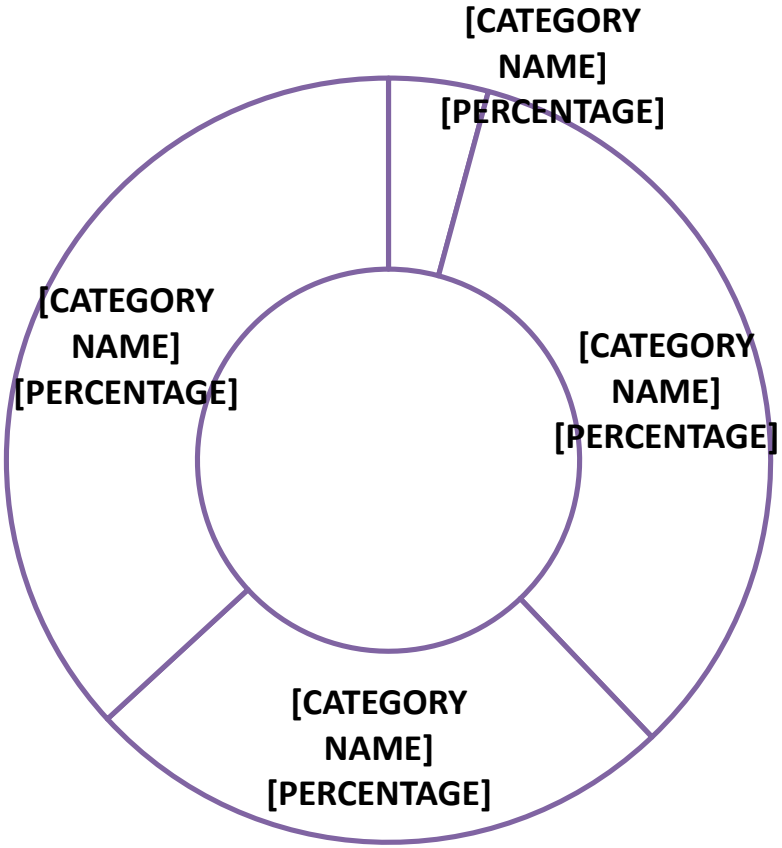
Sorghum: The gluten-free, non-GMO, ancient grain of the future

- **Unique flavonoid pigments**
  - antioxidant, anti-inflammatory, anti-cancer
- **Low starch digestibility**
  - controls weight gain and diabetes



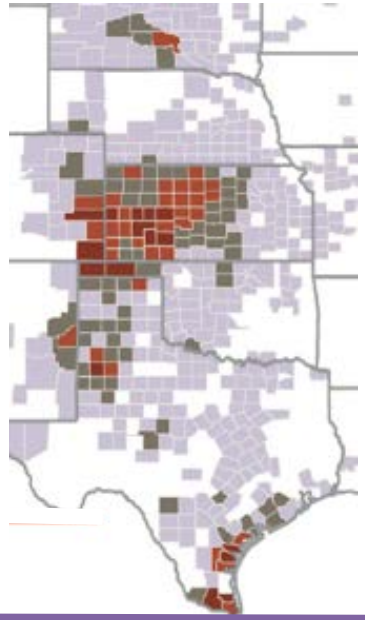
Kansas farmers:

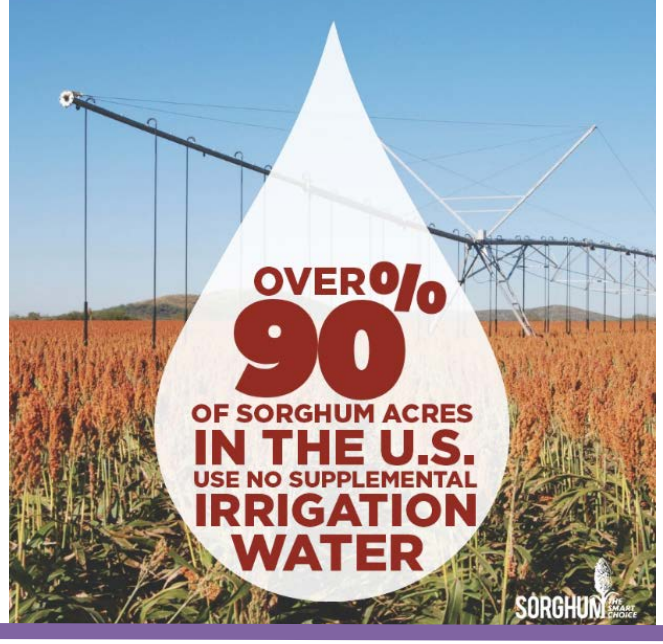
Grown 84 bushels per acre sorghum

Harvested 228M bushels

Planted 2.85M acres

USDA NASS





92% of sorghum is grown in states that overlay the Ogallala Aquifer

NASS

Sheridan 6 Case Study

Goal

5-year
20% conservation
99 sq miles

Result

25% conservation
78% reduction in water decline

Kansas Office of the Governor 2017)

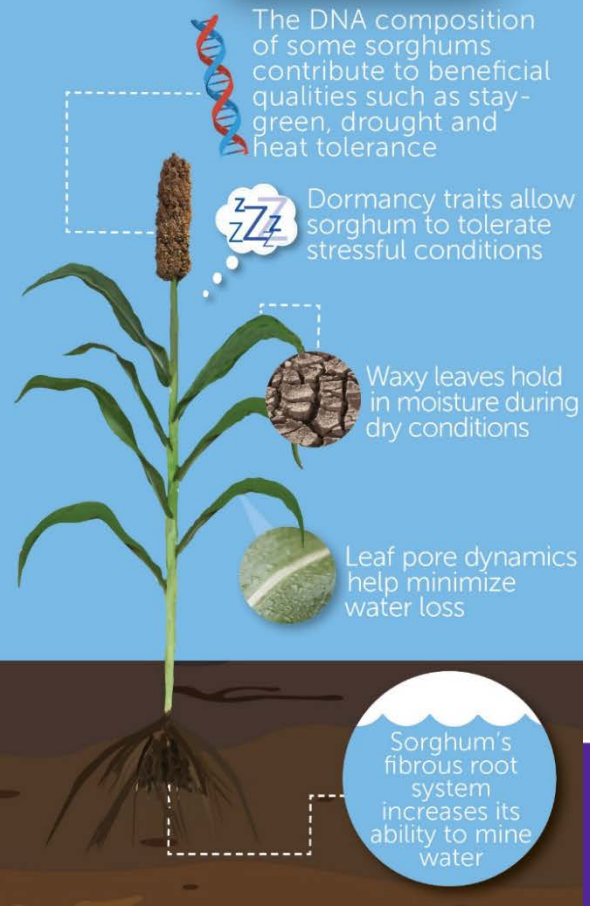
Irrigated Crop Mix Shift in LEMA	
Corn	-22.8%
Alfalfa	-4.9%
Sorghum	**406.2%**
Soybean	-13.5%
Wheat	95.0%
Mixed Crop	-18.3%

