# Alfalfa to get back into planetary boundaries

## Sequence 3: Genetics and breeding

Charlie Brummer

*Young researcher session*

FROM 03 › TO 06 nov. 2025

2025 world alfalfa congress
FRANCE REIMS-CHÂLONS

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## Developing and Testing Alfalfa Cultivars Under Limited Water Conditions

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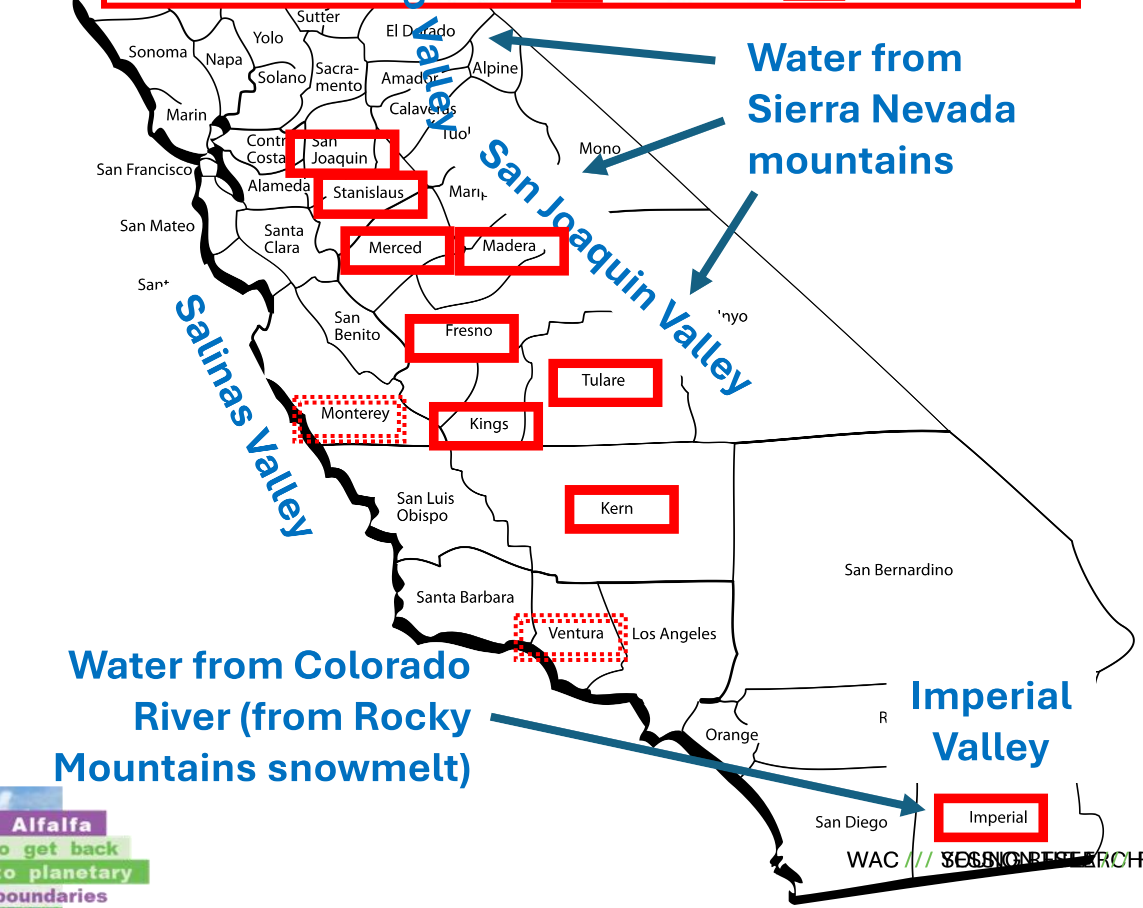
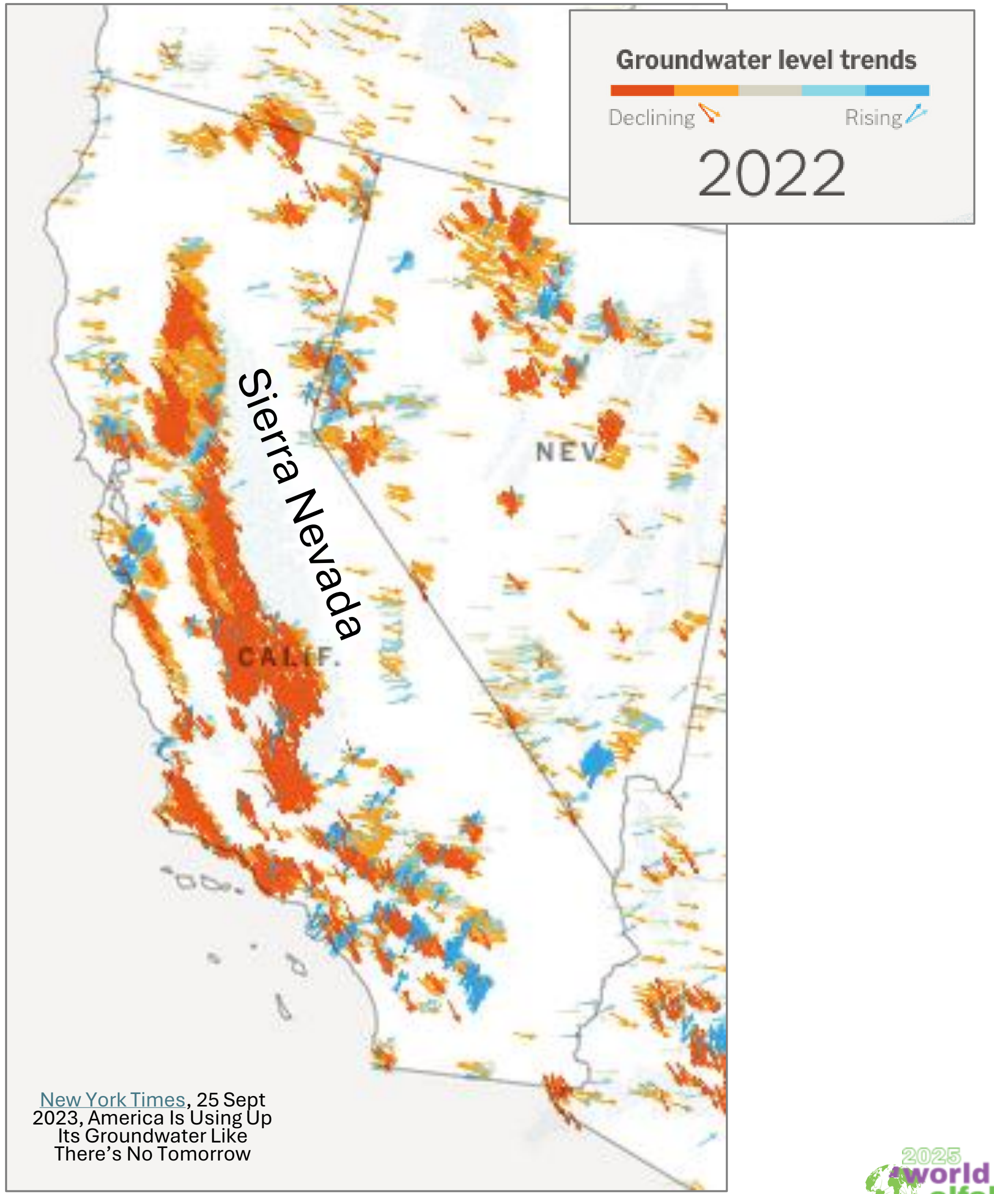
FROM 03 › TO 06 nov. 2025

