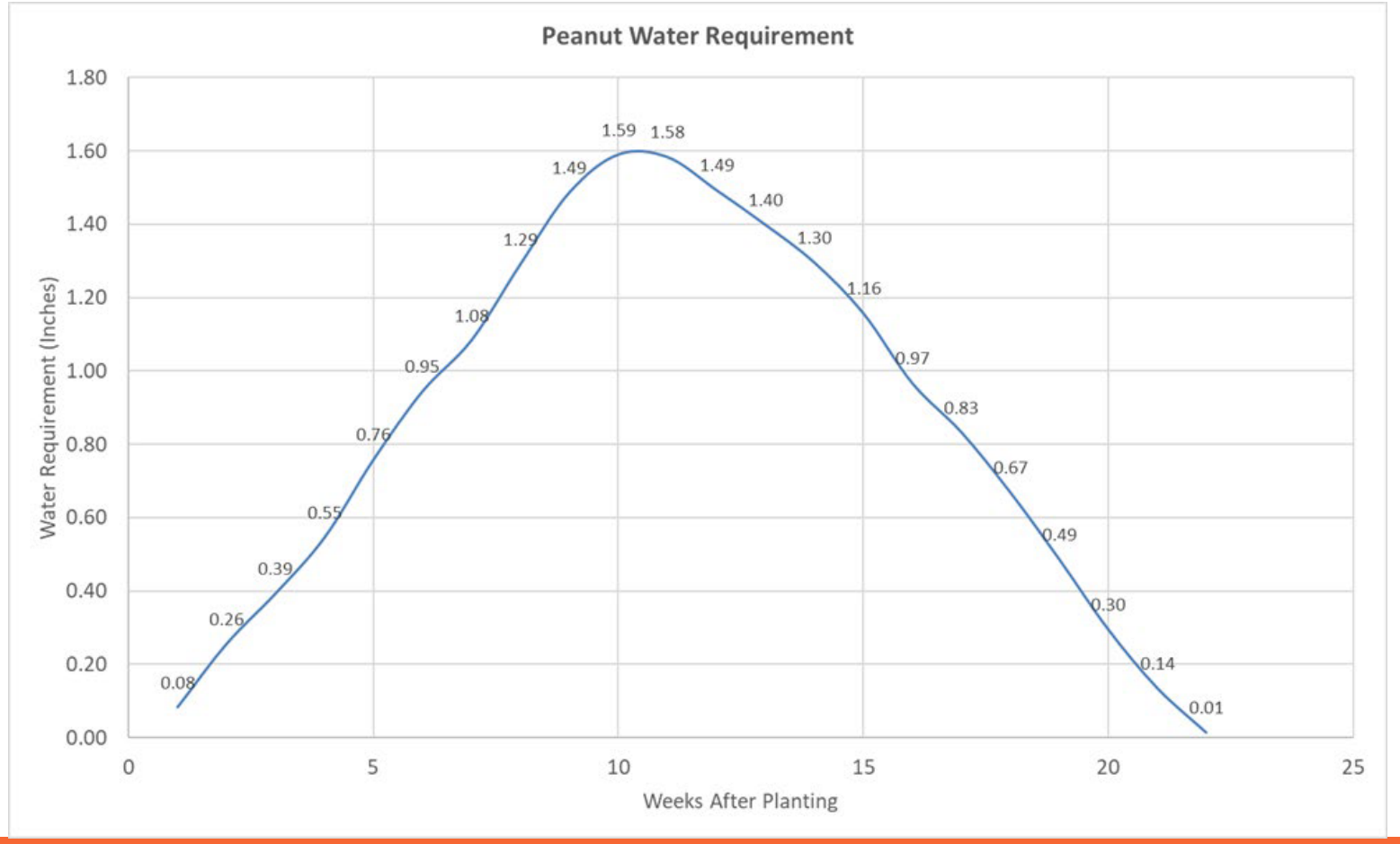
Crop Water Use - Peanut

- Peanut
- Low Demand
  ~ pre-pegging
- Peak Full Bloom
- Declines as early pod set matures



