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WITH UP-TO-DATE SOYBEAN PRODUCTION INFORMATION

MISSISSIPPI SOYBEAN PROMOTION BOARD PROJECT NO. 12-2017 (YEAR 1) 2017 ANNUAL REPORT

PROJECT TITLE: Managing Irrigation Water Usage and Scheduling with Producers in Northeast Mississippi.

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OBJECTIVES

Objective 1. Demonstrate onsite with growers the use of soil moisture sensor technology and portable soil moisture meters, and encourage producer adoption of soil moisture sensor technology to enhance irrigation management practices. The counties with growers who participated in this study were Benton, Lee, Monroe, and Noxubee. Growers in Benton and Lee Counties have very limited knowledge of this technology, whereas the growers in Noxubee County had prior experience working with irrigation scheduling. Each grower had one watermark 900 monitor and sensors placed at 6, 12, and 24 in. depths within the demonstration field.

Objective 2. Educate growers on proper identification of crop growth and development stages and water usage with the agronomic stages, and demonstrate the value of applying research-based recommendations in producer fields.

RESULTS

Rainfall.

The 2017 growing season started with excessive rainfall in May and June for most of Mississippi. In our demonstration fields, we experienced above-normal rainfall during the growing season, and this limited our early-season root system development and caused problems with plants adapting during the dry periods of summer. In many situations, the lower areas of the fields were greatly affected by excessive moisture, while the more droughty area of the fields exhibited stronger plants and higher soybean yields. Details of the program are shown in Table 1.

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Table 1. Counties in the demonstration program, total irrigation water applied, rainfall amounts during the growing season, and irrigation and rainfall amounts for each demonstration field during the growing season.			
County	Irrigation	Rainfall During Growing Season (Planting – Harvest)	Total Water
		-----inches-----	
Benton	1.00	17.31	18.31
Lee	3.75	19.19	22.94
Noxubee #1	2.75	16.81	19.56
Noxubee #2	4.65	20.45	25.10

**Yield
Results
(Table
2).
Benton**

County. The irrigated and non-irrigated test field yielded 58.0 bushels/acre. Therefore, there was no response to the 1.0 inch of irrigation water being applied through the center pivot irrigation system on this field.

Lee County. The irrigated portion of the field yielded 42 bu/acre and the nonirrigated portion yielded 49.0 bu/acre. The 3.75 in. of irrigation water applied through the center pivot system was associated with a decreased yield 7.0 bu/acre.

Noxubee County. Field #1 irrigated yield was 64.5 bu/acre and the nonirrigated yield was 55.2 bu/acre. The 2.75 in. of irrigation water applied through a center pivot increased yield by 9.3 bu/acre. Therefore, each inch of additional water **increased** soybean yield by 3.1 bu/acre.

Noxubee County. Field #2 irrigated yield was 65.0 bu/acre and the nonirrigated yield was 55.0 bu/acre. The 4.65 in. of irrigation water applied through a center pivot increased yield by 10.0 bu/acre. Therefore, each inch of additional water **increased** soybean yield 2.15 bu/acre.

Table 2. Results from Irrigated Field Studies in Shown Counties.				
County	Irrigated Yield	Yield produced for each inch of water (including irrigation & rainfall)	Non Irrigated yield	Yield produced for each inch of water (rainfall only)
	Bu/acre	Bu/acre/in.	Bu/acre	Bu/acre/in.
Benton	58.0	3.17	58.0	3.35
Lee	42.0	1.83	49.0	2.55
Noxubee #1	64.5	3.35	55.2	3.28
Noxubee #2	65.0	2.59	55.0	2.69

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SUMMARY

Data from the USDA Agricultural Statistics Services indicate that fields of growers who participated in the irrigation management demonstration program produced higher soybean yields than their current county yield average. Although our demonstration plot yields were higher than the county average, we still have some work ahead of us in irrigation management.

Growers still overwater fields and internal and surface drainage issues in East Mississippi are still limiting our production. Under a normal rainfall pattern, we would get much better yield results due to a better root system. Listed is my take-home message from this project and ways we can better serve our growers in East Mississippi.

- Currently we have a lack of overall concentration for irrigation management in East MS on the local level. We need to identify an irrigation specialist that will concentrate on both sides of the state and concentrate on irrigation with the way our systems work in East MS. We are a 99% surface water system with center pivots, so our extension programming should address this focus area.
- Overall lack of training to extension agents in East Mississippi with managing irrigation water usage. More team approach with our state soybean specialist, state irrigation specialist, and county extension personnel. This team should develop grants that would assist agents in their day-to-day interaction with growers who irrigate.
- East MS has a golden opportunity for increasing the profitability for our soybean growers if we make a concentrated effort in helping them. We should go back to the old SMART program but have separate funding for the East MS program.
- Only Noxubee #1 field had a higher increase for every inch of water when you include irrigation and rainfall amounts together over the area that excluded the irrigation amount. This indicates that we did a better job of managing water to the plants on this particular farm.
- The Lee County field had the worst bu/acre produced for every inch of water. This indicates we are overwatering our crops and drainage improvements must be addressed.
- Although a few fields were indicating low moisture during a few periods of the growing season, we must not overwater our elevated places in the field and concentrate water to the low portions and reduce yield.

Take home message

- Growers should trust the irrigation sensors and become more knowledgeable of the readings and thresholds for irrigation scheduling. More in-field data with various monitors and sensors across more soil types and tillage situations will help growers make better irrigation decisions.
- Knowledge of the sensor readings will keep growers from irrigating when they think it should be done. Irrigation should be based off trusted sensor data.
- We are not maximizing yields on wet years due to overwatering and drainage. Utilizing sensor data and following the guidelines would eliminate our yield issues.