

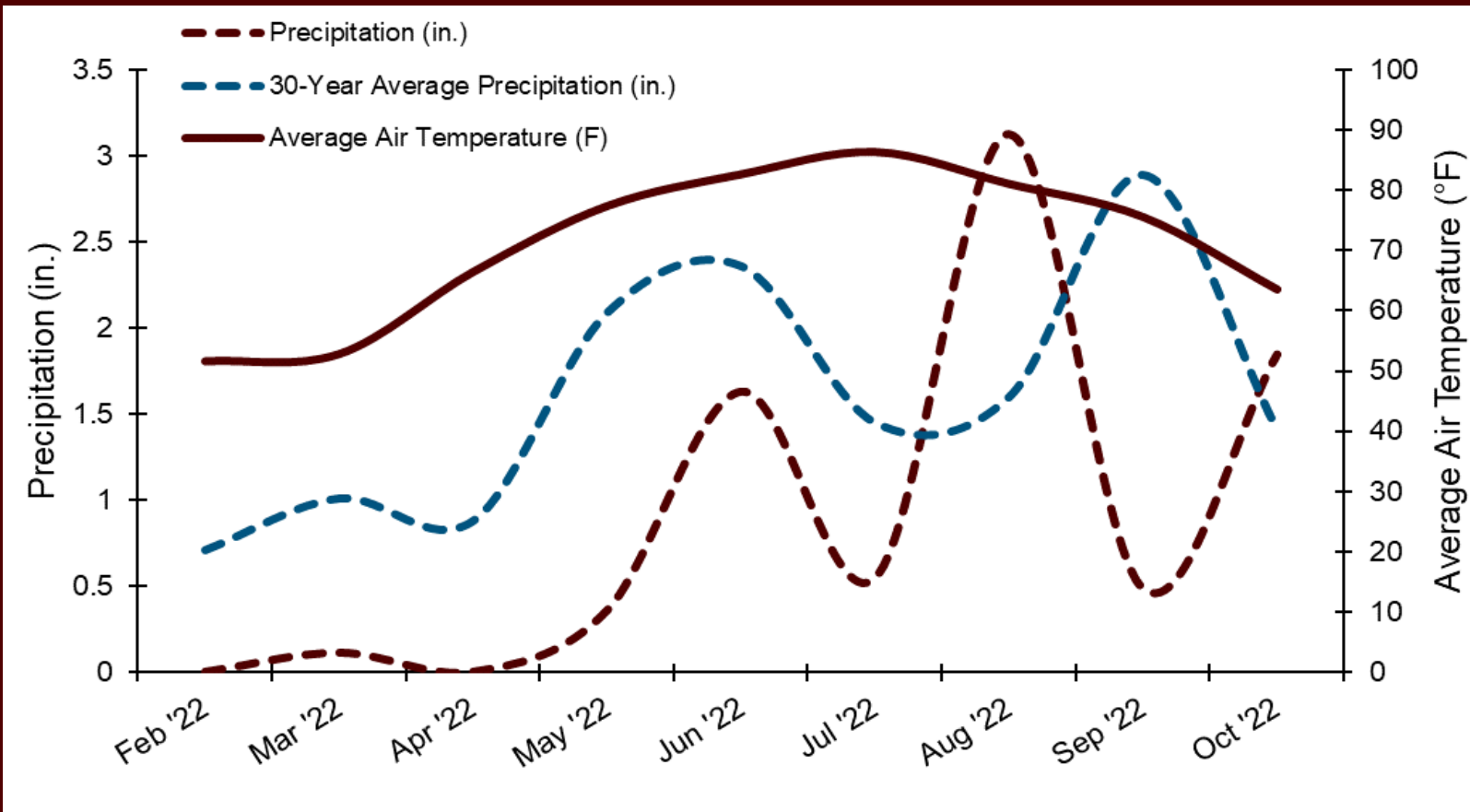
Soil Water Dynamics in Semi-Arid Cotton Conservation Systems