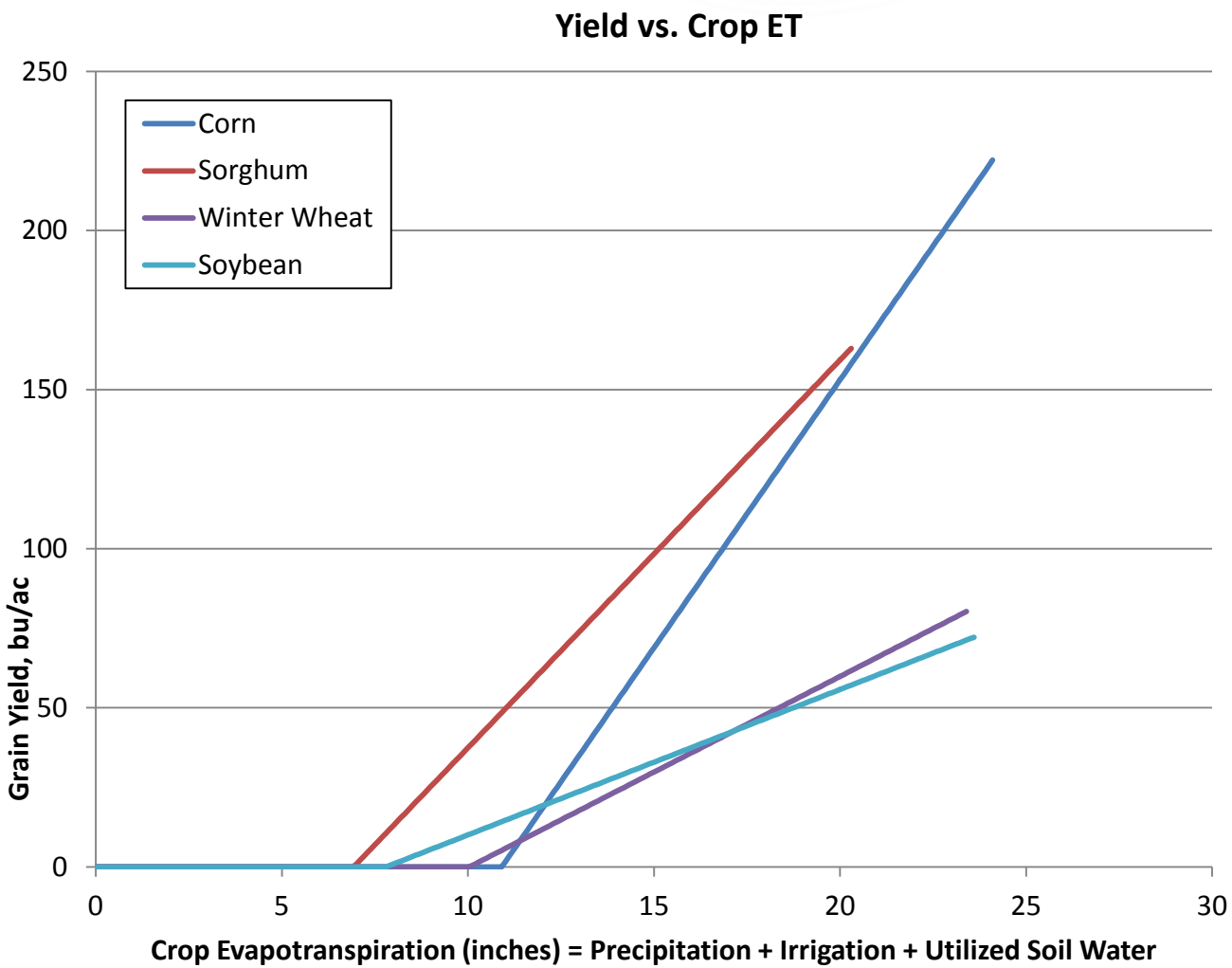
	Water Use (in/acre)	Cash Flow ($/in)
Corn		
Inside LEMA	10.0	$45
Outside LEMA	19.7	$26
Sorghum		
Inside LEMA	6.0	$73
Outside LEMA	NA	NA

Golden, 2016

Sorghum
Rain or Shine

Sorghum's inherent drought tolerance makes it a suitable crop for resource-limited environments. In addition, it possesses flexibility to be profitable and competitive in higher yielding, more ideal conditions.



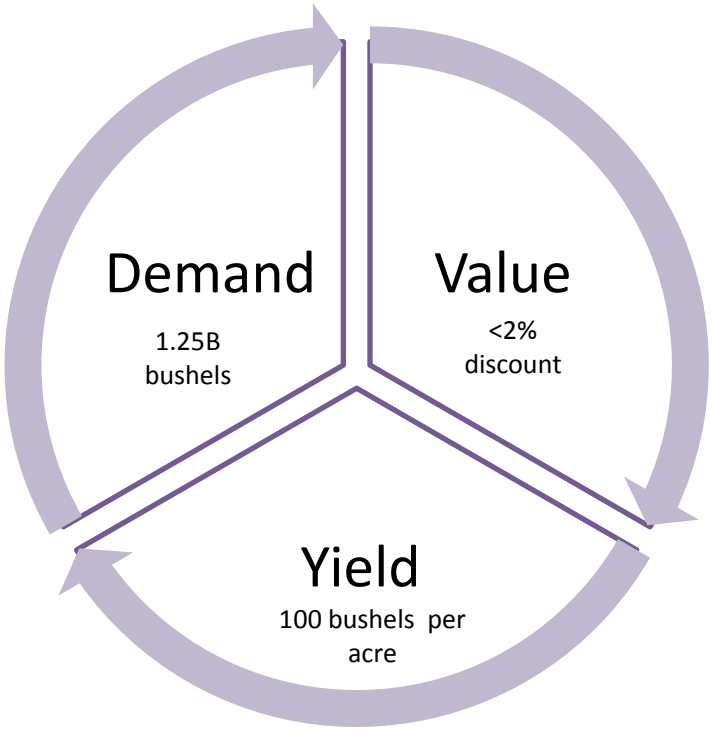


Adapted from Stone et al., 2006 by Lucas Haag, K-State NWREC

CENTER FOR SORGHUM IMPROVEMENT

A farmer partnership housed at Kansas State University

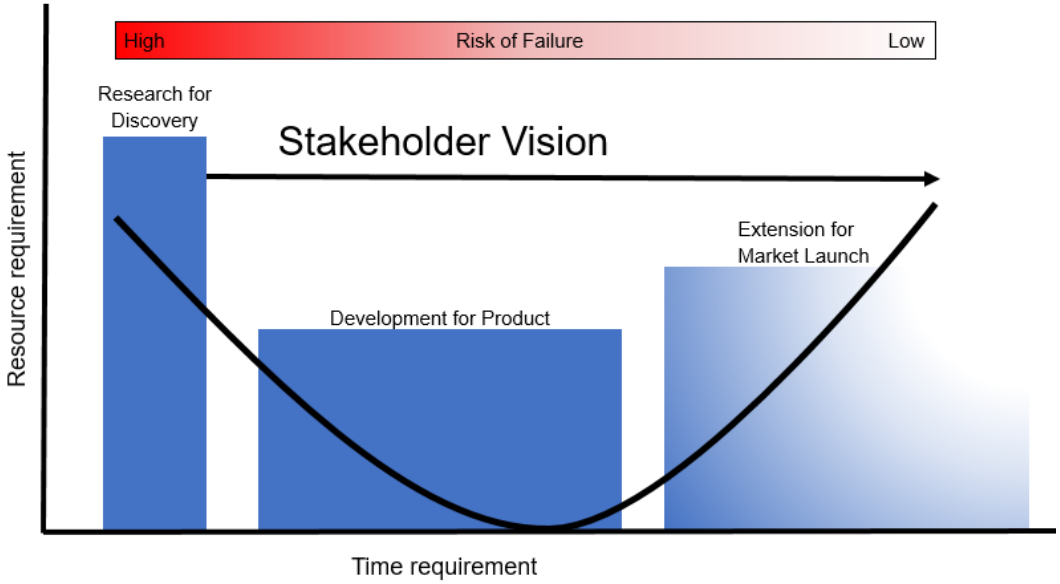
Collaborative Sorghum Investment Program

