

Pivot your Thoughts: Overhead vs Furrow Irrigation



Row-Crop Irrigation

Furrow Irrigation – Recap

- Irrigation thresholds
- Application volumes and rates

Pivot Irrigation – New Research

- Irrigation thresholds
- Application volumes and rates

Why is there a difference?

- Furrow irrigation – balancing wet and dry
- Pivot irrigation – don't get dry

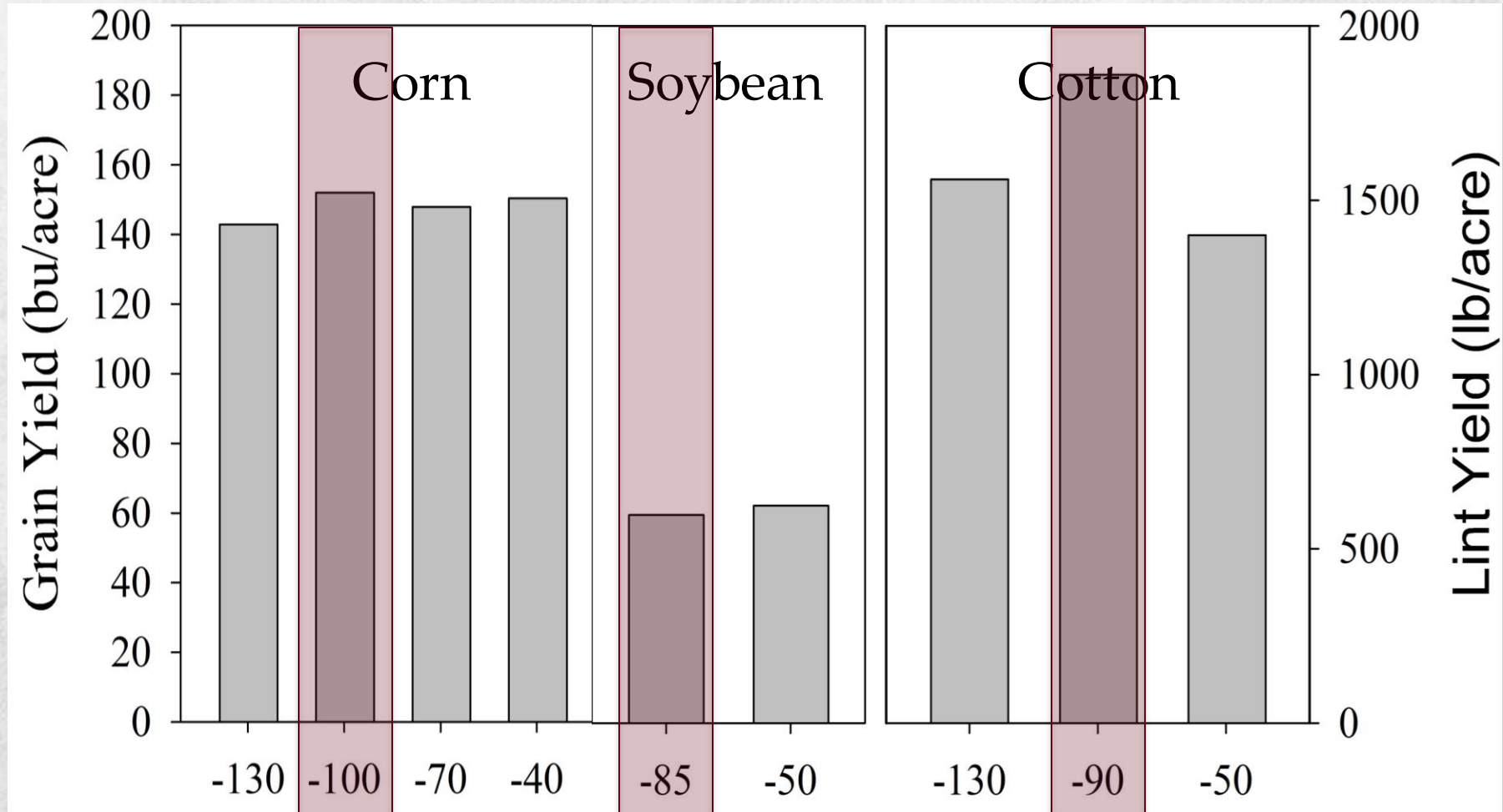


Furrow Irrigation – Scheduling

- How do we decide when to irrigate?
 - ET models
 - University or industry irrigation schedulers
 - Soil moisture sensors
 - Etc.