# California's Water Situation

| Rank 2021 | Rank 2022 | County | Total Value $1,000 | Leading Commodities |
|---|---|---|---|---|
| 3 | 1 | Tulare | 8,612,450 | Milk, Oranges (All), Grapes (All), Cattle |
| 2 | 2 | Fresno | 8,089,863 | Grapes (All), Almonds, Pistachios, Milk |
| 1 | 3 | Kern | 7,699,953 | Grapes (All), Oranges (All), Almonds, Milk |
| 4 | 4 | Monterey | 4,639,893 | Lettuce (All), Strawberries, Broccoli, Cauliflower |
| 5 | 5 | Merced | 4,585,893 | Milk, Almonds, Chickens, Cattle |
| 6 | 6 | Stanislaus | 3,629,777 | Milk, Almonds, Horticulture (All), Cattle |
| 7 | 7 | San Joaquin | 3,275,614 | Milk, Almonds, Grapes (All), Cherries |
| 9 | 8 | Imperial | 2,611,103 | Cattle, Lettuce (All), Alfalfa (All), Livestock (Misc) |
| 8 | 9 | Kings | 2,594,574 | Milk, Pistachios, Tomatoes (Processing), Cotton (Lint) |
| 10 | 10 | Ventura | 2,087,291 | Strawberries, Avocados, Horticulture (All), Lemons |
| 11 | 11 | Madera | 1,990,504 | Milk, Grapes (All), Pistachios, Cattle |

County Rank, Total Value of Production and Leading Commodities, 2022 [1]




New York Times, 25 Sept 2023, America Is Using Up Its Groundwater Like There's No Tomorrow