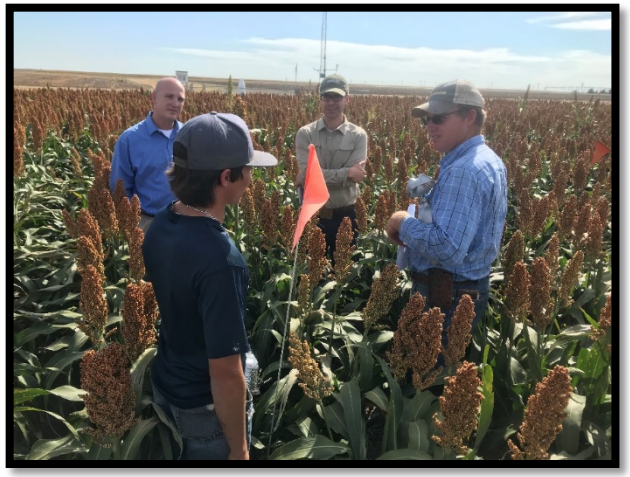


CENTER FOR SORGHUM IMPROVEMENT

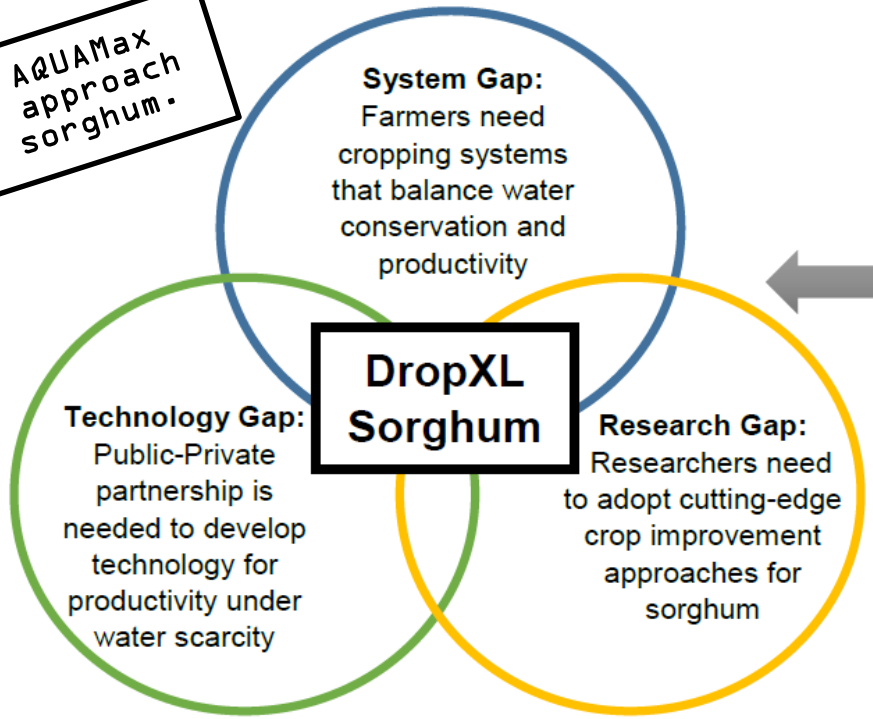
The Center for Sorghum Improvement is a farmer, industry collaborative platform designed to capitalize on sorghum innovation.

CENTER FOR
SORGHUM
IMPROVEMENT





The AQUAMax corn approach for sorghum.



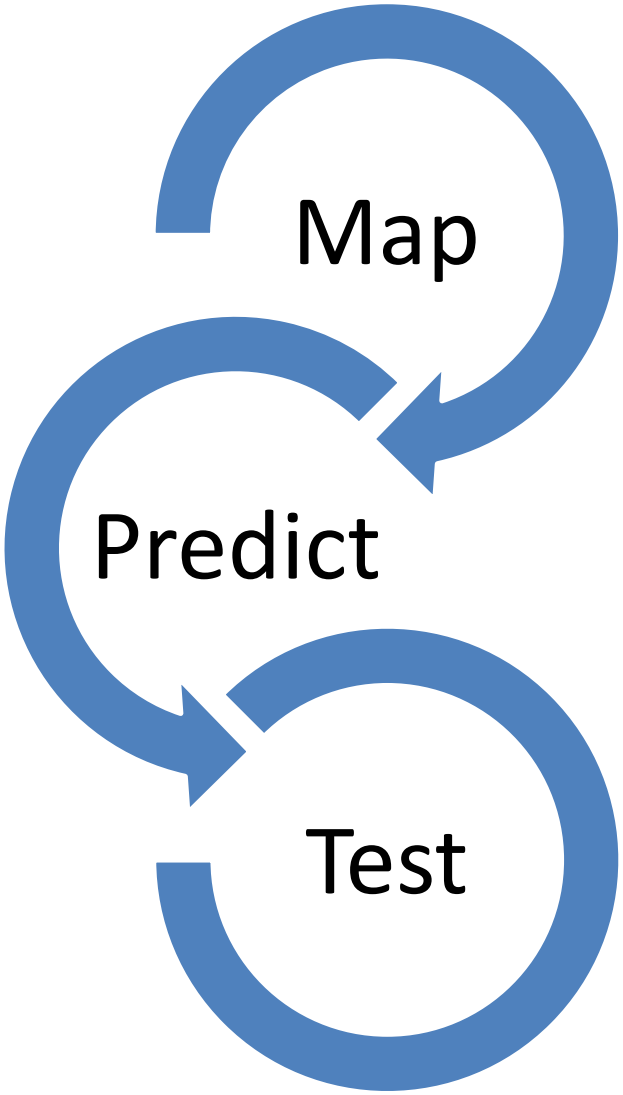
The <u>DropXL mission aligns</u> with *Kansas Water Vision Plan* and *Ag Growth Strategy*:

1. Increase utilization of less water intensive crop varieties (Vision).
2. Implement sorghum research funding mechanism based on a public-private partnership (Vision).
3. Address sorghum research needs (Vision).
4. Expand research partnerships and strengthen Kansas' position as the top sorghum-producing state in the nation (Strategy).

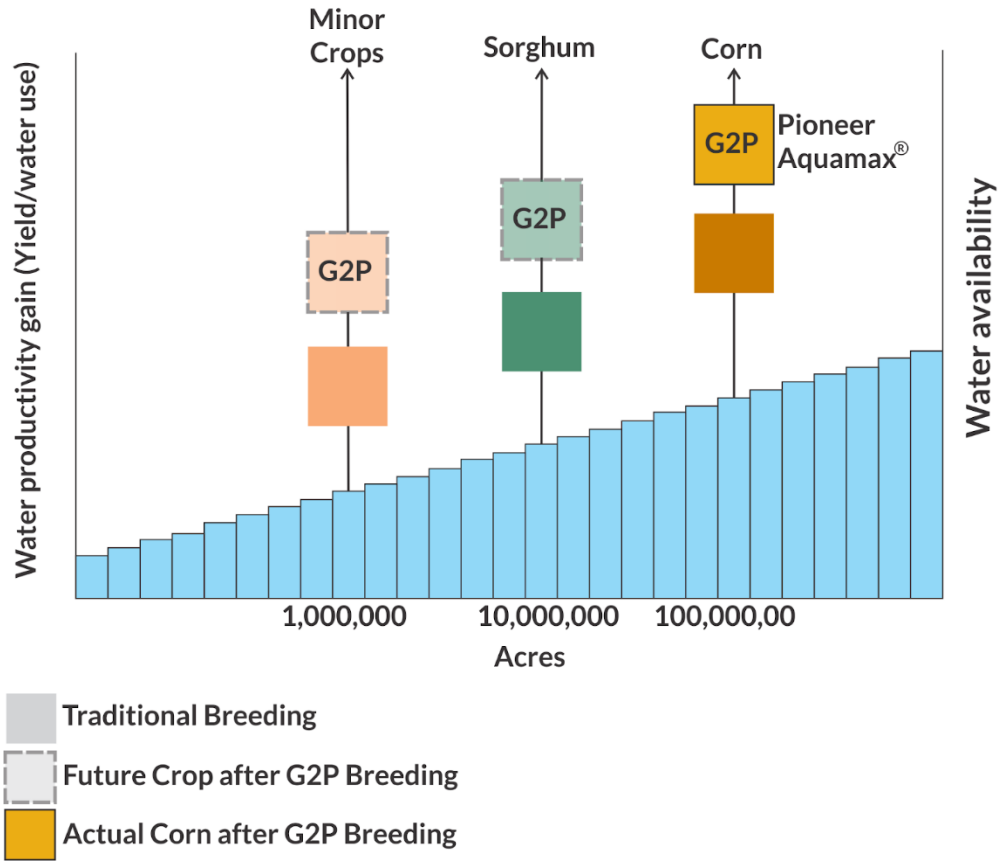
Deliverable: Higher yield under moderate water limitation