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The Southern High Plains



Our Situation



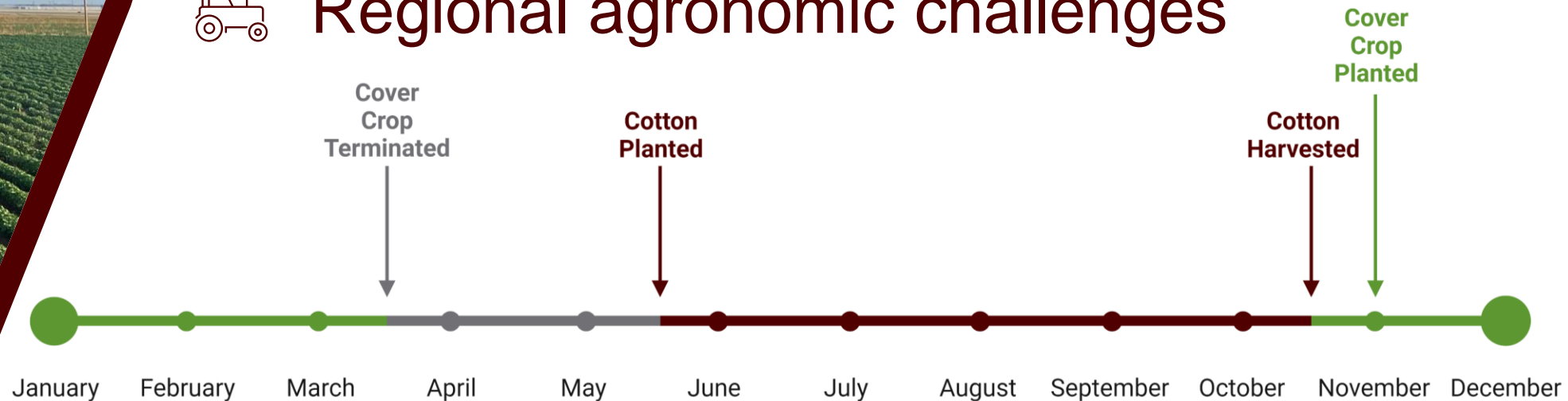
Irrigation source rapidly depleting




Transition to dryland agroecosystems



Regional agronomic challenges



Previous Research

 Long-term study (est. 1998) observing conservation practices on cotton lint yield and soil health parameters