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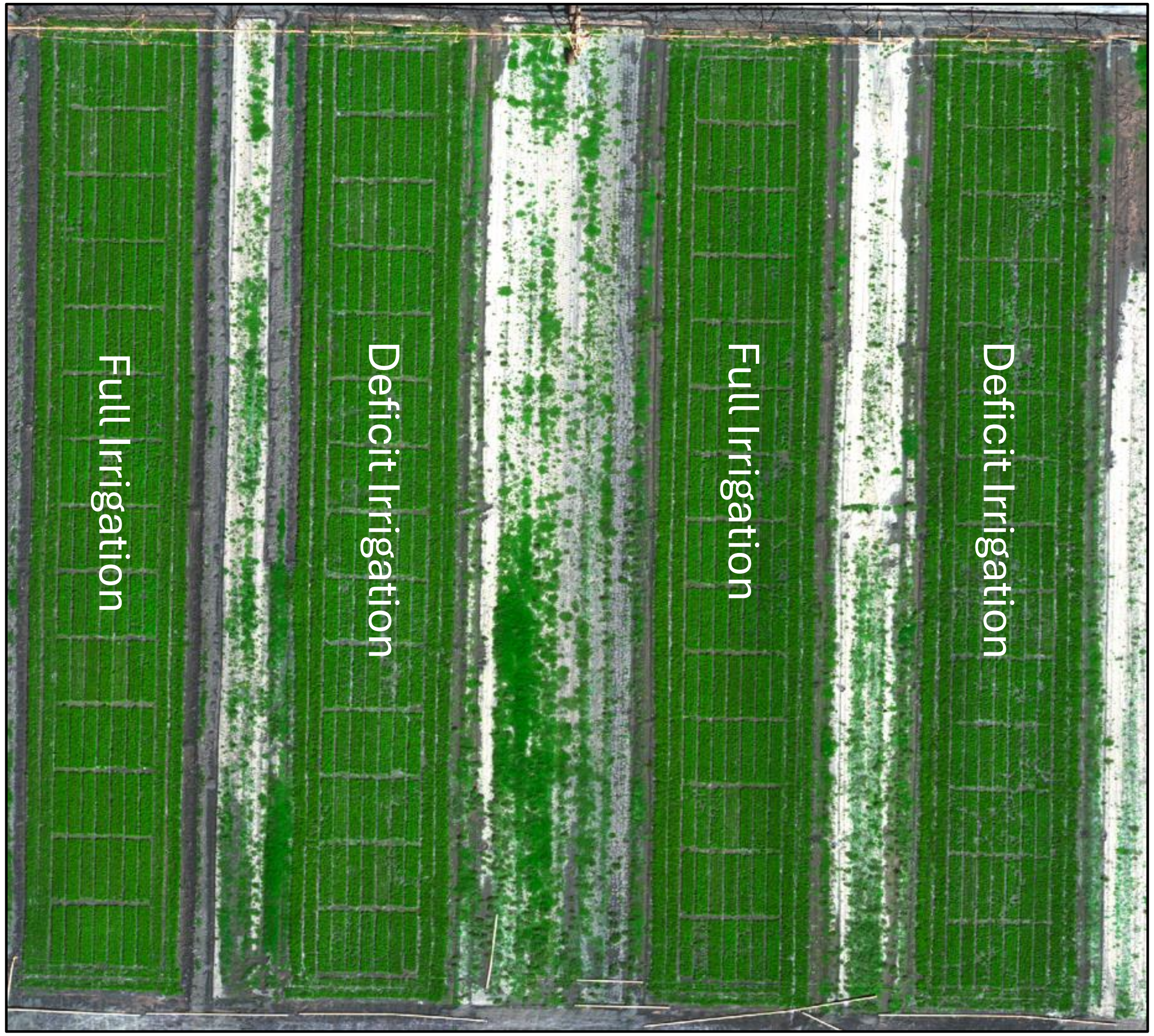
# Evaluating Cultivars Under Full & Deficit Irrigation

- El Centro and Davis ~40 entries
- Established Autumn 2023
- Irrigation cut from July through October
- Which cultivars are best for deficit irrigation?
- Is there a cultivar x irrigation type interaction?

No apparent effect on stand persistence after first two years.
What is long term effect?