Limited Transpiration Crop Model Effects → 2019 Short-term (Research)
Trait Technology Package → 2024 Mid-term (Development)
DropXL Sorghum Technology → Long-term

The Approach

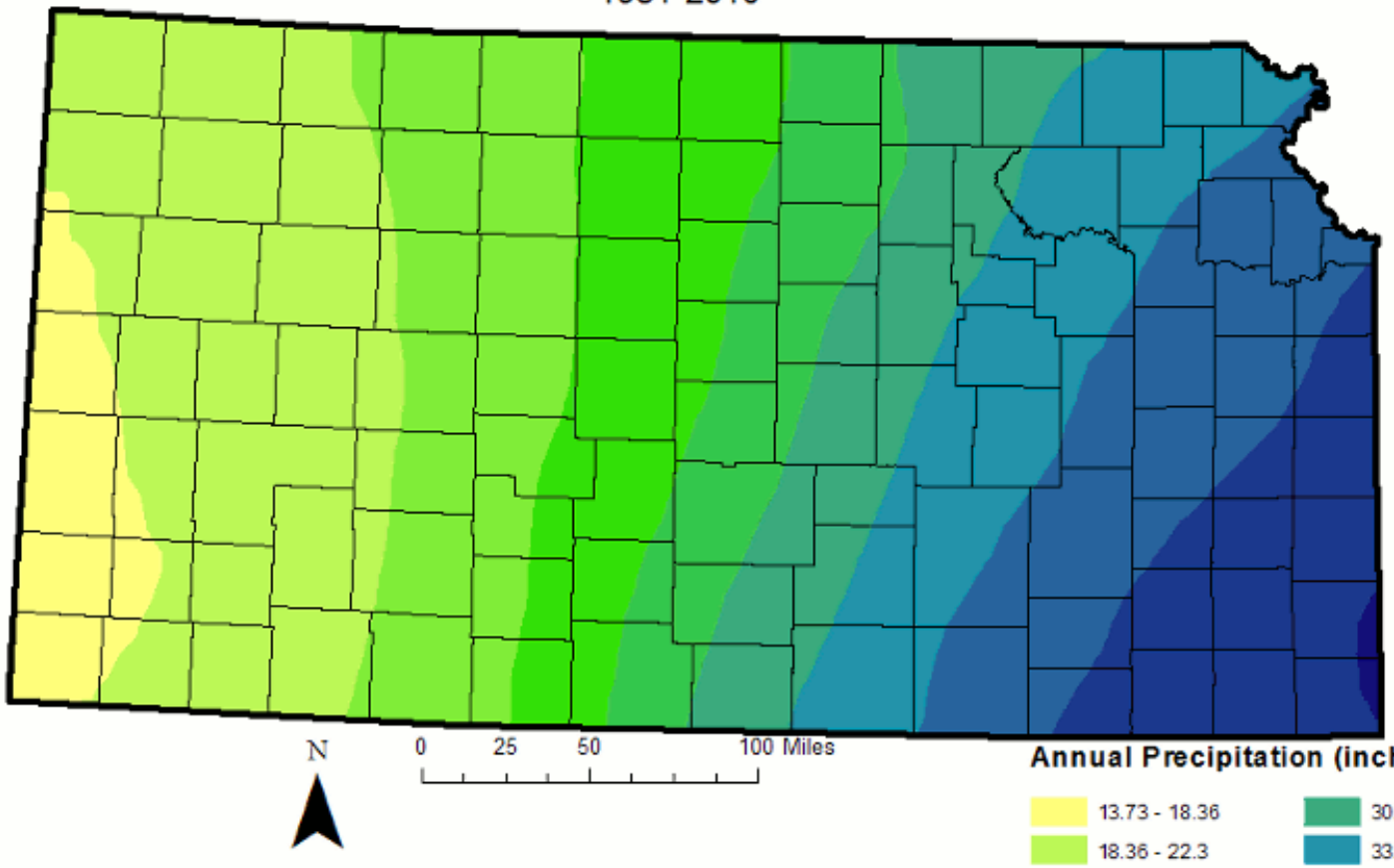


If you are in the treasure hunting business, start with a map.