Furrow Irrigation – Small Plot

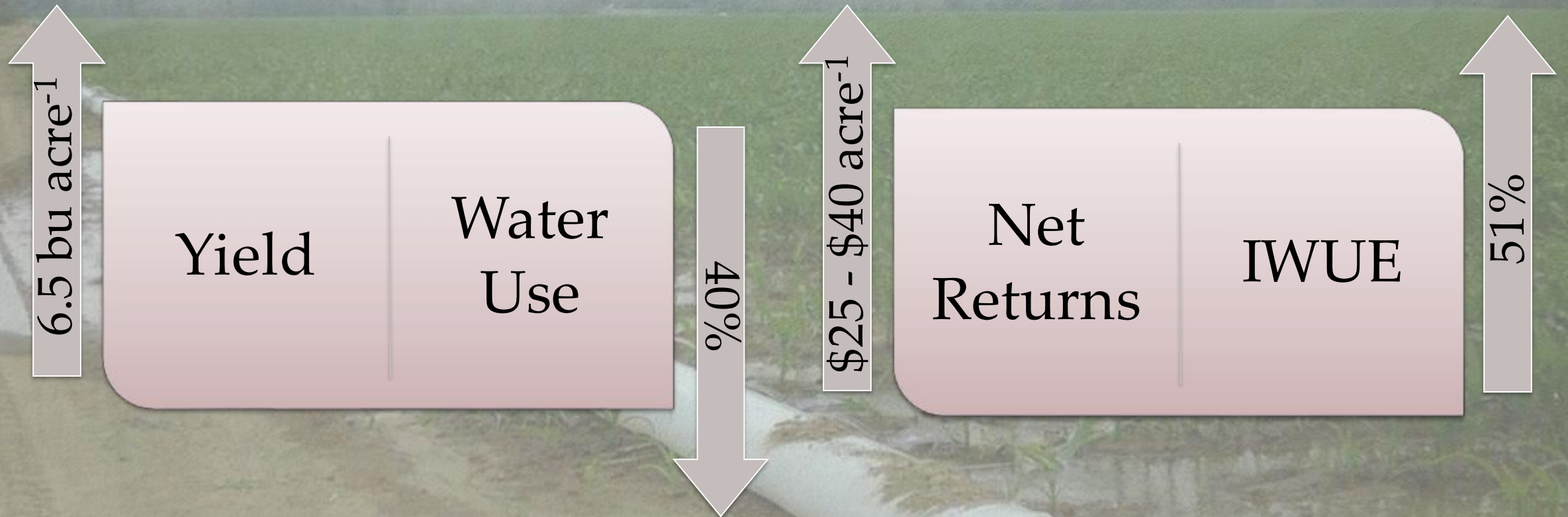


Furrow Irrigation – On-Farm Corn

- Paired fields (grower-irrigated and MSU-irrigated)
- MSU side irrigated at -75 to -100 cbar
- 18 locations (MS and AR)
- 5 years (2013-2017)
- Fine sandy loam to clay
- MSU side also used CHS and surge valves



Furrow Irrigation – On-Farm Corn



Spencer et al. (2019)