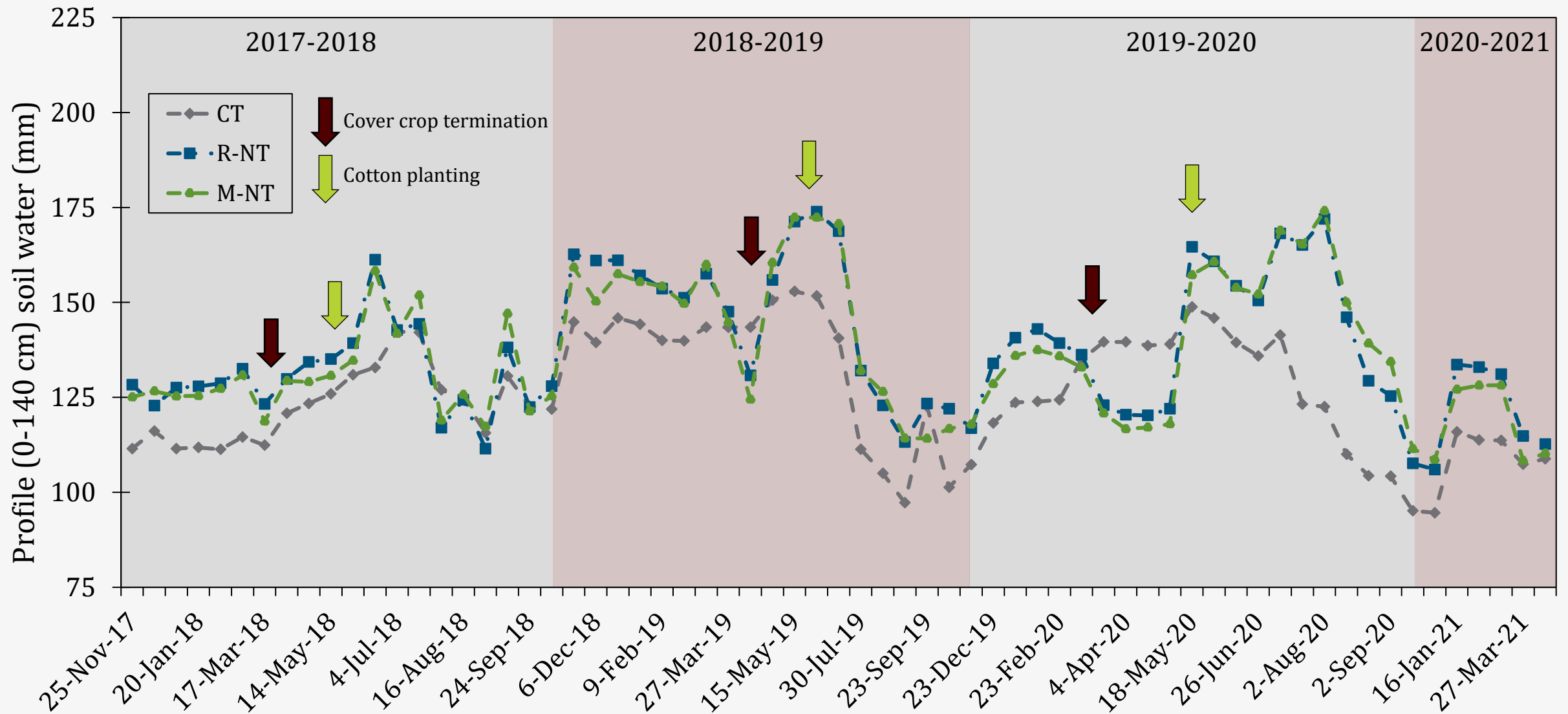
 No differences in cotton lint yield across systems in years 2018-2020

 Cover crops increased in-season soil moisture

 Soil water availability was not a limiting factor in conservation systems



Previous Research



Burke et al., 2021, Soil Till. Res., 208, 104869.

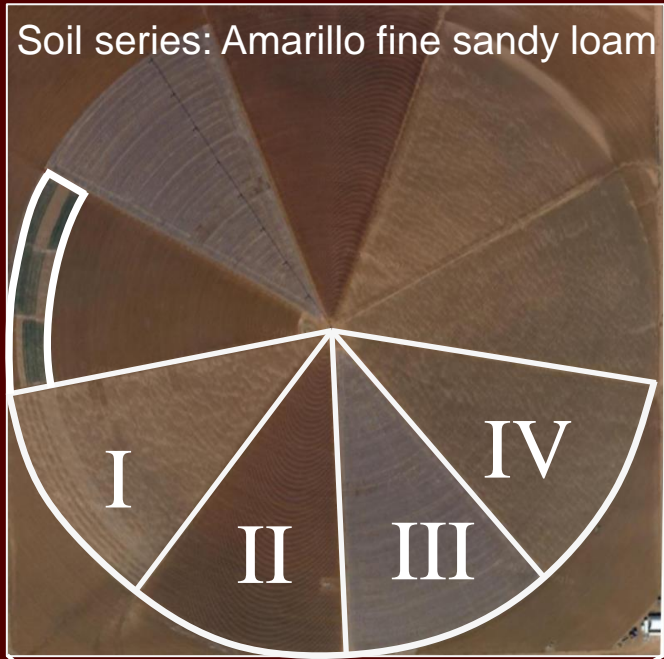
Burke et al., 2022, Agronomy, 12, 1306.

