

# Alabama's Irrigation Watershed Planning Project: Supporting drought risk mitigation through a proactive planning process.

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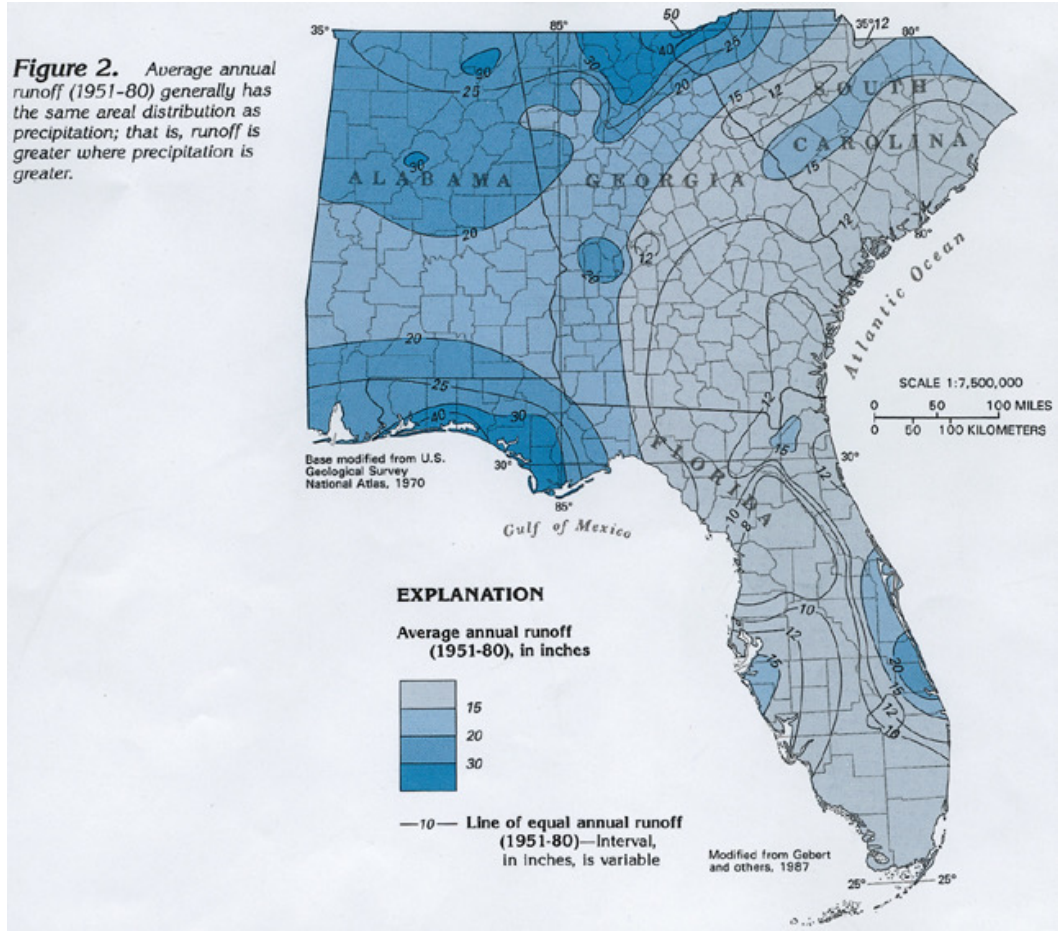
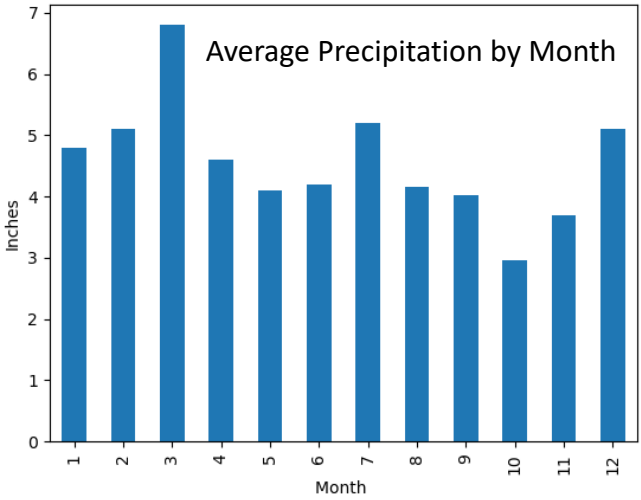
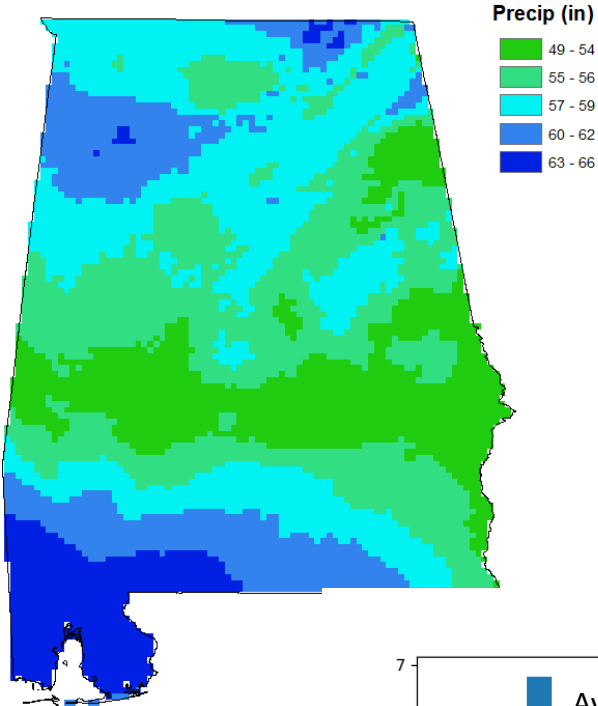
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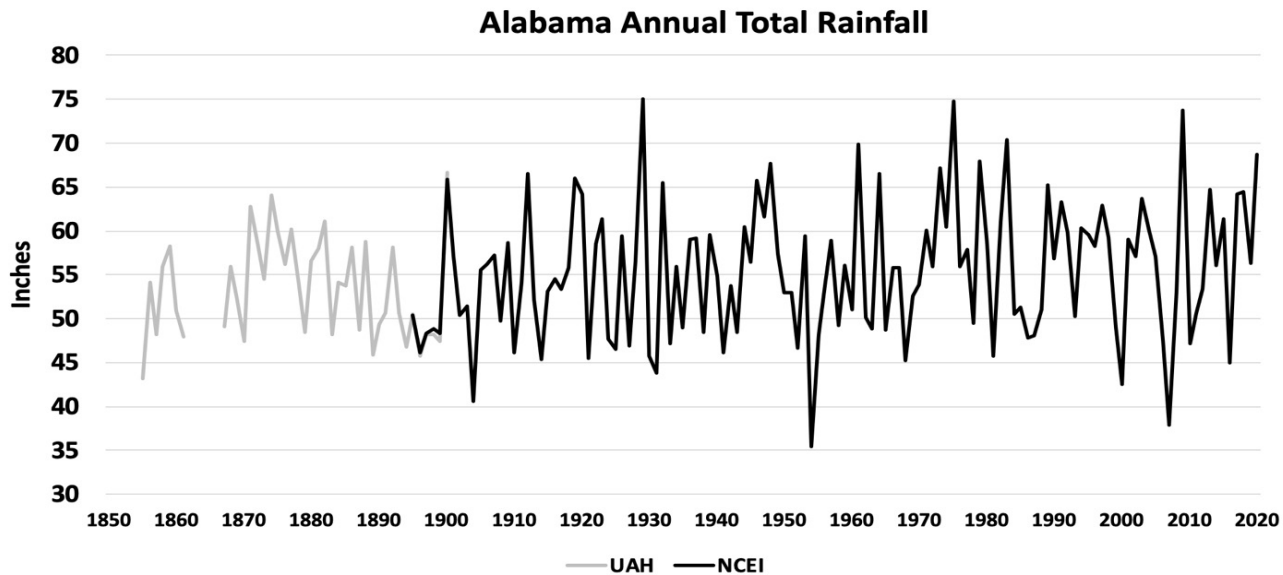