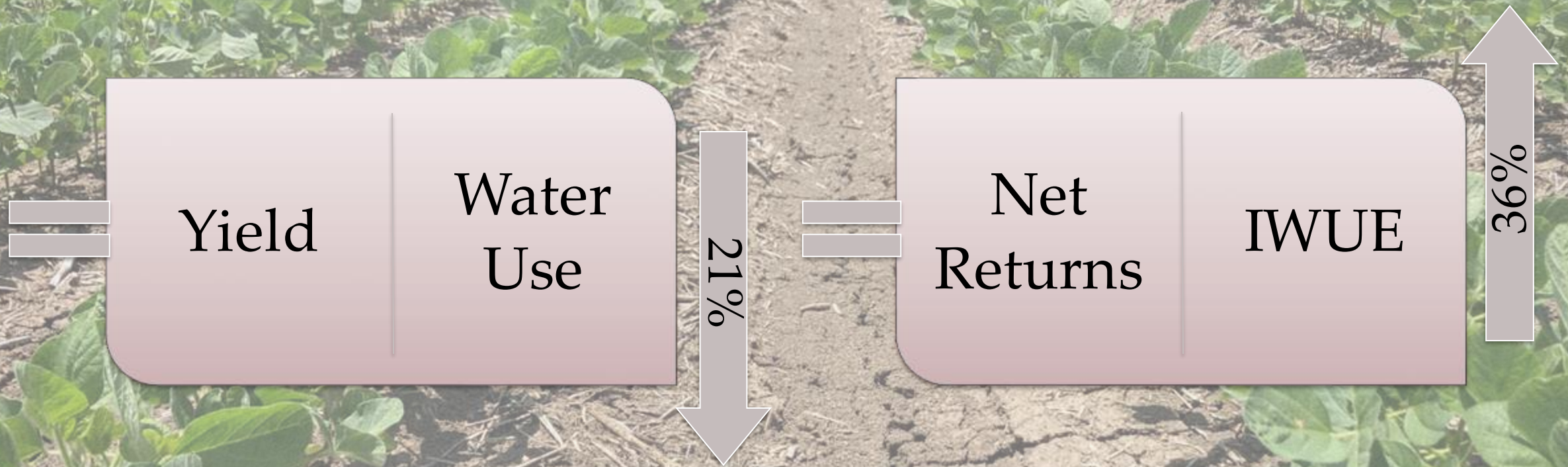
Furrow Irrigation – On-Farm Soybean

- Paired fields (grower-irrigated and MSU-irrigated)
- MSU side irrigated at -85 to -100 cbar
- 20 locations (MS and AR)
- 3 years (2013-2015)
- Very fine sandy loam to clay
- MSU side also used CHS and surge valves

Bryant et al. (2017)



Furrow Irrigation – On-Farm Soybean



Bryant et al. (2017)



Row-Crop Irrigation

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Pivot Irrigation – New Research

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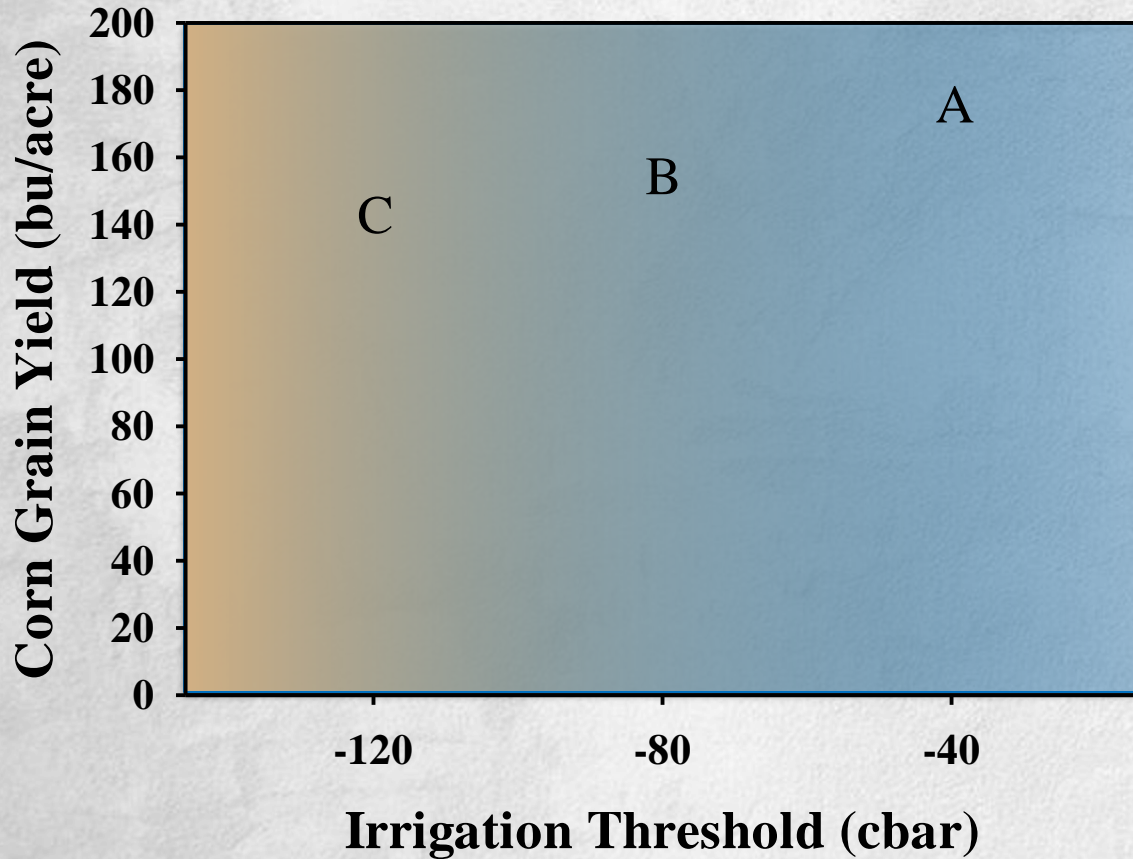
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Pivot Irrigation – New Research