Normal Annual Precipitation

1981-2010

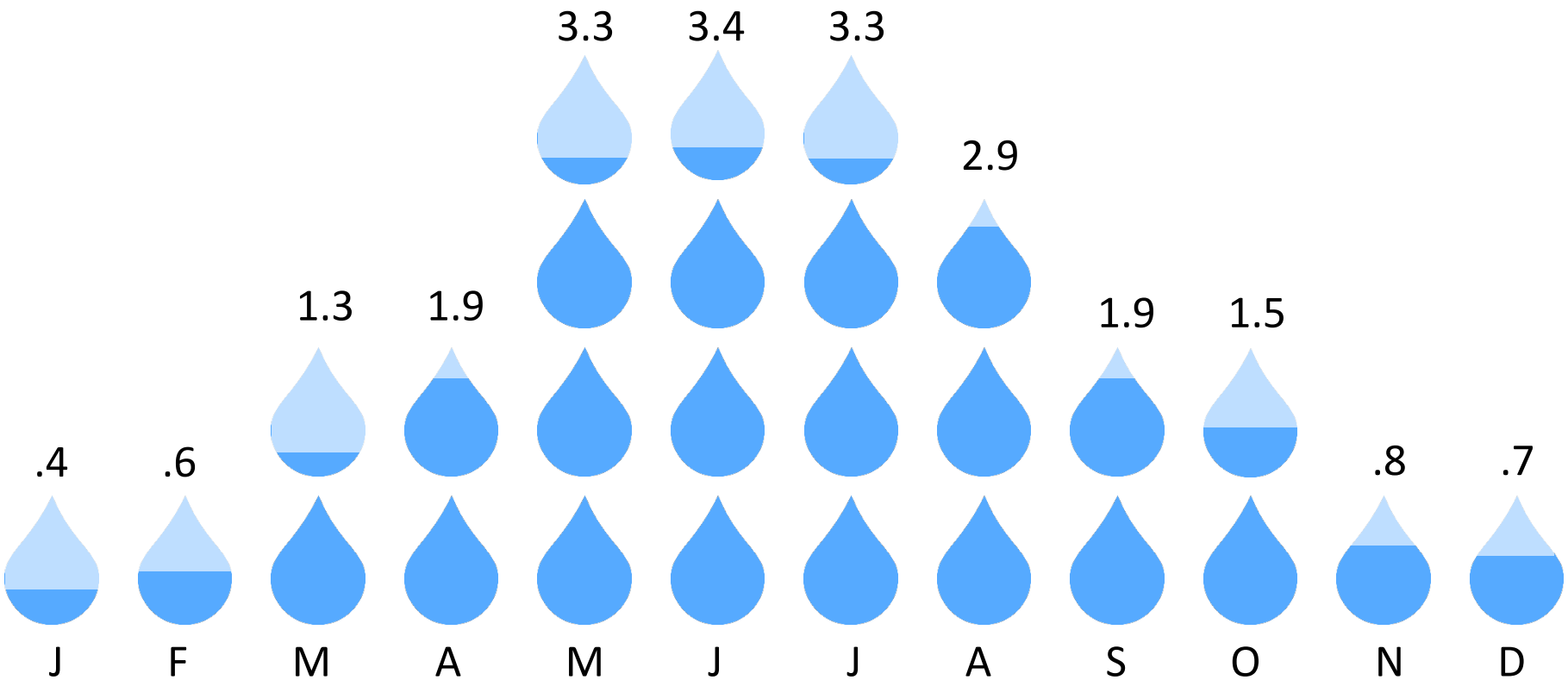


Annual Precipitation (inches)

- 13.73 - 18.36
- 18.36 - 22.3
- 22.3 - 25.66
- 25.66 - 28.53
- 28.53 - 30.97
- 30.97 - 33.84
- 33.84 - 37.2
- 37.2 - 41.14
- 41.14 - 45.77
- 45.77 - 51.2

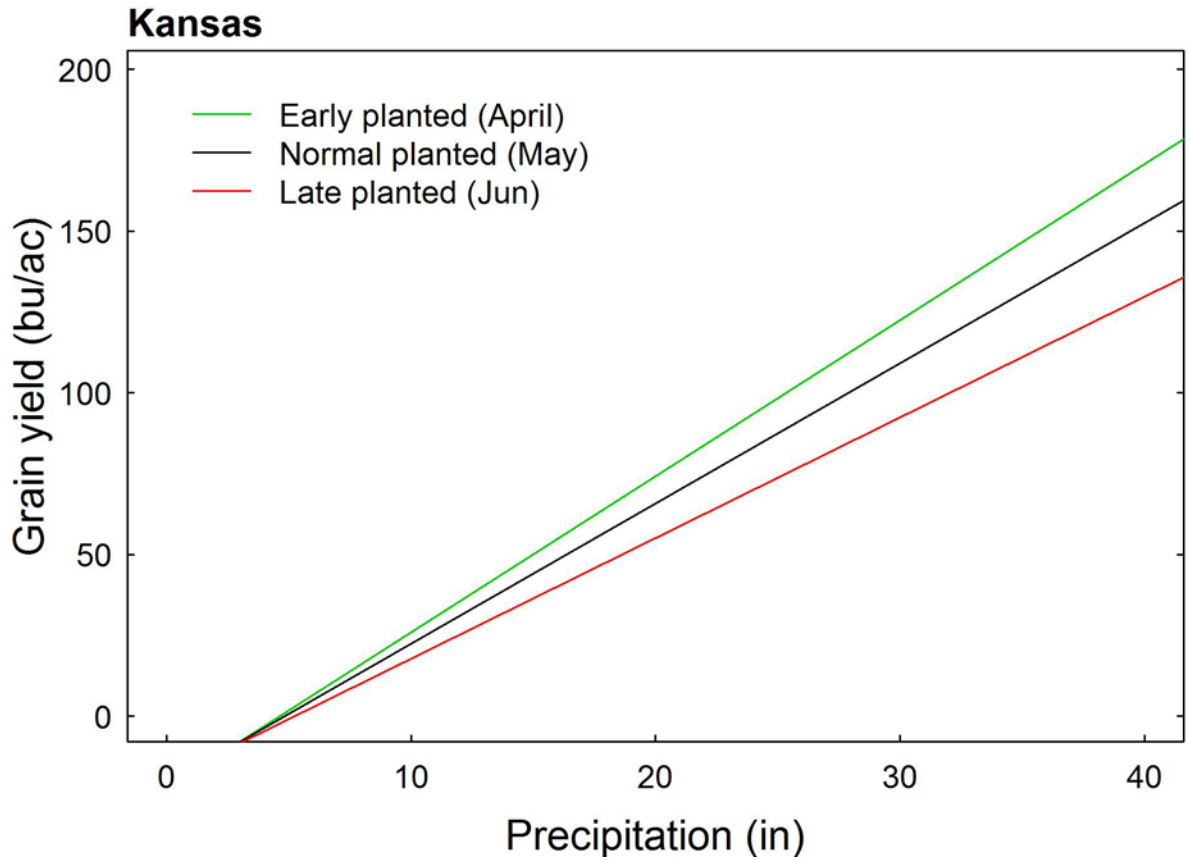
Produced by Weather Data Library
Department of Agronomy
Kansas State University

Is my crop growing, when water is available?



Source: DropXL Sorghum, Morris, Raymundo

Change in Rainfall, and Productivity Compared to May Planting		
April	+2"	+3 Bu/Ac
June	-2"	-6 Bu/Ac

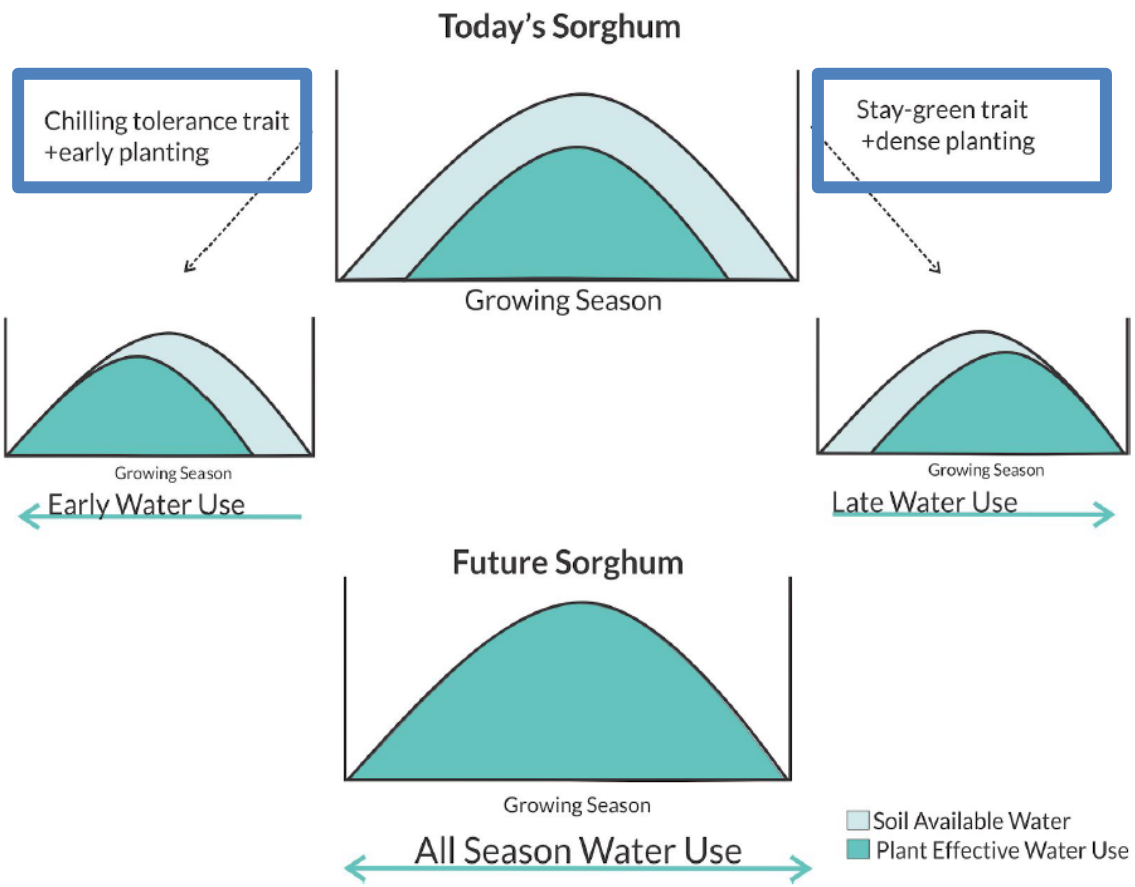


35M Direct Impact
60M Total Impact

Economic Impact to Kansas with April to May planting shift
Source: KDA IMPLAN Data