THE UNIVERSITY OF  
ALABAMA IN HUNTSVILLE

Alabama's annual rainfall ranges from about 55 inches in the north to 65 inches near the coastal zone. About 40% of this rainfall flows into streams and rivers and eventually to the Gulf with the remaining being soaked into the ground and/or recycled into the air by vegetation.

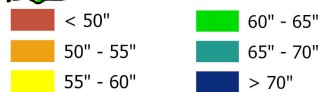
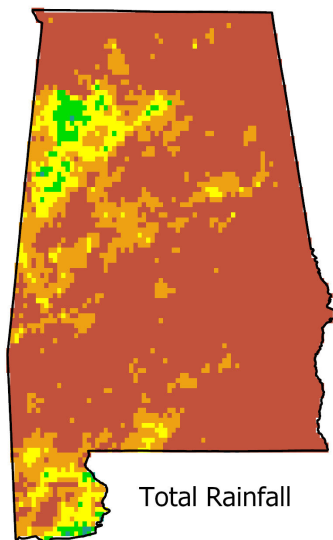


# But the averages don't *mean* all that much

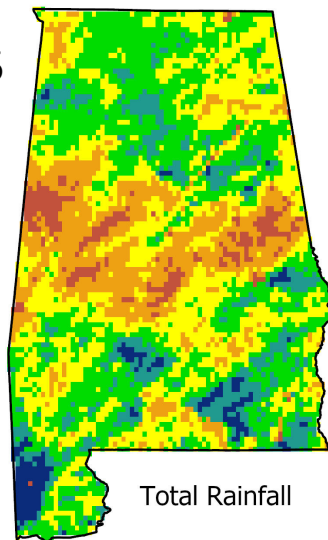


Our annual variation alone is more than many States total rainfall!