Objective

Optimize cotton production systems that maintain economic, agronomic, and environmental sustainability with decreasing irrigation capacity



Moving Forward



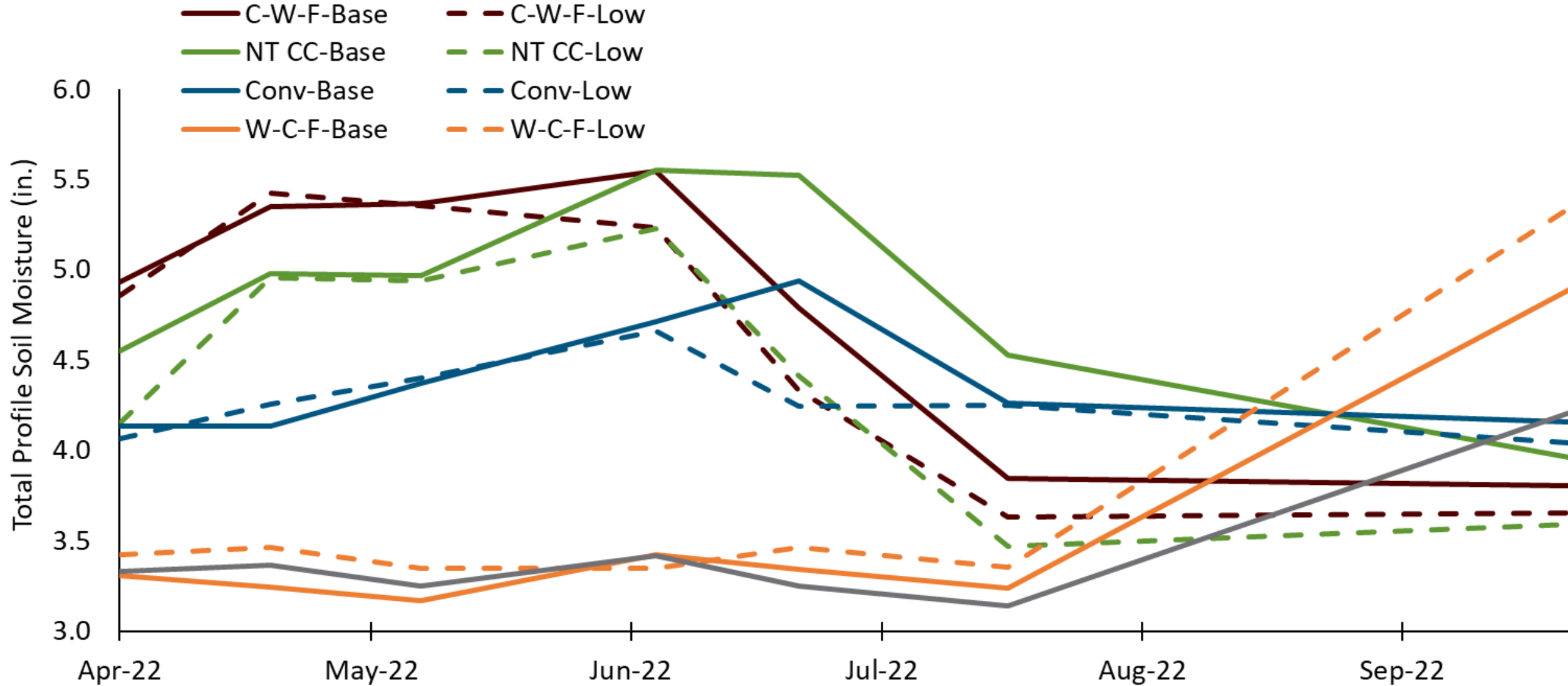
Main Plot

- I Continuous cotton; winter fallow; conventional tillage
- II Continuous cotton; rye cover crop; no-tillage
- III Cotton ('22)-wheat-fallow; no-tillage
- IV Wheat- fallow-cotton ('23); no-tillage
Wheat-summer cover-cotton ('23); no-tillage

