

# ASSESSING WATER USAGE IN NON-CONVENTIONAL RICE

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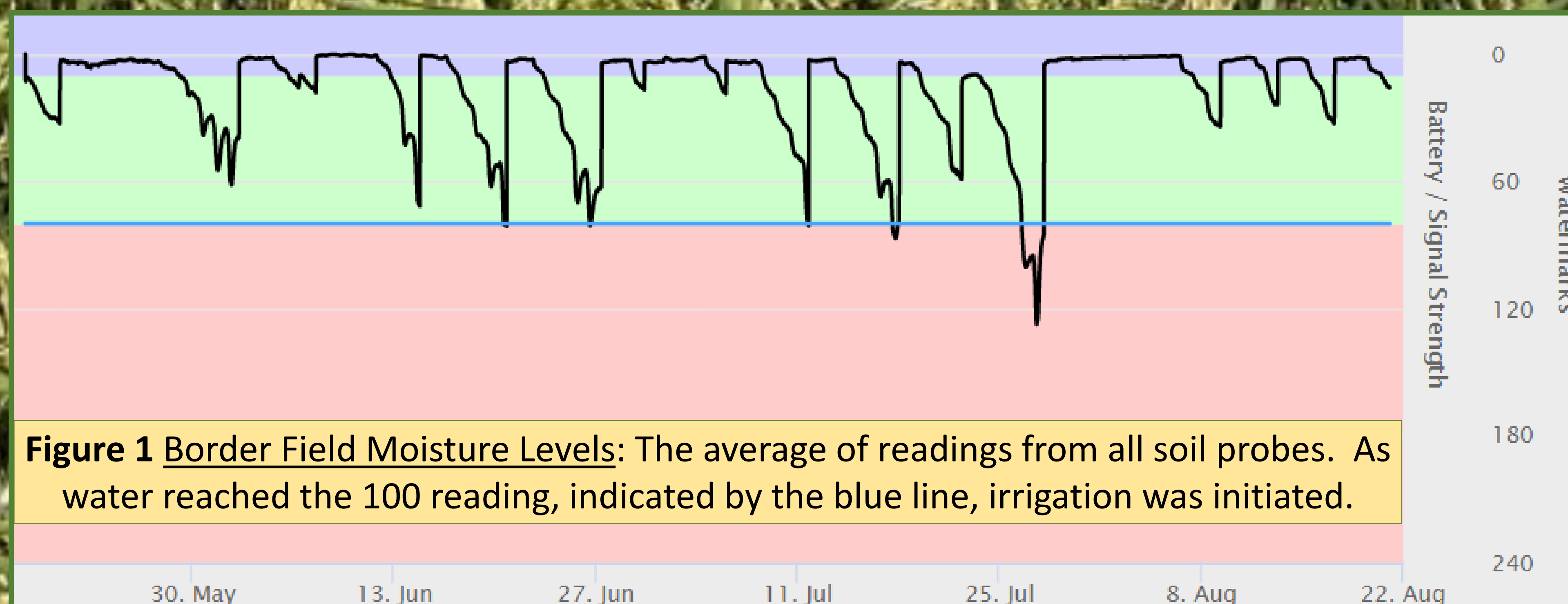
## Introduction:

In Arkansas rice production the majority of acres are grown using the conventional flooded field method. However, the popularity of non-flooded rice is on the rise. This applied research trial set forth with the hypothesis that the border and furrow irrigation methods in rice are valid methods to increase water conservation by producers. These methods require a field that does not possess a cross slope. The border field was divided by small levees/borders every 60-80ft. These borders are not required to be as substantial as in traditional fields but provide just enough height to direct water down the field. The furrow rice was planted on 30-inch beds with furrows running the length of the field. Water is then flushed across the fields to ensure adequate irrigation and not put into a traditional flood. Both fields selected for this trial were a Crowley-Stuttgart loam which is excellent for flushing water across instead of flooding.