Prairie (2022)



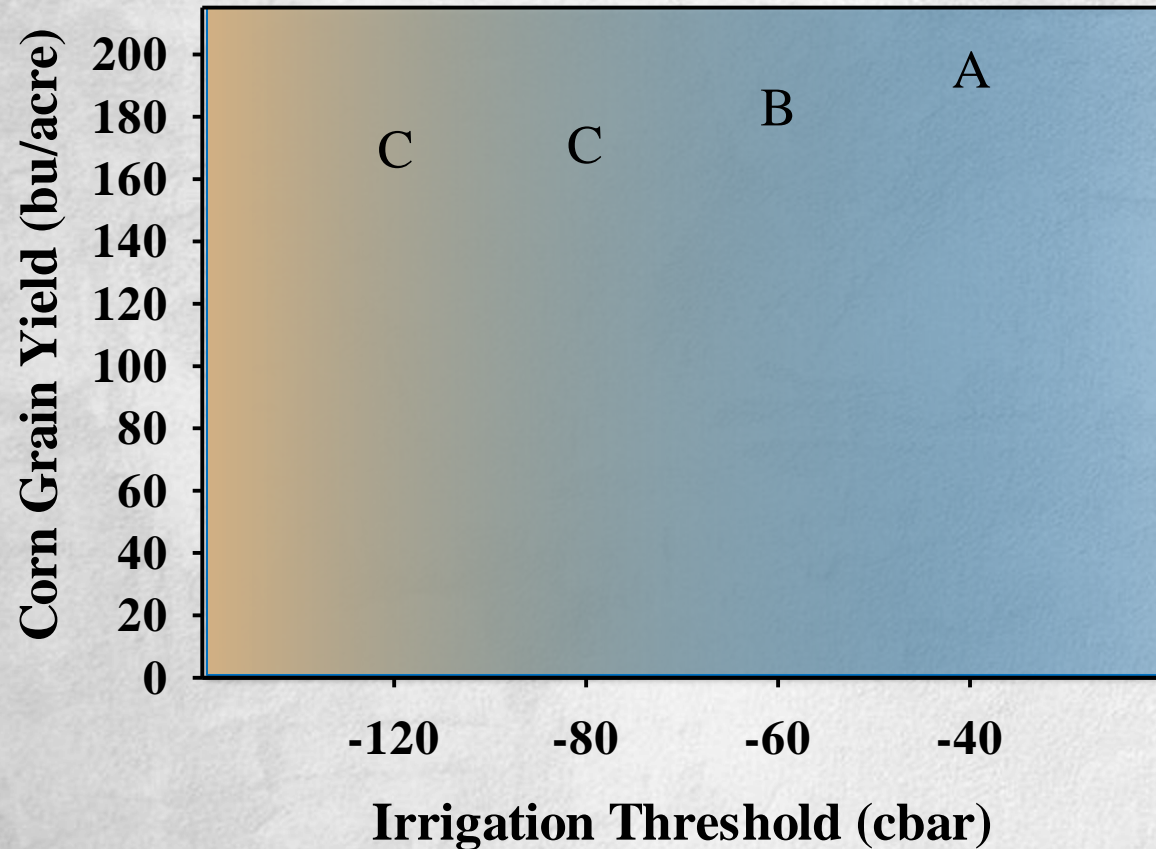
Why the difference from furrow?

- Was it the year?
- Is it location?
- Is it the type of irrigation system?



Pivot Irrigation – New Research

Prairie and Delta (2022 and 2023)



Why the difference from furrow?