Source: DropXL Sorghum, Morris, Raymundo

Leveraging DropXL, G2P Bridge



K·STATE Research and Extension

FFAR

Kansas GRAIN SORGHUM Commission

CORTEVA

RECS

University of California Agriculture and Natural Resources

Research and Extension Center System

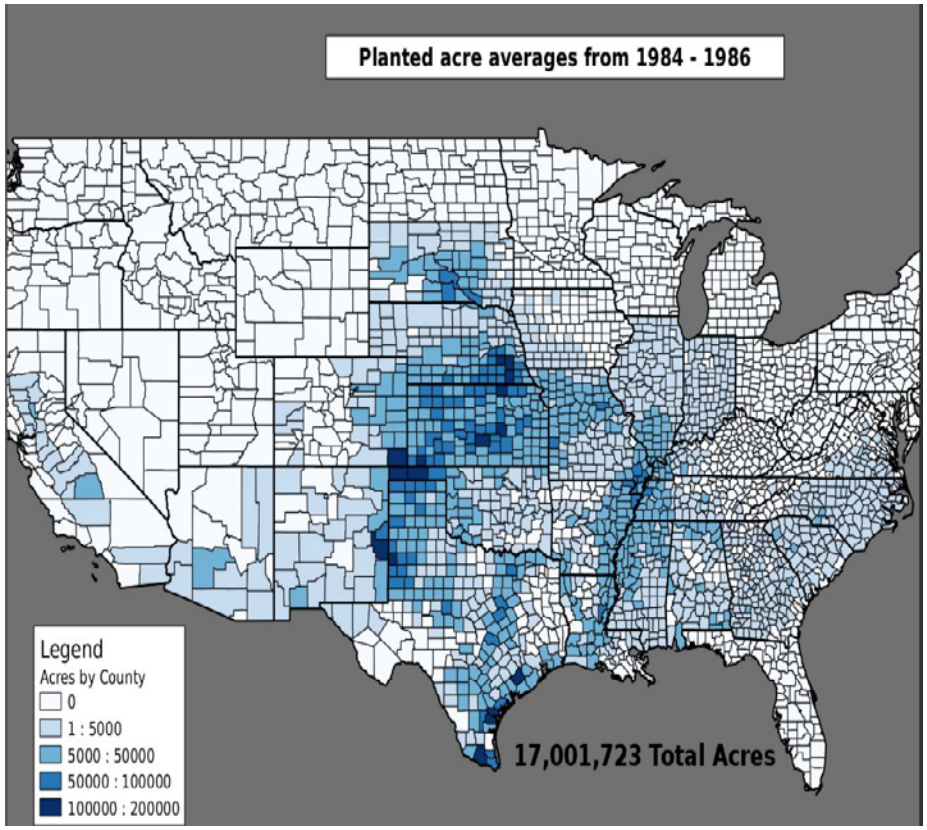
Kansas State University

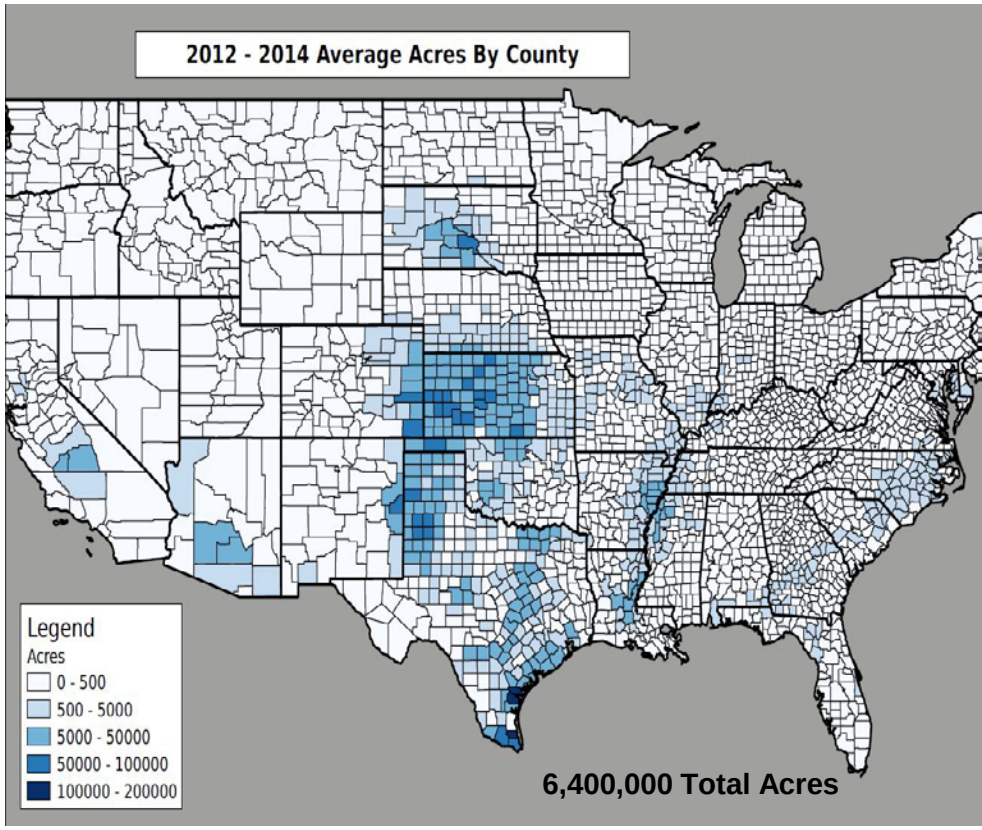
Center for Sorghum Improvement

Collaborative Sorghum Investment Program
Center for Sorghum Improvement
Kansas State University