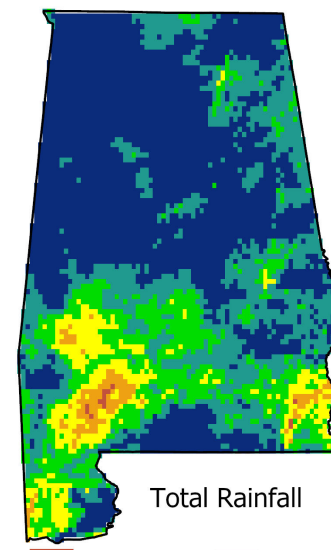
2010



2015



2020

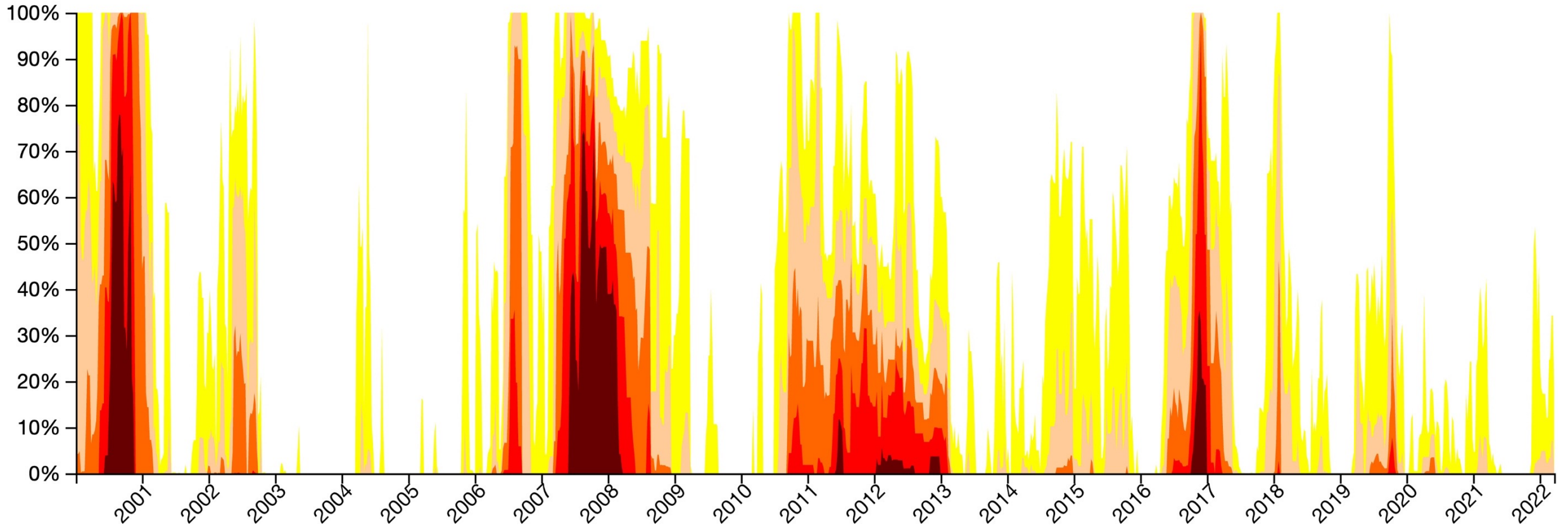


Map data: PRISM Climate Dataset

Time series: John R. Christy, The University of Alabama in Huntsville

# % Area in Drought - Alabama

2000 - 2022



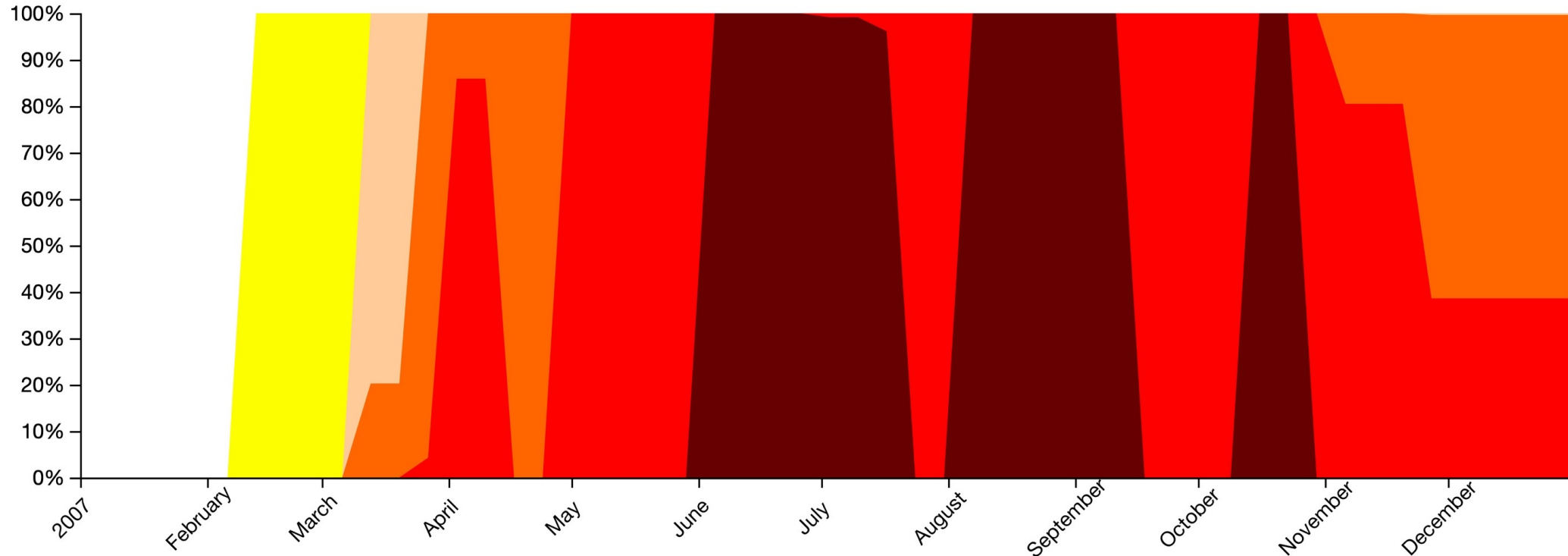
- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

U.S. Drought Monitor  
Alabama

# % Area in Drought – Lawrence County, AL



2007



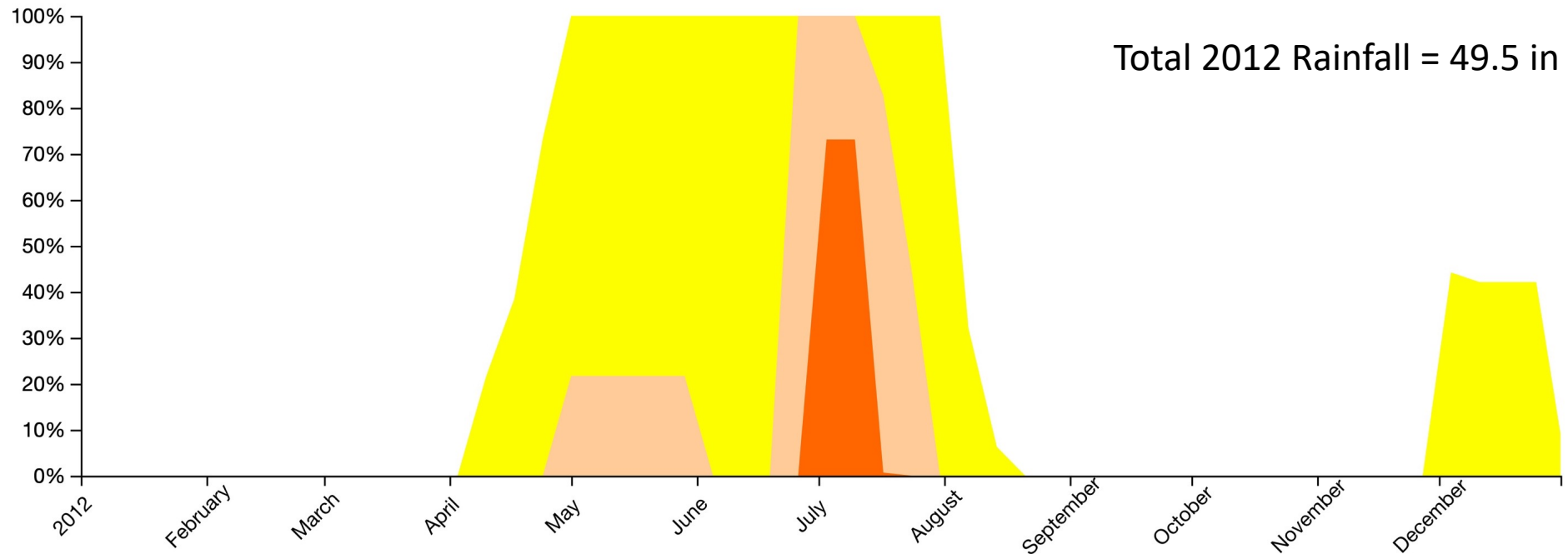
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U.S. Drought Monitor  
Lawrence County, AL

2007 was an exceptional drought  
 Pickwick watershed precip was 38 in  
 Lawrence county yields were 73 bu/ac – ½ the average

# % Area in Drought – Lawrence County, AL

2012

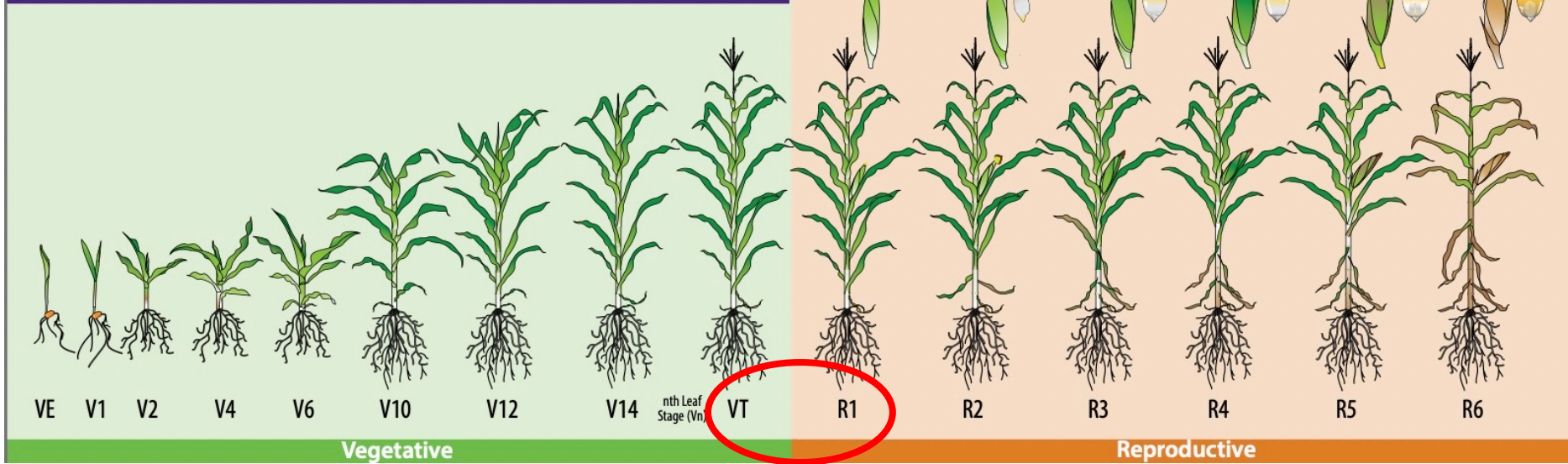


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U.S. Drought Monitor  
Lawrence County, AL