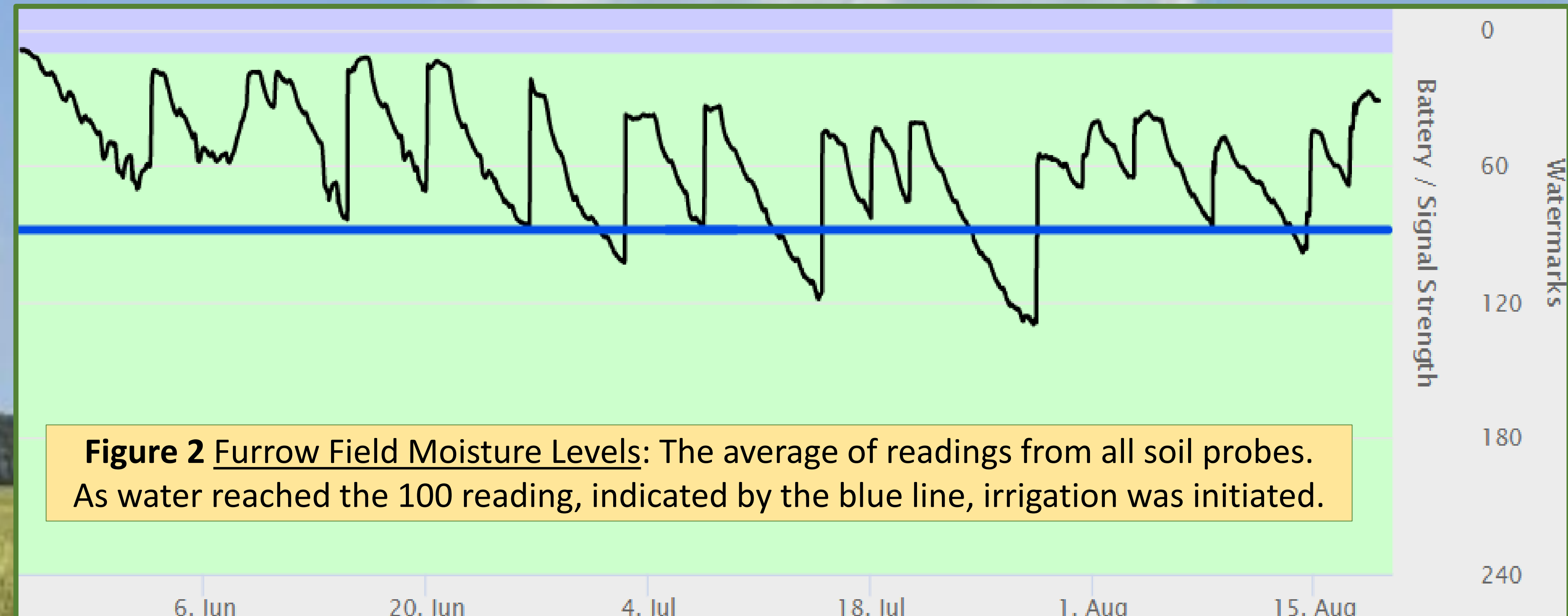


## Field Prep and Study:

Both fields were seeded at 23lbs/acre with Rice Tec 7521 FP. Stand counts were at 6 plants per sq ft. in the Border Field and 6.6 plants per sq ft. in the Furrow Field. Both fields are within the standard population recommendations (Hardke et al., 2022). Before irrigation was initiated, a flow meter was attached to the well used for each field. An Agsense moisture reader was also installed in each field with probes at 4in, 6in, 12in, and 18in. Each field was scouted on a weekly basis. Each week the change on the flow meters were recorded and the Agsense moisture sensors were consulted. The data in Figures 1 and 2 was used to relay to the producer when to flush water across both fields.



**Figure 1** Border Field Moisture Levels: The average of readings from all soil probes. As water reached the 100 reading, indicated by the blue line, irrigation was initiated.



**Figure 2** Furrow Field Moisture Levels: The average of readings from all soil probes. As water reached the 100 reading, indicated by the blue line, irrigation was initiated.

## Results:

### Production at Harvest

- Border field – 212 bushels/acre
- Furrow field – 187 bushels/acre

### These fields received the following water based on calculations from flow meter readings

- Boarder field – 19.5 acre/in of water
- Furrow field – 20.6 acre/in of water

### Water usage per Bushel

- Border field – 10.8 bushel per acre/in of water
- Furrow field – 9.1 bushel per acre/in of water

It should be noted this growing season experienced conditions which reached D4 levels which is classified as an Exceptional Drought with possible widespread crop and pasture losses, fire risk, shortages of water in reservoirs, streams and wells causing water emergencies. The average usage of water in Arkansas rice is 30 acre/inch of water. Where the cost of 1 acre/inch of water is calculated at \$5.56 (Watkins, 2022). Table 1 below breaks down the cost of irrigating these fields versus the average rice field in Arkansas and shows significant savings in irrigation cost. This was achieved through timely watering and the use of data points provided by the moisture sensing technologies. Further research should look to compare boarder and furrow irrigated field water usage vs that of a conventional flooded field.

Table 1	Cost per acre/inch	Cost per field	Savings
Average Field	\$166.80	-	-
Border Field	\$108.42	\$3,794.70	\$2,043.30
Furrow Field	\$114.54	\$6,185.16	\$2,822.04

## References:

Hardke, J., Barber, T., Bateman, N., Butts, T., Hamilton, M., Henry, C., Mazzanti, R., Norsworthy, J., Roberts, T., & Wamishe, Y. (2022, January). 2022 Rice Management Guide. University of Arkansas System Division Of Agriculture. Retrieved March 8, 2023, from <https://www.uaex.uada.edu/farm-ranch/crops-commercial-horticulture/rice/2022%20Rice%20Management%20Guide.pdf>

Watkins, B. (2022). Crop enterprise budget: Arkansas Crop Budget Resources. Crop Enterprise Budget | Arkansas crop budget resources. Retrieved March 8, 2023, from <https://www.uaex.uada.edu/farm-ranch/economics-marketing/farm-planning/budgets/crop-budgets.aspx>

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