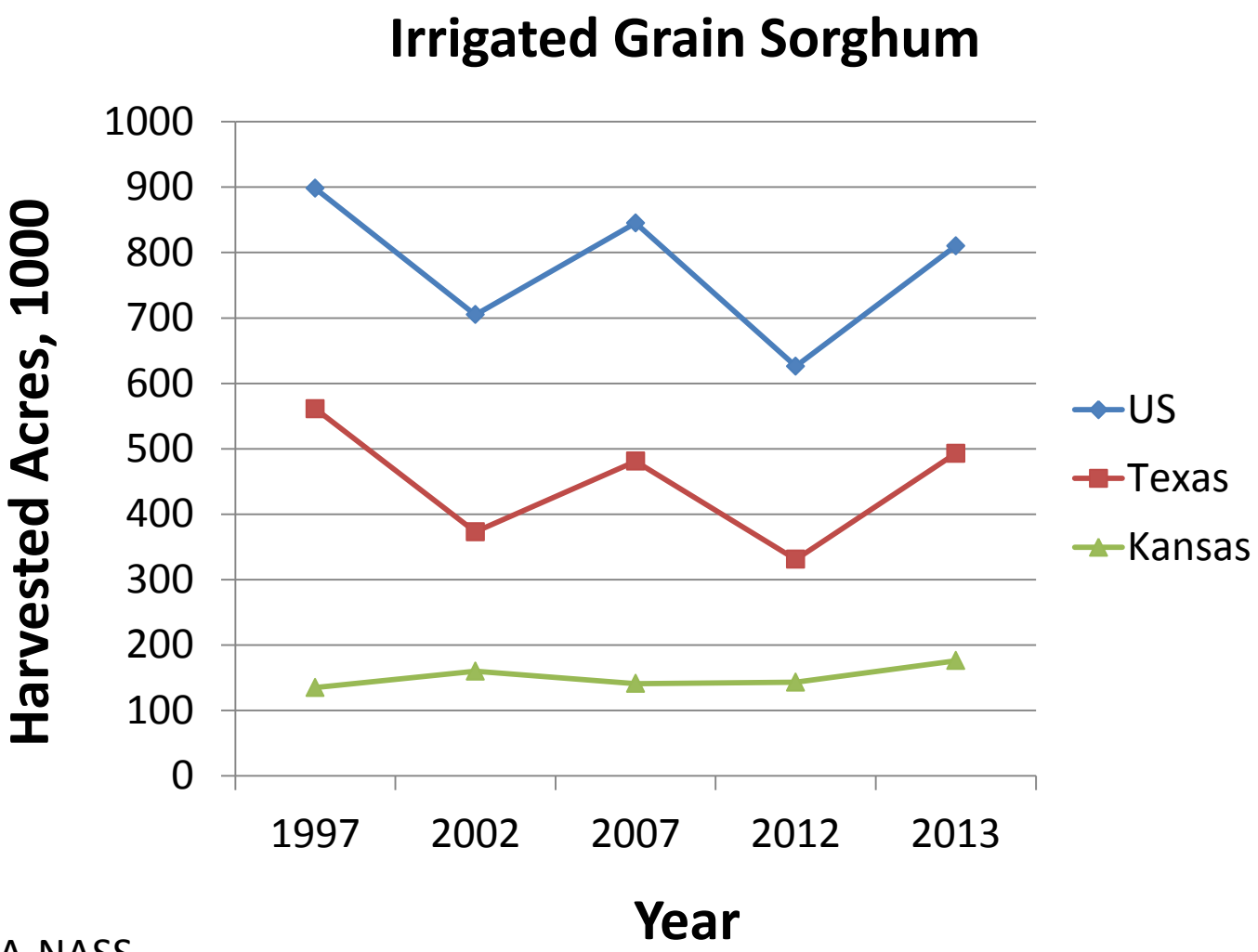
www.csisorghum.org
785-477-6018 sarahann@ksu.edu