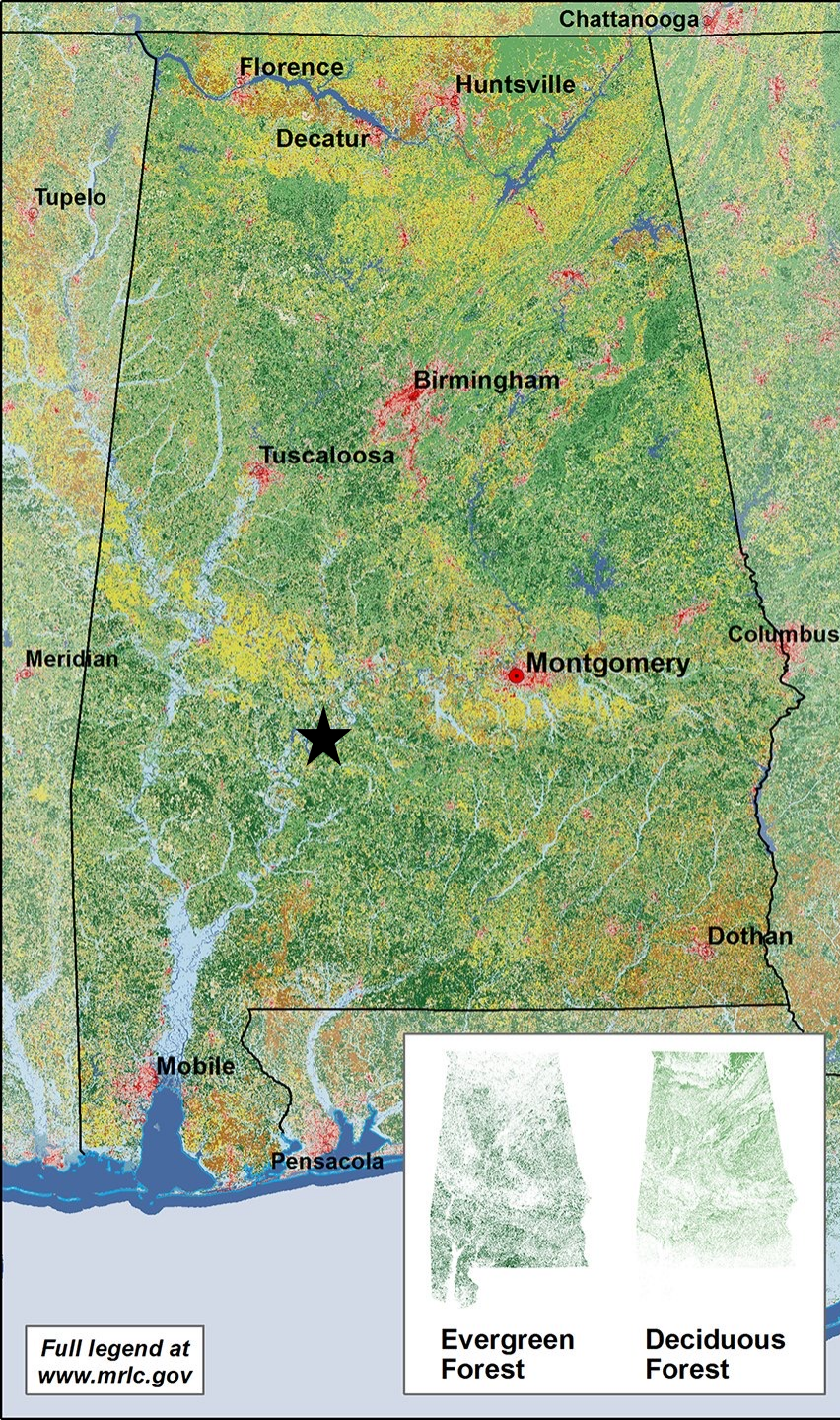
2012 looked a bit different  
Pickwick watershed precip was 52.75 inches  
Lawrence county yields were 78 bu/ac