- Was it the year? NO
- Is it location? NO
- Is it the type of irrigation system? Very Likely



Row-Crop Irrigation

Furrow Irrigation – Recap

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Pivot Irrigation – New Research

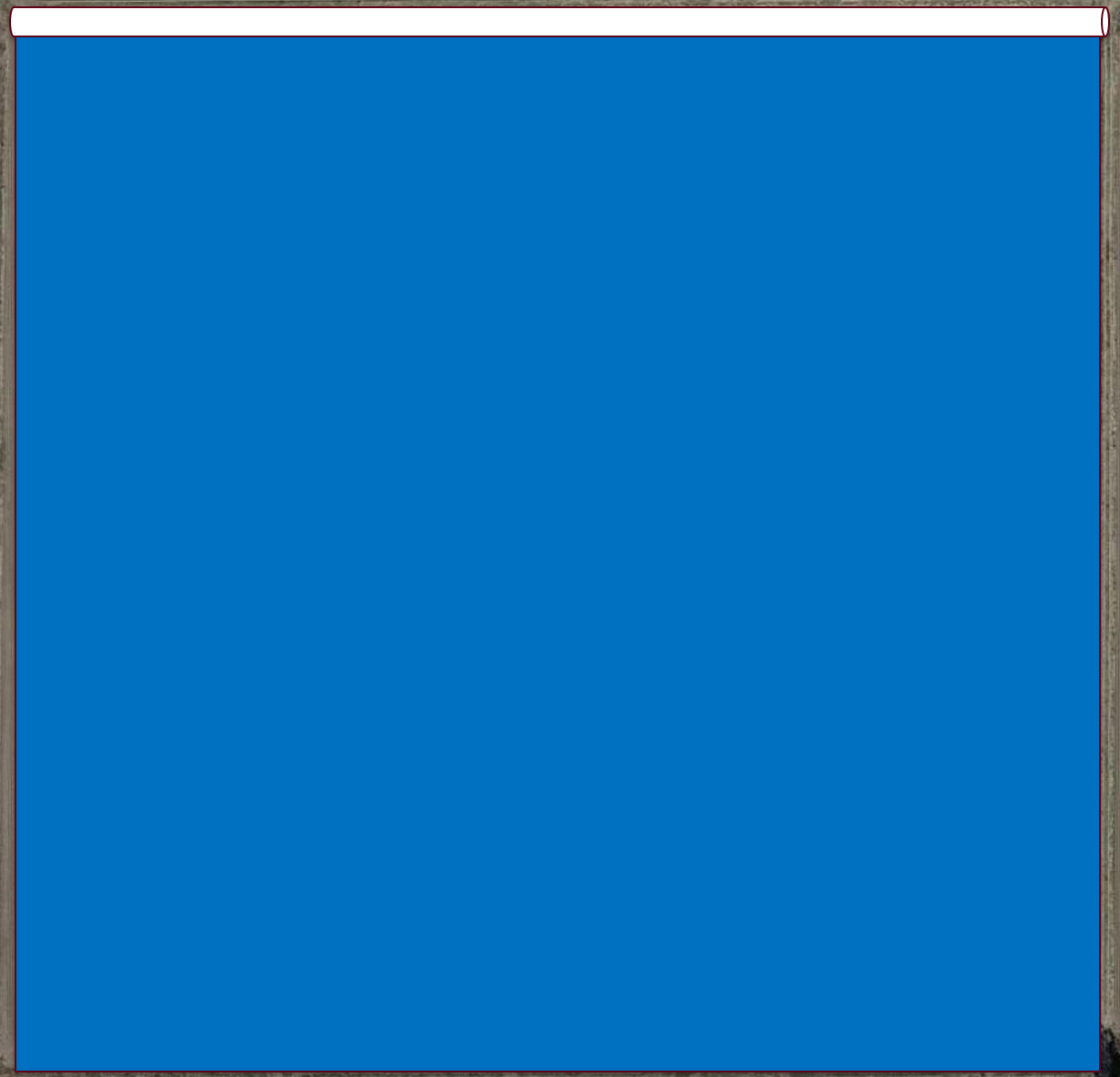
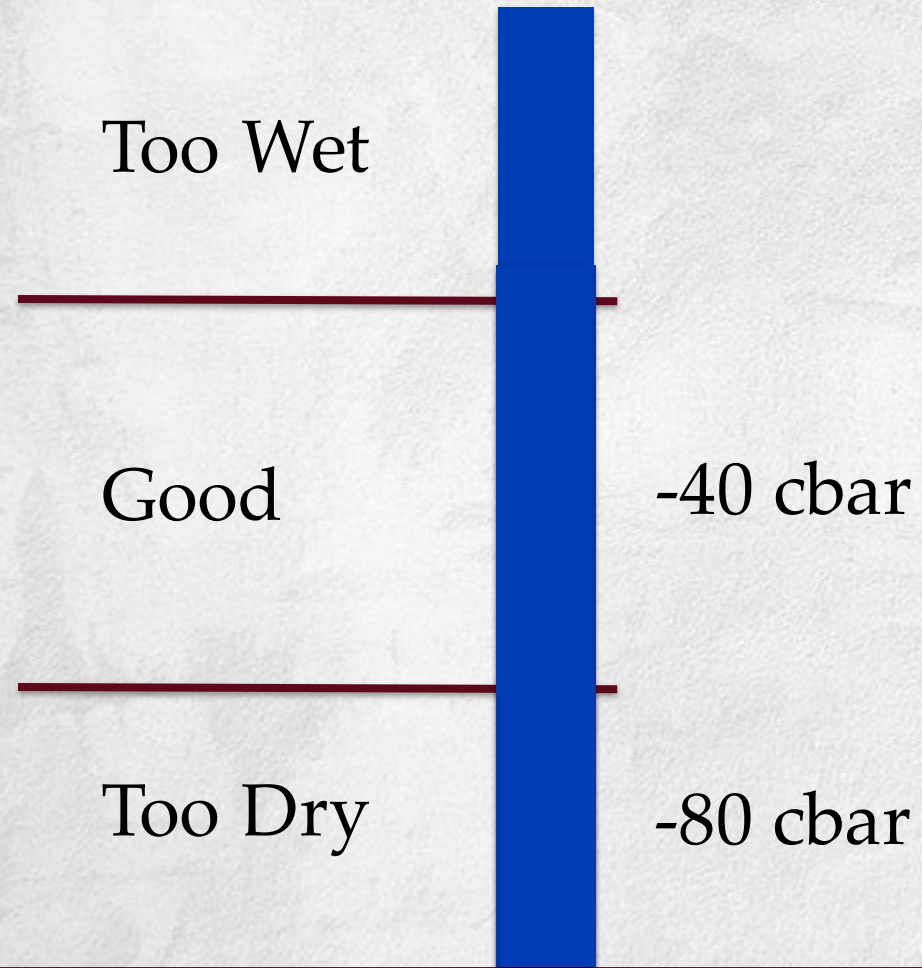
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Why is there a difference?