Change in Acres

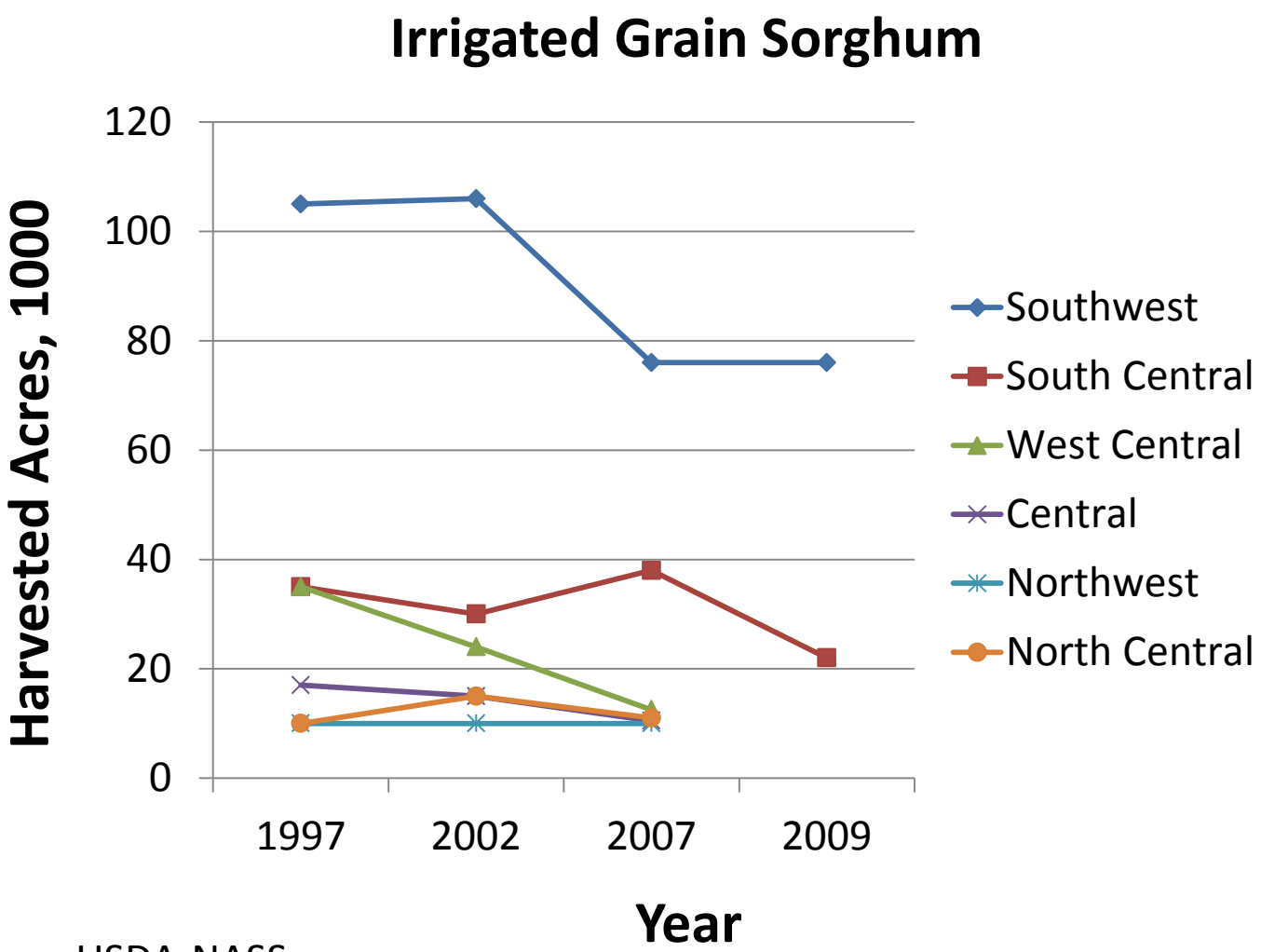




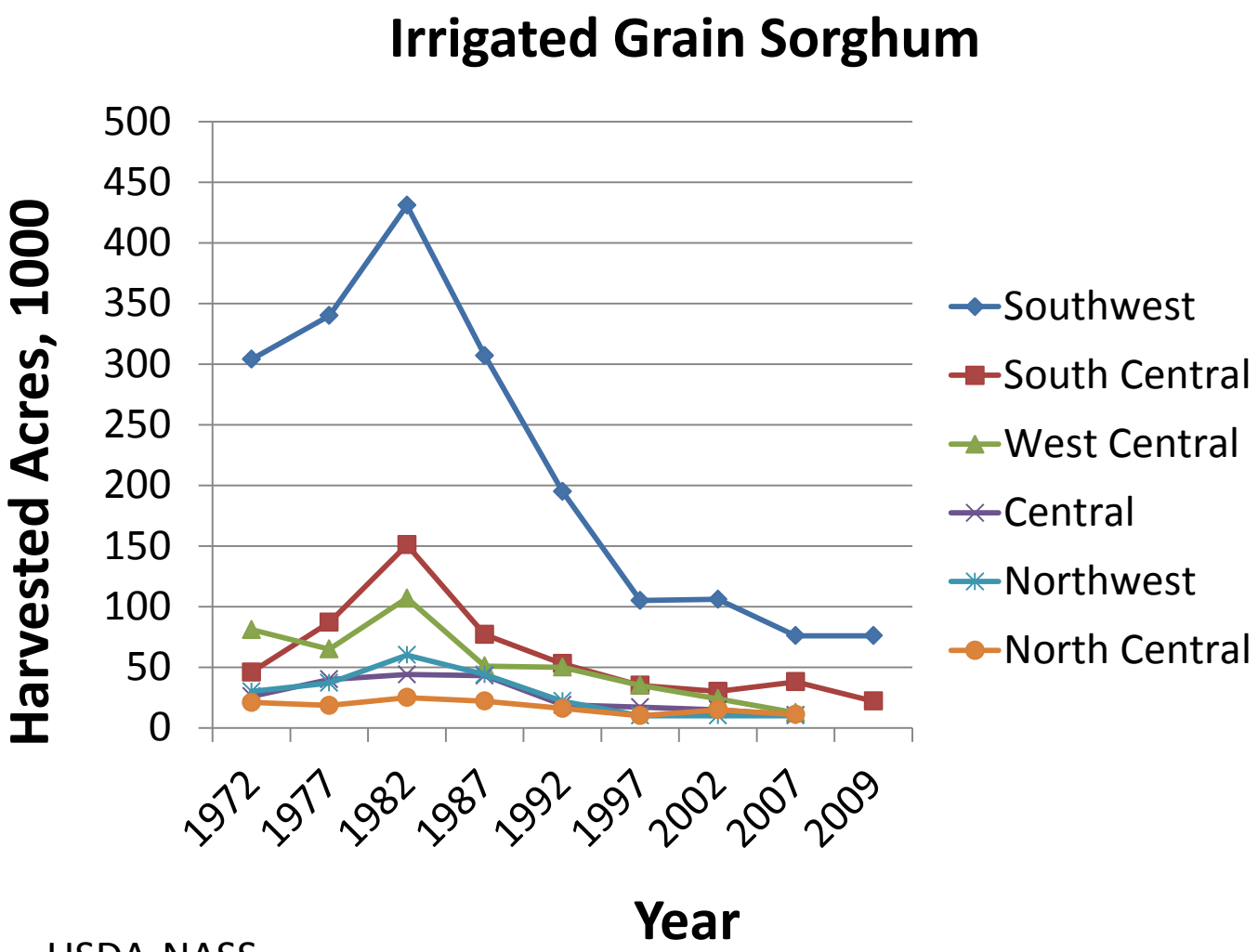
AMS Approved

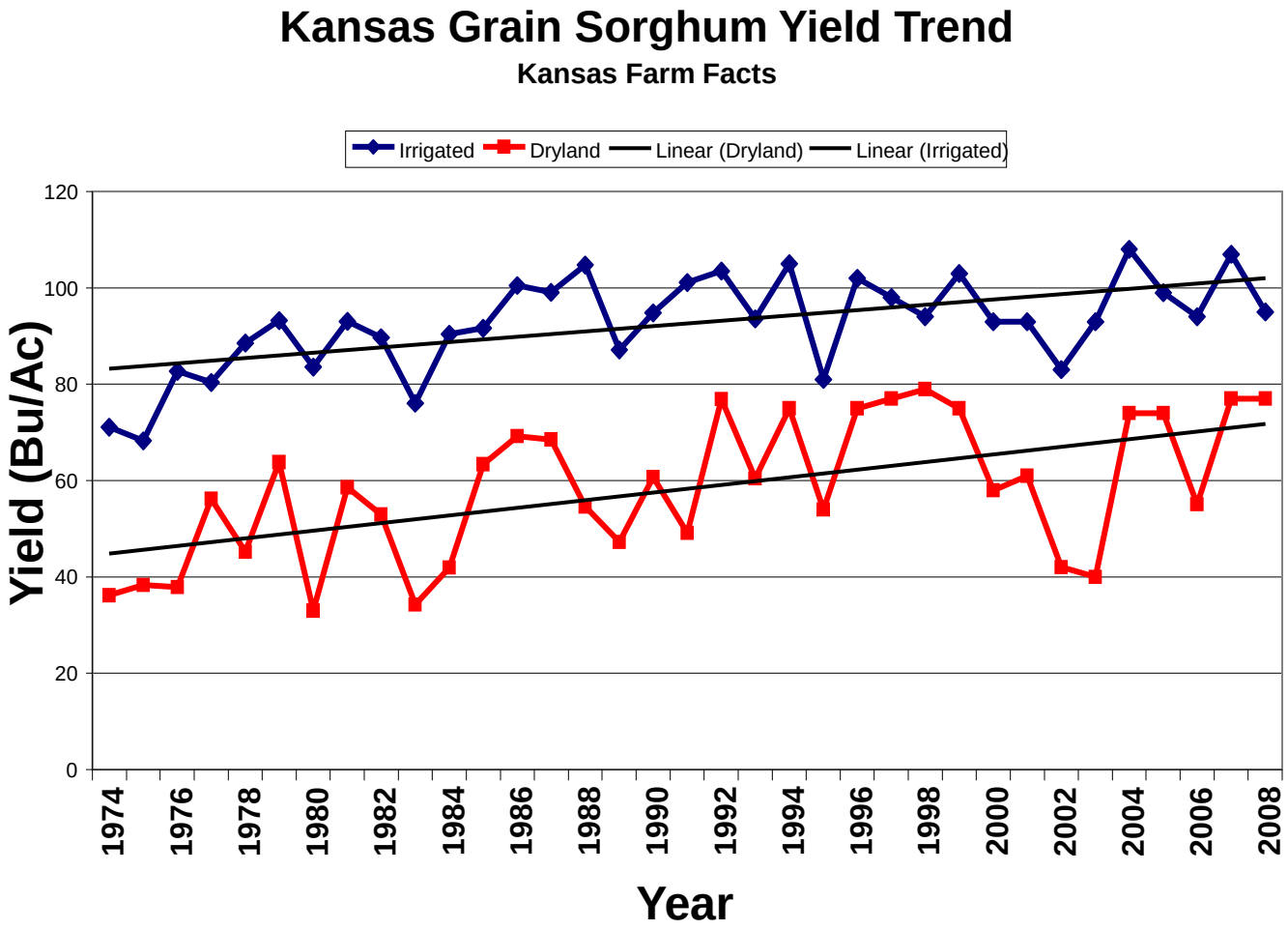

Irrigated Grain Sorghum
Harvested Acres, 1000
1000
900
800
700
600
500
400
300
200
100
0
1997
2002
2007
2012
2013
Year
US
Texas
Kansas

USDA-NASS


Irrigated Grain Sorghum
Harvested Acres, 1000
120
100
80
60
40
20
0
1997
2002
2007
2009
Year
Southwest
South Central
West Central
Central
Northwest
North Central

USDA-NASS


Irrigated Grain Sorghum
Harvested Acres, 1000
500
450
400
350
300
250
200
150
100
50
0
1972
1977
1982
1987
1992
1997
2002
2007
2009
Year
Southwest
South Central
West Central
Central
Northwest
North Central

USDA-NASS

Irrigated sorghum yields increased 0.6 bu/year