# Corn Growth and Development

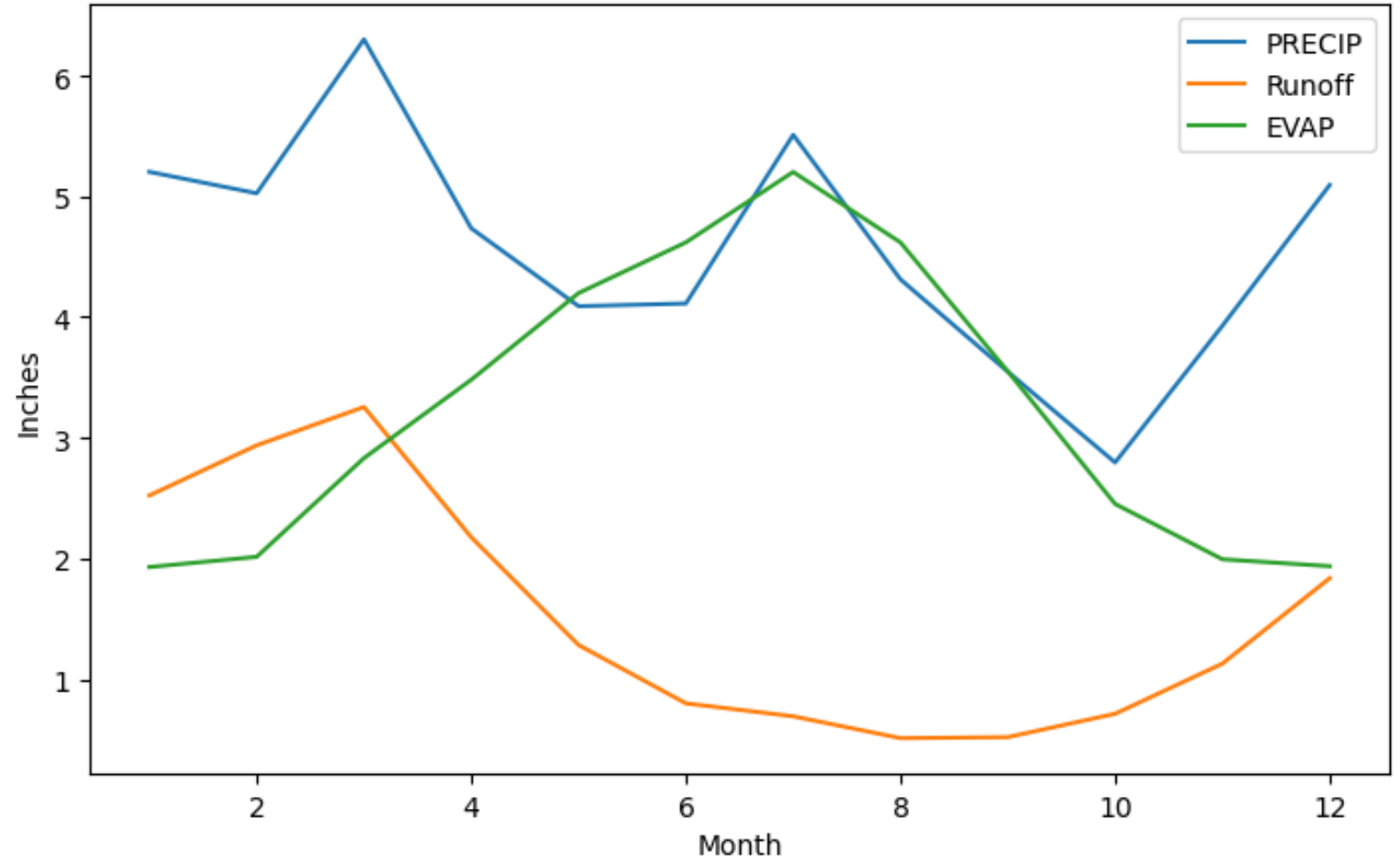


Source: Ciampitti, I.A., R.W. Elmore, & J. Lauer. 2016. Corn Growth and Development. Poster. [bookstore.ksre.ksu.edu/pubs/MF3305.pdf](http://bookstore.ksre.ksu.edu/pubs/MF3305.pdf)

June							July						
Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa
29	30	31	1	2	3	4	26	27	28	29	30	1	2
5	6	7	8	9	10	11	3	4	5	6	7	8	9
12	13	14	15	16	17	18	10	11	12	13	14	15	16
19	20	21	22	23	24	25	17	18	19	20	21	22	23
26	27	28	29	30	1	2	24	25	26	27	28	29	30
3	4	5	6	7	8	9	31	1	2	3	4	5	6



# Alabama Hydrologic Cycle



ET data derived from the WaSSI Model

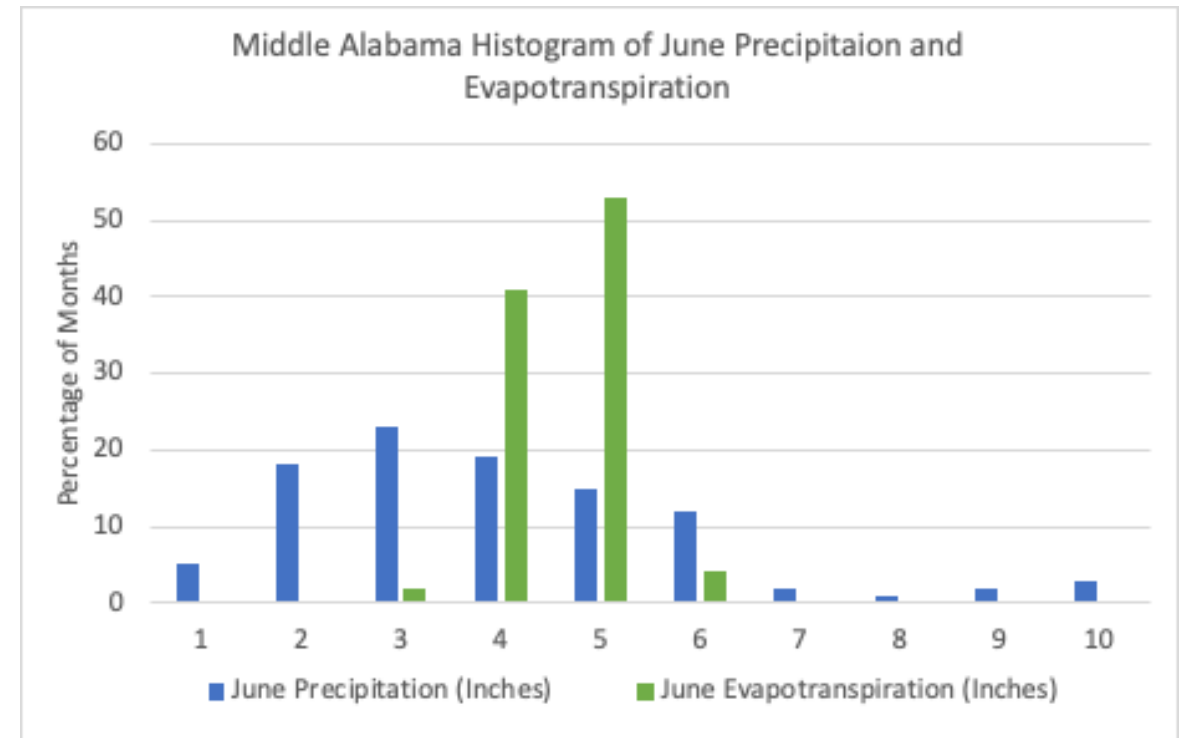
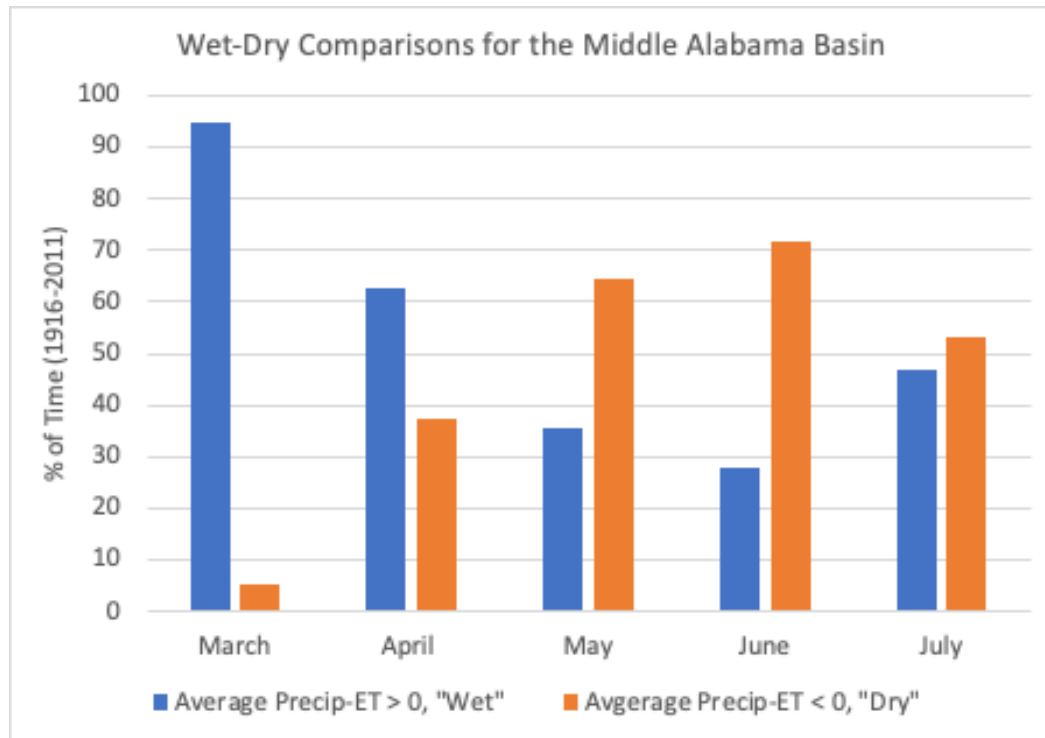
Full legend at [www.mrlc.gov](http://www.mrlc.gov)