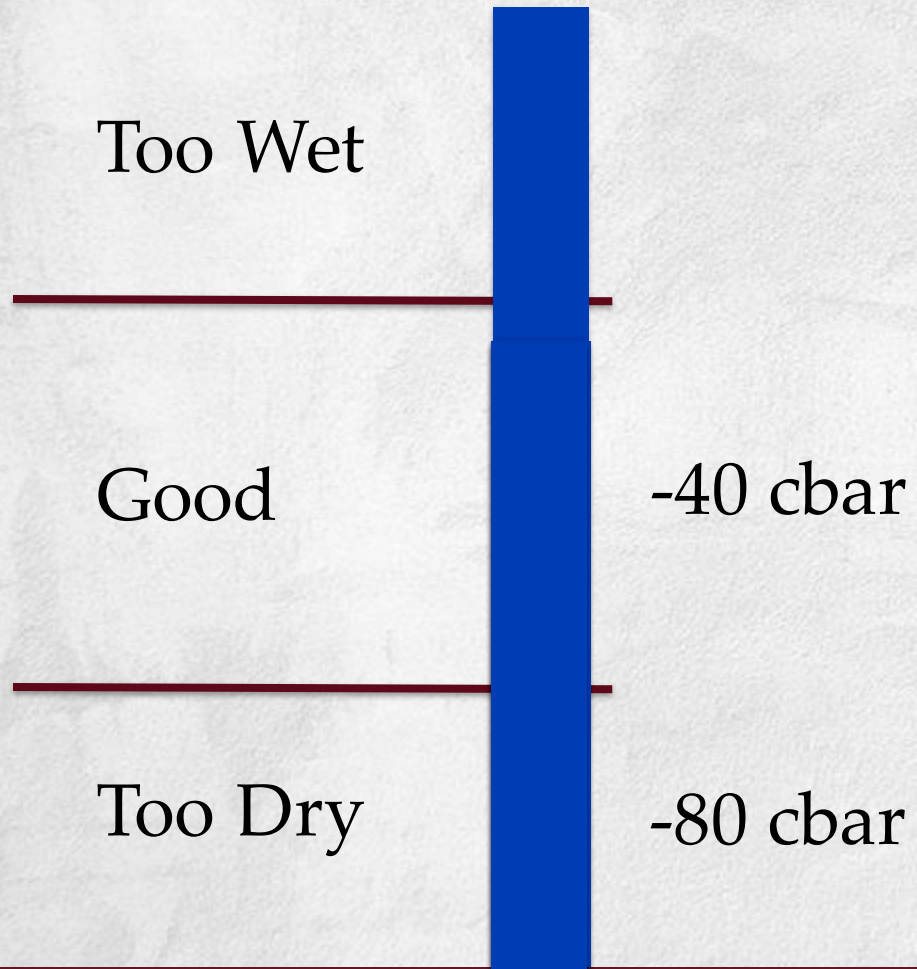
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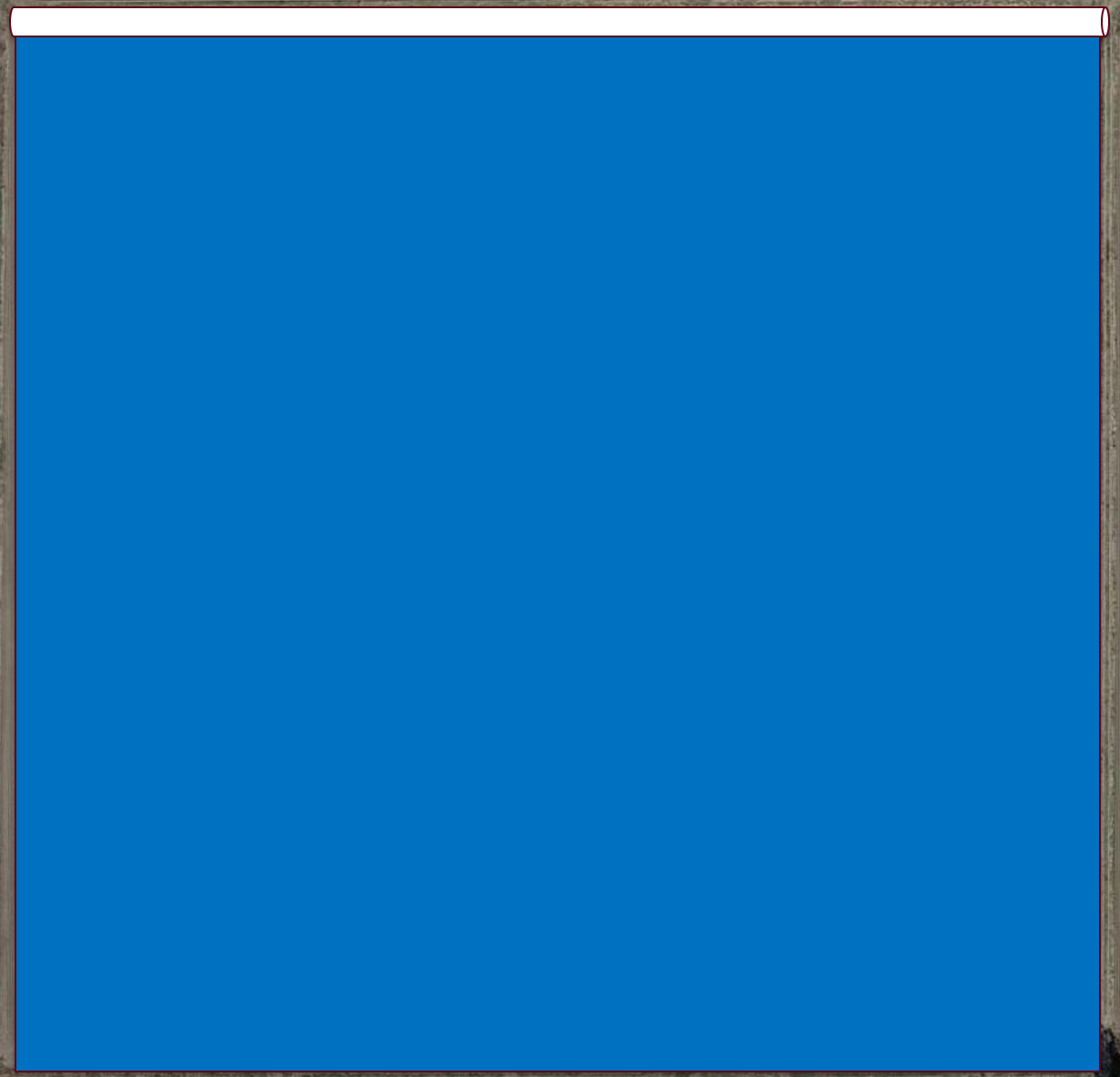
Furrow Irrigation: Balancing Wet and Dry