Davis, CA
Two reps per basin

Funding from USDA-NIFA Alfalfa Seed and Alfalfa Forage Systems Program; US Alfalfa Farmers Research Initiative/USDA-ARS; CCIA; CAFA

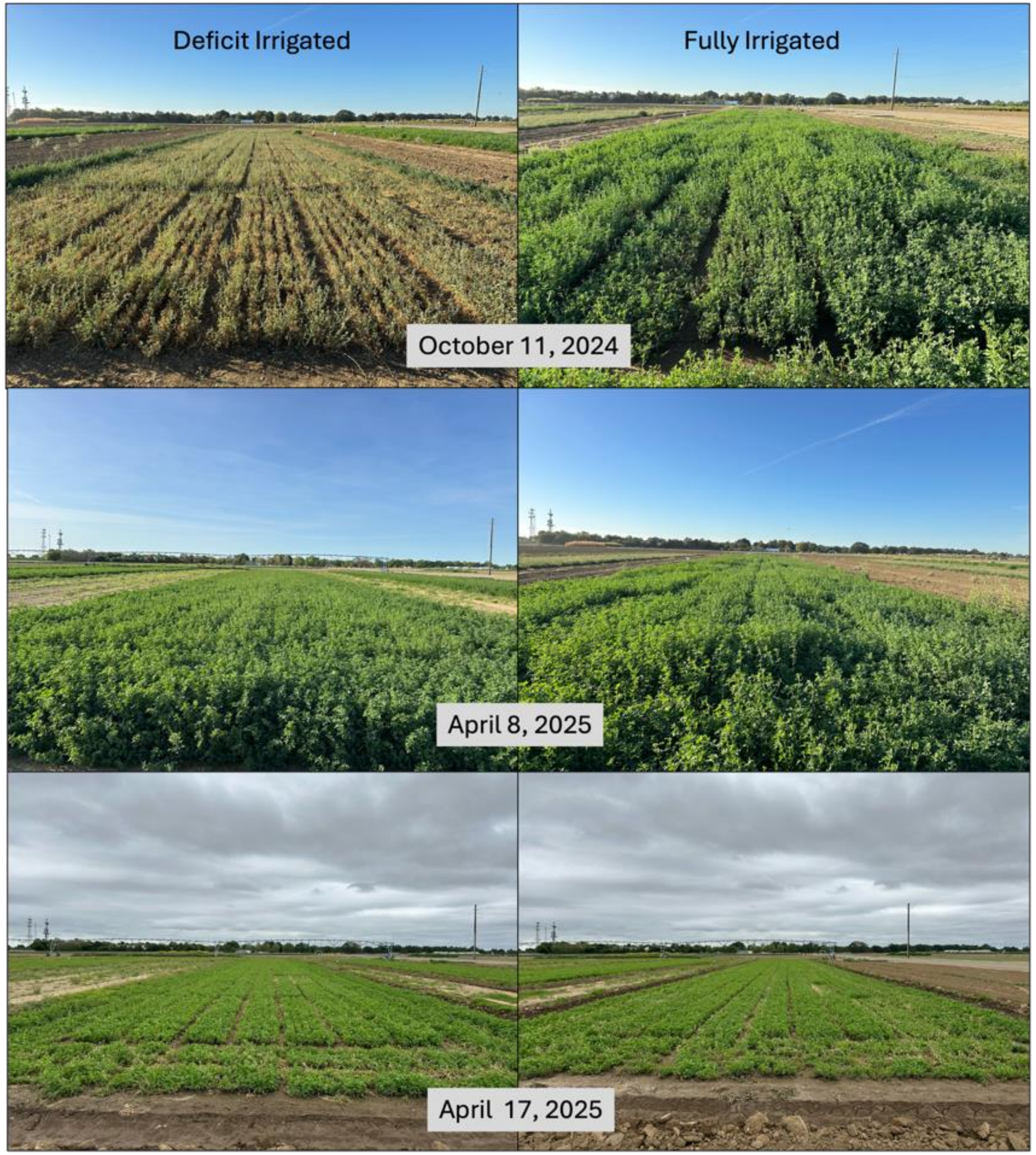
# Yield, water savings, and persistence

## Yield (Two Year Total)

| | Full | Deficit | Yield Penalty |
|---|---|---|---|
| | *Mg ha$^{-1}$ dry matter* | | |
| Davis | 45 | 31 | 14 (-30%) |
| El Centro | 51 | 42 | 9 (-17%) |

## Irrigation Water Applied

| | Full | Deficit | Savings |
|---|---|---|---|
| **Davis** | *cm of water applied* | | *%* |
| 2024 | 90 | 47 | 48 |
| 2025 (thru Sept) | 126 | 90 | 29 |
| **Total** | **217** | **137** | **37** |
| **El Centro** | | | |
| 2024 | 191 | 115 | 39 |
| 2025 (thru Sept) | 152 | 90 | 41 |
| **Total** | **343** | **205** | **40** |




Thank You!
Questions?