Evergreen Forest

Deciduous Forest

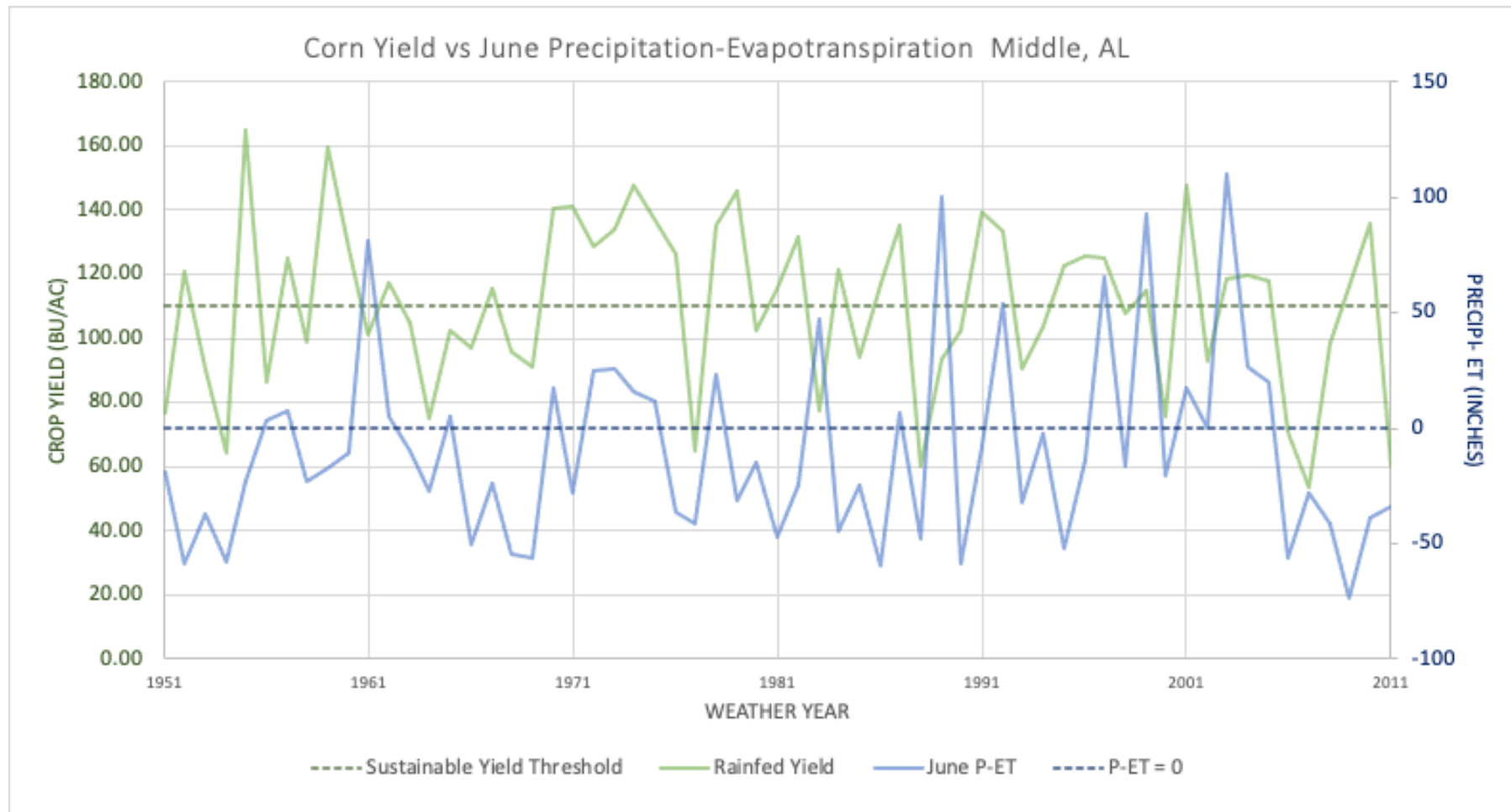


# Precipitation versus Evapotranspiration in the Middle AL



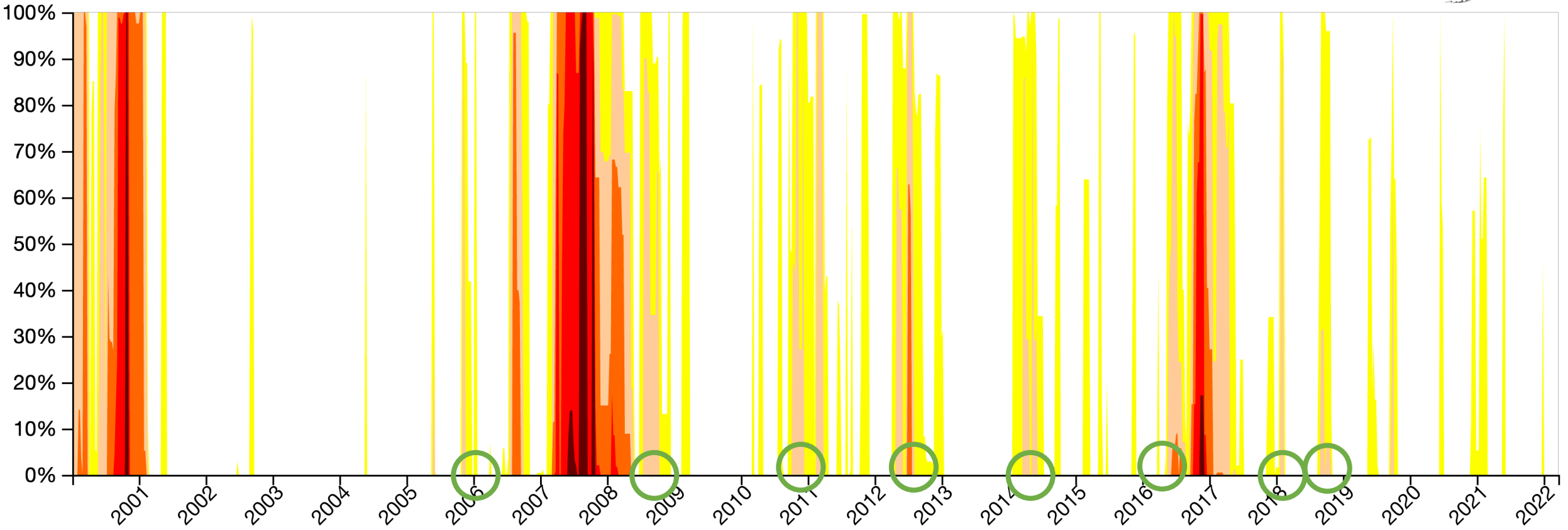
- When ET exceeds precipitation, plants may become stressed and can be an indicator of “agricultural drought”. 70% of the time June precipitation is less than the evapotranspiration.
- Research has shown that just one day of moisture stress during silking can reduce yields by 8% (KSU, 2007)
- 1 inch of supplemental irrigation could reduce the overall evaporative deficit in June by 30%

# Corn Crop Development in the Middle AL



In 28 of the 60 years (~50%), farmers had yields below 110 bu/acre (production deficit). Of those 28 years, June had a precipitation deficit 82 percent of the time correlating to low yields.

