SUSTAINABILITY ANALYSIS

2020 ON-FARM PRACTICES REPORT

EXECUTIVE SUMMARY

About the Project

United Sorghum Checkoff supports growers that are implementing conservation practices, in-field and edge-of-field, on their farms. They have partnered with Pheasants Forever to bring a unique program to assist with expertise and incentives to implement these types of practices. Sorghum is one of the top five cereal crops in the world. The growers in the program participated from across the state of Kansas. Kansas is the largest sorghum producer in the United States (Kansas Grain Sorghum Commission, 2019).

About Sorghum Checkoff

The Sorghum Checkoff commits to reveal the potential and versatility of sorghum through increased shared value.

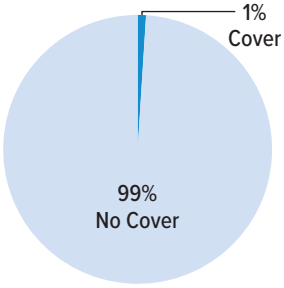
Quantifying the Impact of Actual Farm Practices

The benefits were determined through EcoPractices' unique process that is able to pinpoint the influence of specific agricultural practices. While agricultural practices have progressed to better care for natural resources, the ability to quantify the influence these practices have on sustainability has not kept pace. Having such data brings more depth to on-farm decision-making while reducing supply chain sustainability risk.

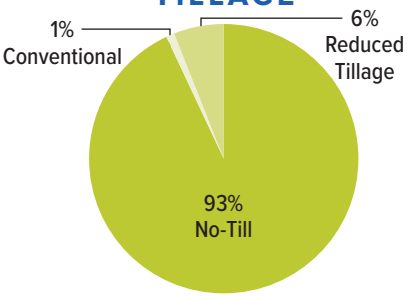
Conservation Practice	Fields	Acres
Buffer	1	5
Grassed Waterway	2	12

7 farms with **9,167 acres** from **65 fields**

COVER CROPS



TILLAGE



According to the 2017 US Ag Census, the national average is **4% cover crop** adoption, **37% no-till** adoption, and **35% reduced till** adoption.

MANURE APPLICATION

7,505 tons of natural manure were applied. **13% of acres** received solid manure fertilizer at an average rate of **6.4 tons/acre.**

MANURE ECONOMIC VALUE

The average **cost savings** from manure applied to **1,164** acres was estimated to be **$35.35** per acre based on a reduced need for commercial N, P & K resulting in **a total savings** of **$41,138.**

IRRIGATION EFFICIENCIES

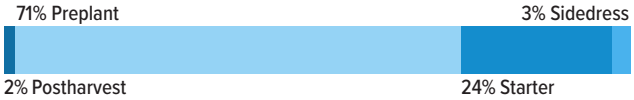
Pivots have nozzles which drop down closer to the ground to avoid much water loss.

7% of fields are irrigated at an average rate of **9.4 acre-in per acre.**

One of the biggest benefits of growing sorghum is its drought tolerance. It originated in northeastern Africa and therefore is greatly adapted to arid-semiarid regions. It also requires less inputs, such as nitrogen fertilizer, compared to other grain crops. Sorghum is in the top 5 cereal grains by production and acreage internationally.**

FERTILIZER TIMING

Application timing is an important strategy to minimize fertilizer loss and increase efficiency.



AVERAGE APPLICATION RATE

An average rate of **66 lbs/acre of nitrogen** applied on **92% of acres.**

Weather, Soils, and In-Field Management Practices influence the following environmental metrics

IN-FIELD ENVIRONMENTAL OUTCOMES

The data is reflective of weather and soils influence in addition to implemented in-field management practices for the project year.†

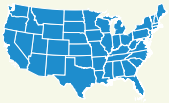
	Overall Farm
Net GHG Emissions	**-0.30 T CO_2e/ac**
Soil Carbon Sequestered	**0.18 T C/ac**
Soil Erosion Rate	**0.82 T/ac**

EROSION AVERAGE

*The USDA National Resources Inventory provides estimates on average erosion for different systems across the US.**

KS Cropland

5.0 T/ac



National Average

4.6 T/ac

Crop	% Acres	Yield
Sorghum Grain	98%	66 bu/ac
Soybean	2%	43 bu/ac

SOIL CONDITIONING INDEX (SCI)

Soil Conditioning Index (SCI) is a tool from NRCS that shows the trajectory of soil health. A positive SCI means a positive trajectory of soil health and vice versa.

The fields in the project are an overall **+ trajectory** for **SCI.**

Cropland

100%

IN-FIELD PRACTICE COMPARISON IMPACTS

When compared to conventional practices (i.e. conventional tillage, no cover crop scenario), in-field farm practices generated:‡

2,948 fewer tons of CO_2e, *which is the same as*

572 average passenger cars off the road for a year

or **15 rail cars of coal** saved from being burned

804 tons of soil carbon sequestered

10,249 tons of soil saved instead of being lost to erosion, *which is the same as*

641 dump trucks of soil

2 lbs/acre of nitrogen saved instead of being lost through leaching and runoff.

<1 lb/acre of phosphorus saved instead of being lost through runoff.

EcoPRACTICES

Data provided by 7 sorghum growers for the 2020 growing season and calendar year.

†‡EcoPractices estimates an environmental impact value for reducing greenhouse gas emissions, reducing soil erosion, and reducing nutrient loss due to reduced leaching. These estimates adhere to processes that are documented by the NRCS Technical Guides and publications from the EPA. These values are tailored to a specific location and participant's operation. Models used are supported by USDA, NRCS, other government agencies, and major universities. Modeled results include input data from public resources for weather, soils, and historical crop rotation. Greenhouse gas simulations were produced from the Greenhouse Gas Inventory (GGIT) tool developed by Soil Metrics, LLC (2021) https://soilmetrics.eco. The GGIT tool implements the USDA-sanctioned greenhouse gas inventory methods described in Eve et al. (2014) 'Quantifying Greenhouse Gas Fluxes in Agriculture and Forestry: Methods for Entity-Scale Inventory". The GGIT tool utilizes greenhouse gas modeling technology developed for the COMET-Farm tool, licensed by Colorado State University to Soil Metrics, LLC.

*USDA, NRCS 2017 National Resource Inventory | **Kansas State University, Department of Agronomy