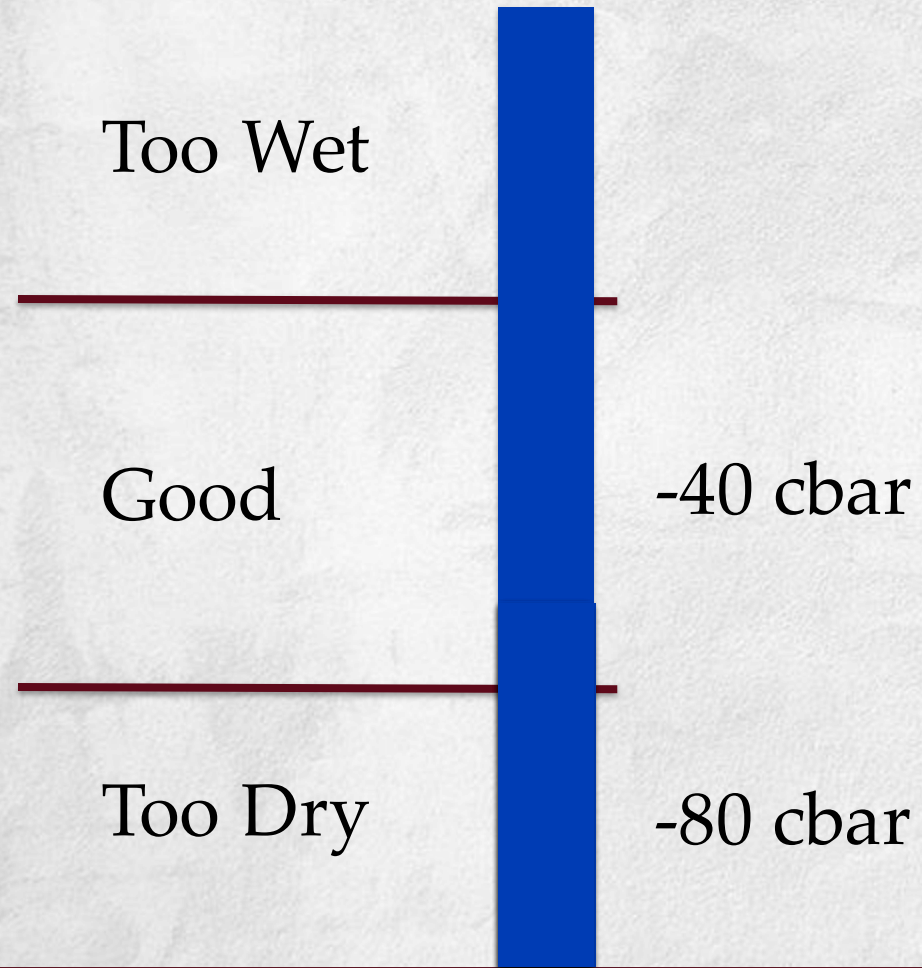
Pivot Irrigation: Stay in the Sweet Spot



Furrow Irrigation: Irrigating Too Soon



Pivot Irrigation: Don't Get Too Dry



Summary

- Use soil moisture sensors
- Manage pivots and furrow systems differently
 - Furrow irrigation threshold: 80 to 90 cbar
 - Pivot irrigation threshold: 40 cbar
- Adapt to your system
 - Low-capacity wells or under-designed pivots
 - Windshield wipe pivots



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