# % Area in Drought – Lawrence County, AL

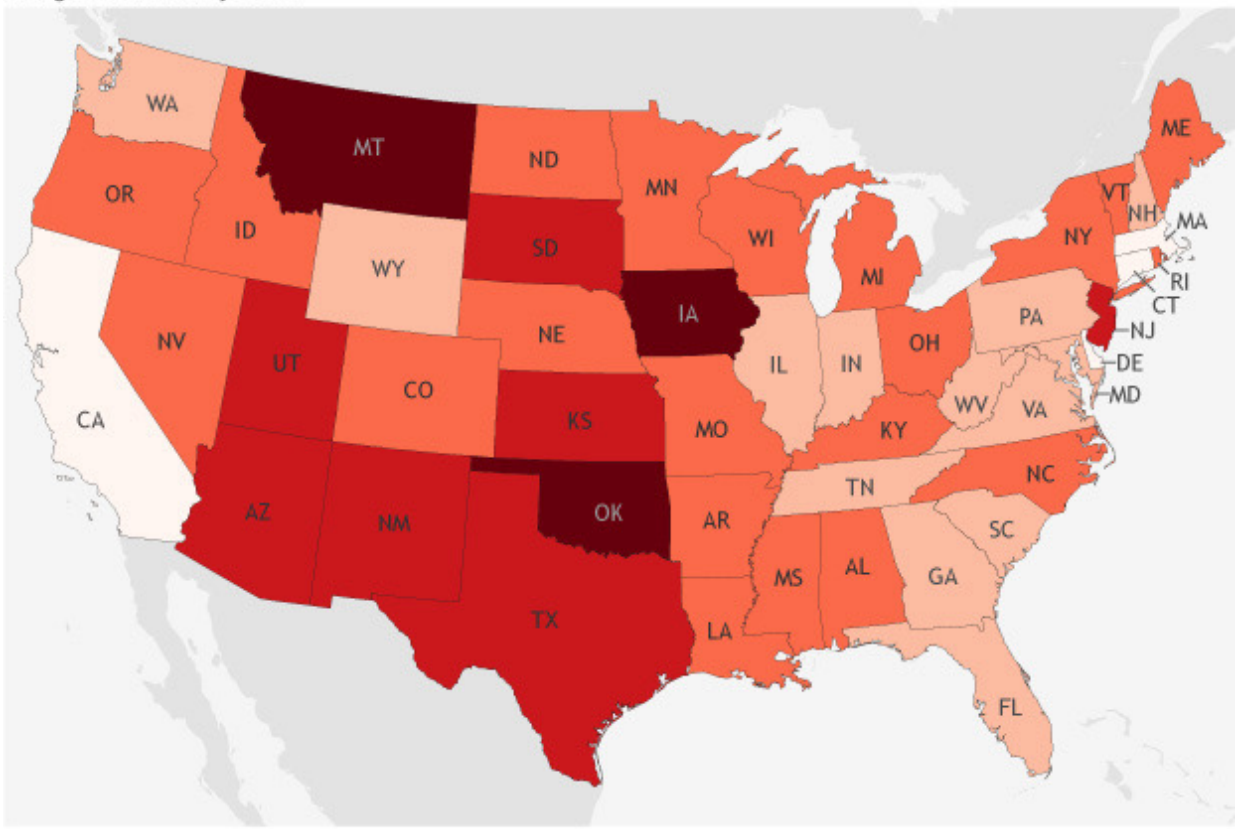


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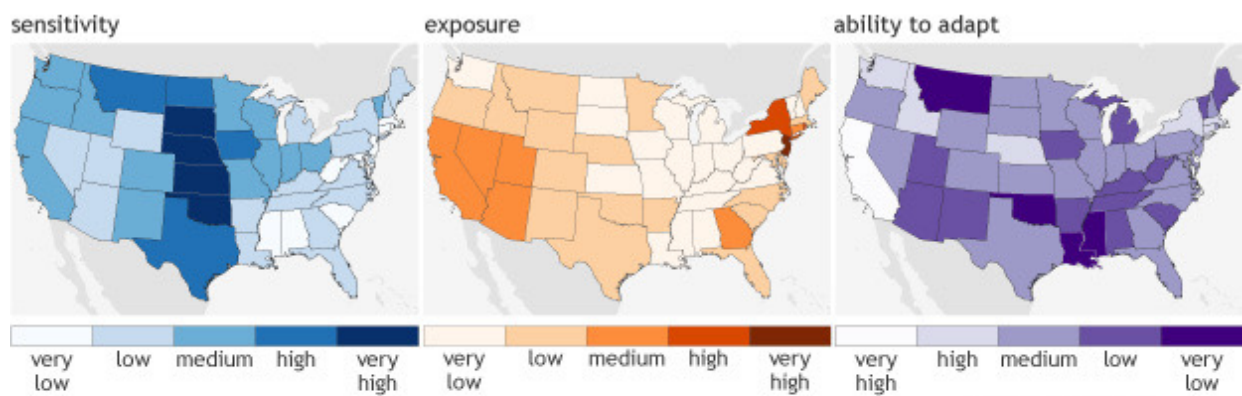
U.S. Drought Monitor  
Lawrence County, AL

# State rankings of drought vulnerability and its drivers

Drought Vulnerability Index



Irrigation, alongside best conservation practices, has the potential to mitigate the risk of agriculture and improve our ability to adapt to climate variability and change