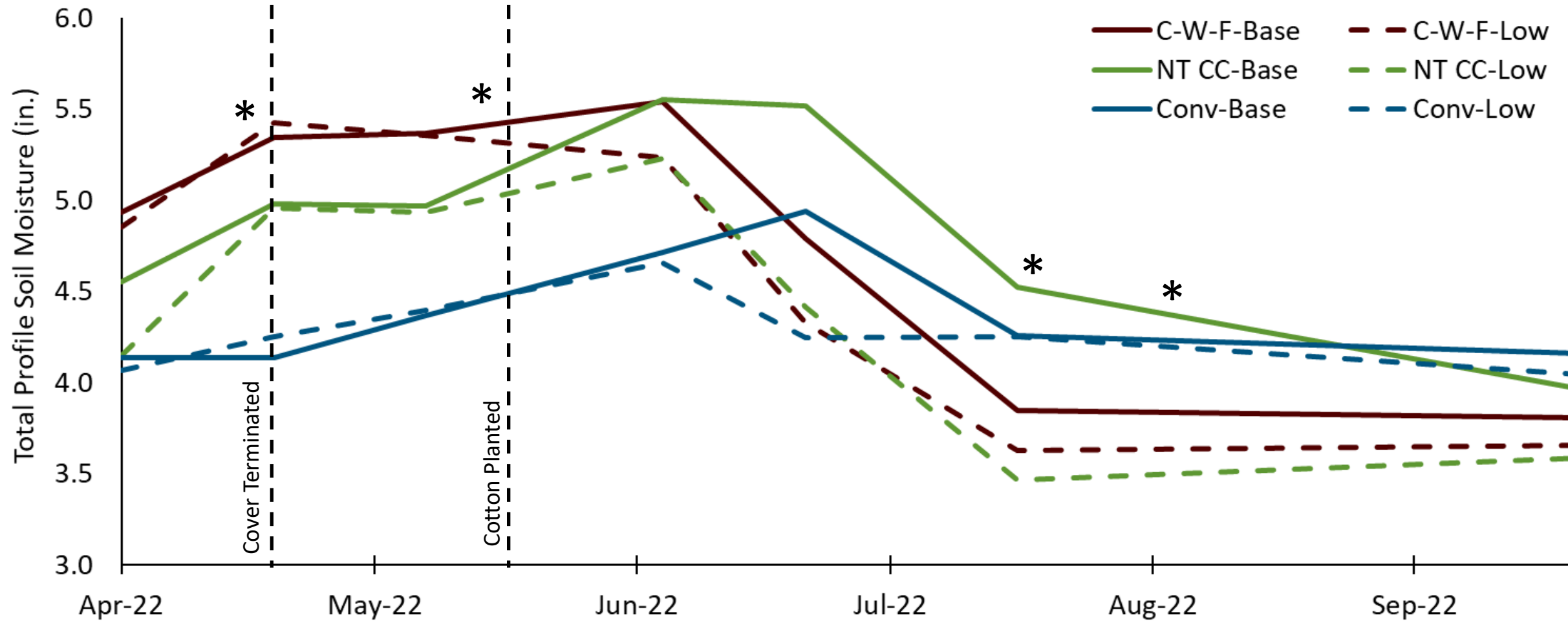
Split plot

- 60% estimated ET replacement
- Irrigation to achieve adequate stands with ≤ 3 in. of early season irrigation, otherwise dryland cropping system