18.78 inches/season needed

Crop Water Use - Peanut



Crop Water Use - Peanut

Peanut Irrigation Schedule			
Days after Planting	Weeks after Planting	Inches per Week	Inches per Day
1 - 7	1	0.08	0.01
8 - 14	2	0.26	0.04
15 - 21	3	0.39	0.06
22 - 28	4	0.55	0.08
29 - 35	5	0.76	0.11
36 - 42	6	0.95	0.14
43 - 49	7	1.08	0.15
50 - 56	8	1.29	0.18
57 - 63	9	1.49	0.21
64 - 70	10	1.59	0.23
71 - 77	11	1.58	0.23
78 - 84	12	1.49	0.21
85 - 91	13	1.40	0.20
92 - 98	14	1.30	0.19
99 - 105	15	1.16	0.17
106 - 112	16	0.97	0.14
113 - 119	17	0.83	0.12
120 - 126	18	0.67	0.10
127 - 133	19	0.49	0.07
134 - 140	20	0.30	0.04
141 - 147	21	0.14	0.02
148 - 150	22	0.01	0.00

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Figure 2. **Farms by Size**

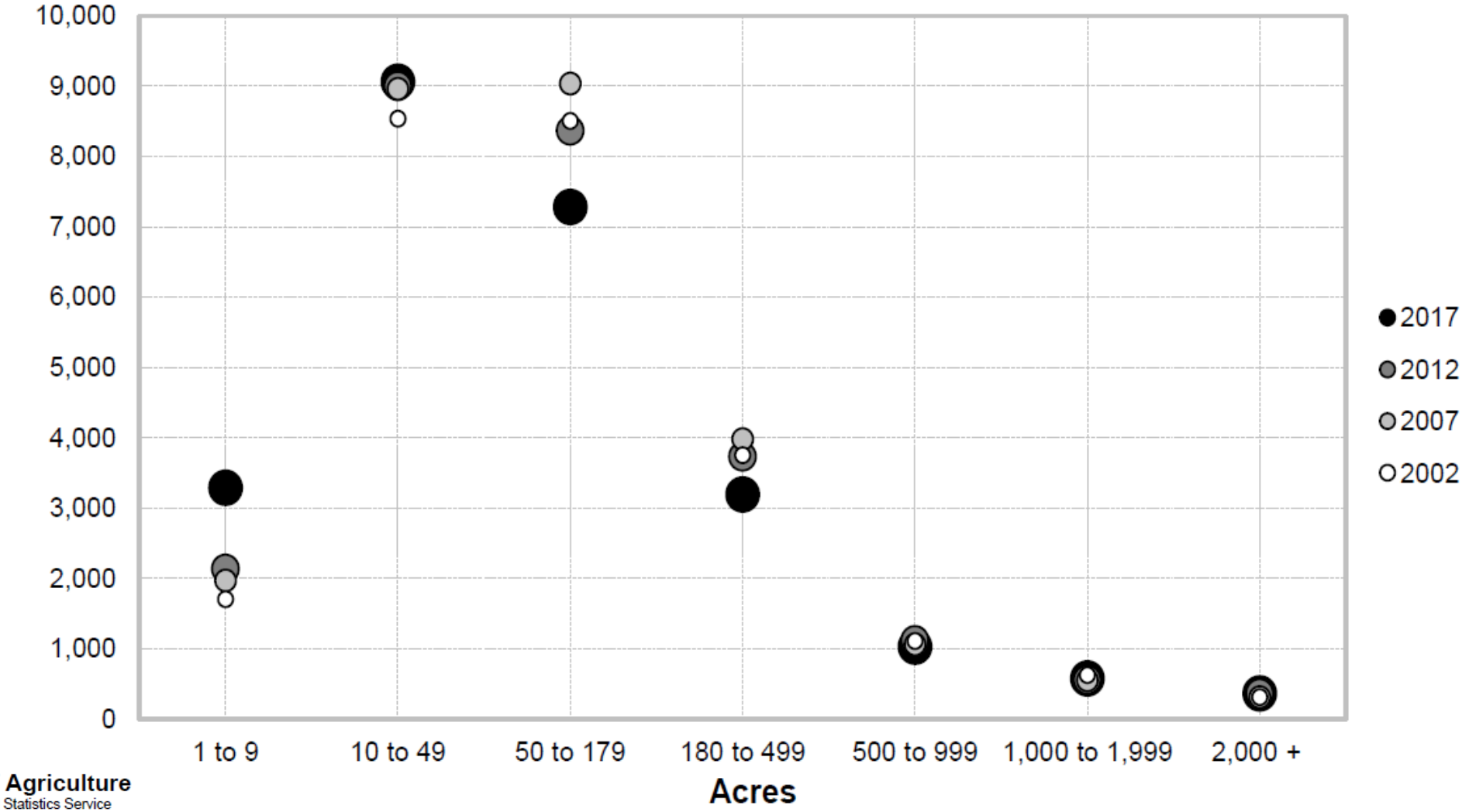

Figure 3. **Farms by Market Value of Agricultural Products Sold**