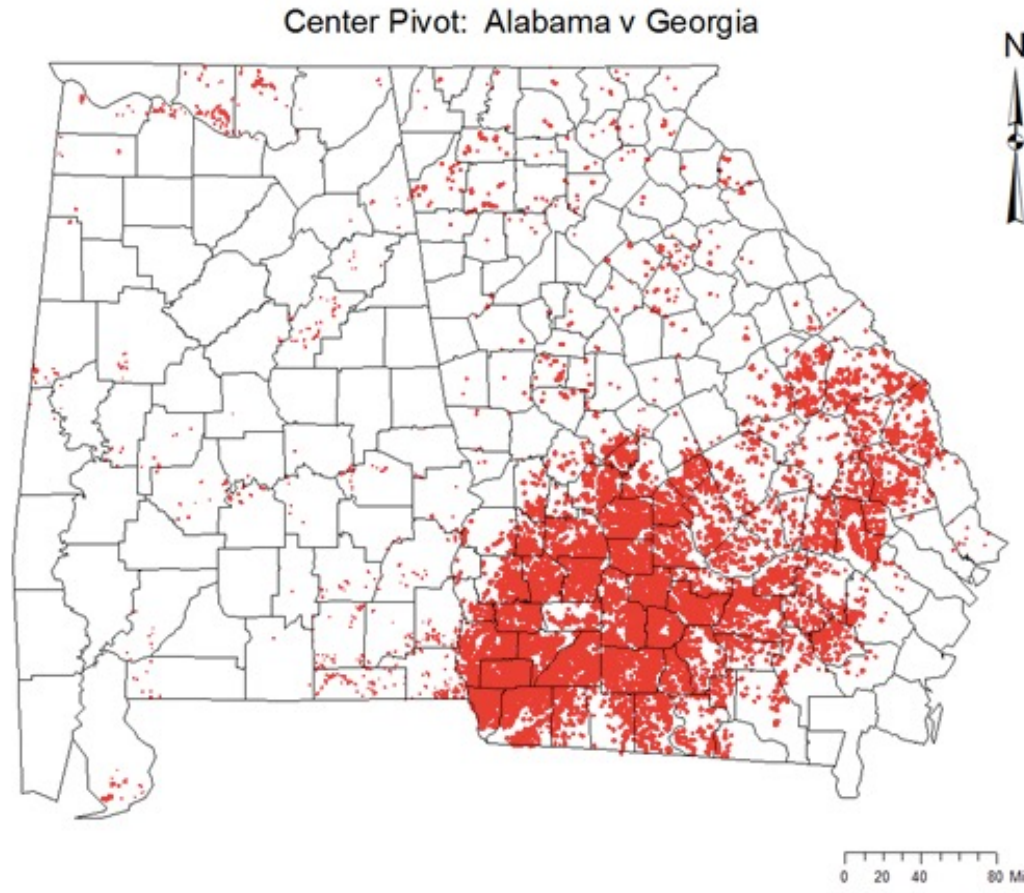
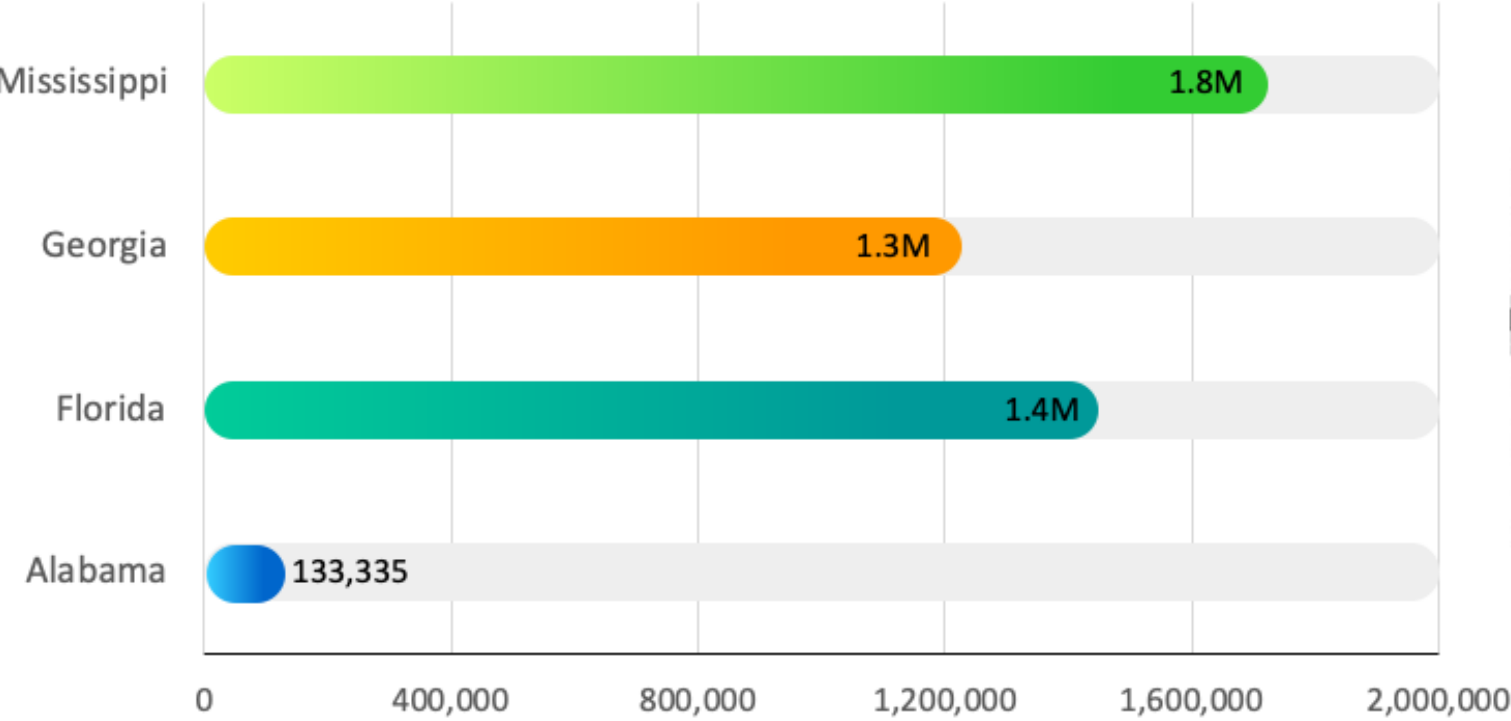
NOAA Climate.gov  
Data: Engström et al., 2020

# Benefits of Properly Managed *Supplemental* Irrigation

- Higher crop yields/fewer crop failures
  - Less land under new ag production
- More organic matter returned to soil
  - Improved soil quality, water and nutrient holding capacity
- Higher crop density
  - Less sediment erosion
- Higher nutrient use efficiency
  - Less nutrient runoff; Improved water quality
- Lower greenhouse gas emissions from soils



# Acres Harvested Cropland Under Irrigation (2017)



Data Source: National Agricultural Statistics Service. (2019). *2017 census of agriculture: United States summary and state data*. U.S. Department of Agriculture.

# Alabama Irrigation Initiative

- Program of AL Soil & Water Conservation Committee
- Use PL 83-566 funds to help individual AL farmers install irrigation infrastructure (by cost-share)
- First project of its kind
- Possible irrigation infrastructure:
  - Center pivot/Sprinkler system
  - Tow-traveler systems
  - Drip irrigation systems
  - Wells
  - Pumping plant
  - Pipelines
  - Reservoirs/ponds
  - Electric service



Statewide Resource  
Assessment (HUC 8) ✓

Watershed Plan

- Preliminary Investigation  
Feasibility Report
- Plan of Work
- Environmental Assessment

AL Soil and Water  
Conservation Committee  
(SLO) Project Applications  
& Ranking

CPA 52 On Farm Assessment





# In addition to irrigation infrastructure...

Additional equipment **offered and fully covered** by the Sponsoring Local Organization (AL SWCC) for the purpose of promoting sustainable agricultural and conservative irrigation practices:

**3-year irrigation management plan**

**Soil sensors**

**Flow meters**



“The best irrigation I ever had was when I didn’t need it.”

# Projects Completed to Date

- **18 + Projects**
- \$1.9M
- Almost **2,000** acres of new irrigated fields
- Many producers have installed IWM systems to include:
  - weather stations
  - flow meters
  - moisture sensors
  - subscription to services to help determine appropriate timing and amount