Results

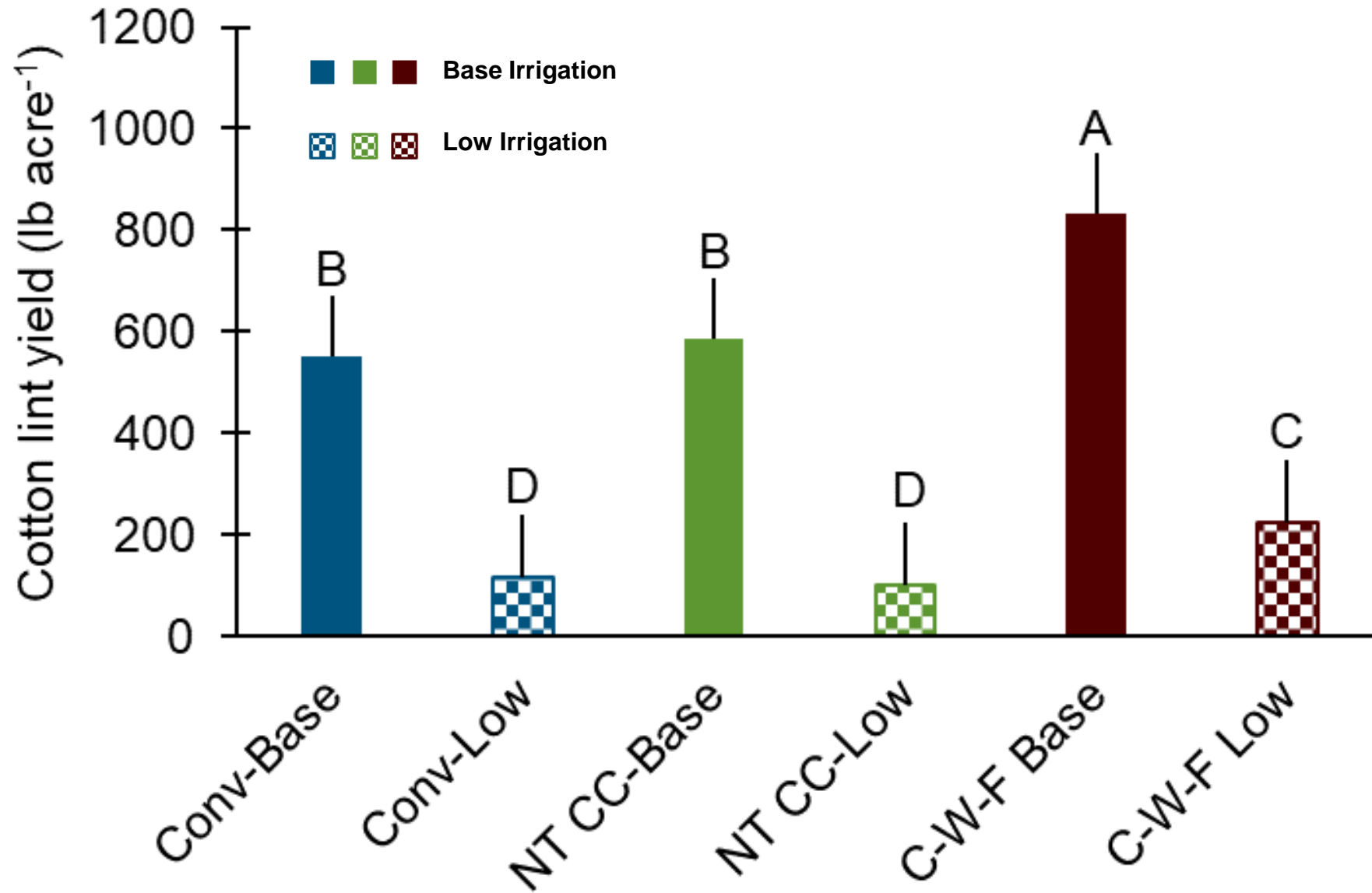


Results



* = significant differences

Results



What's Next



Soil health parameters



sUAS data collection



Agricultural
Policy/Environmental
eXtender Model (APEX)



Economic analysis and
modeling



Questions?

TEXAS A&M
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Results

