

Water Conservation and Irrigation

Cache County Crop School, Logan, UT, February 14, 2023

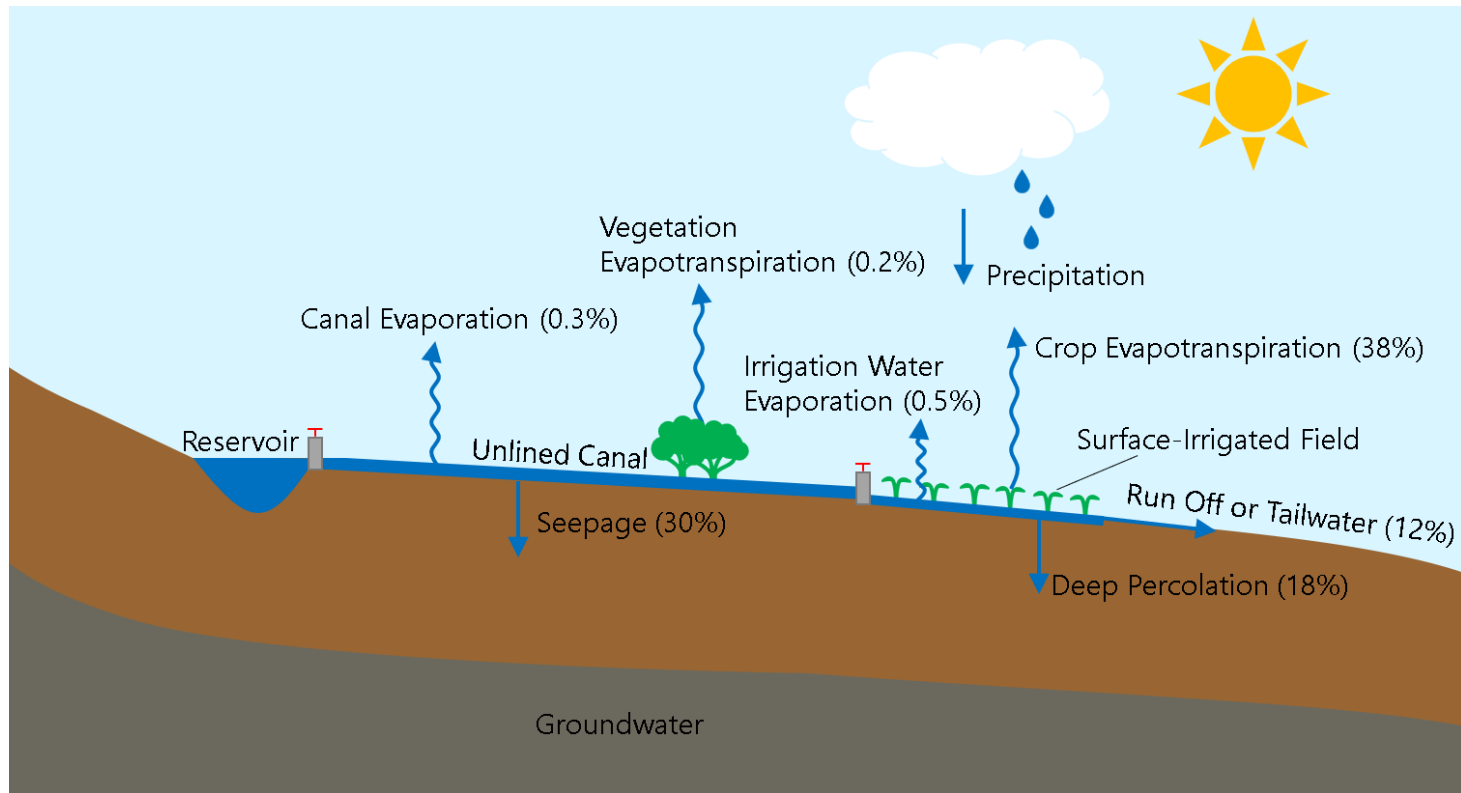
Burdette Barker, Extension Irrigation Specialist

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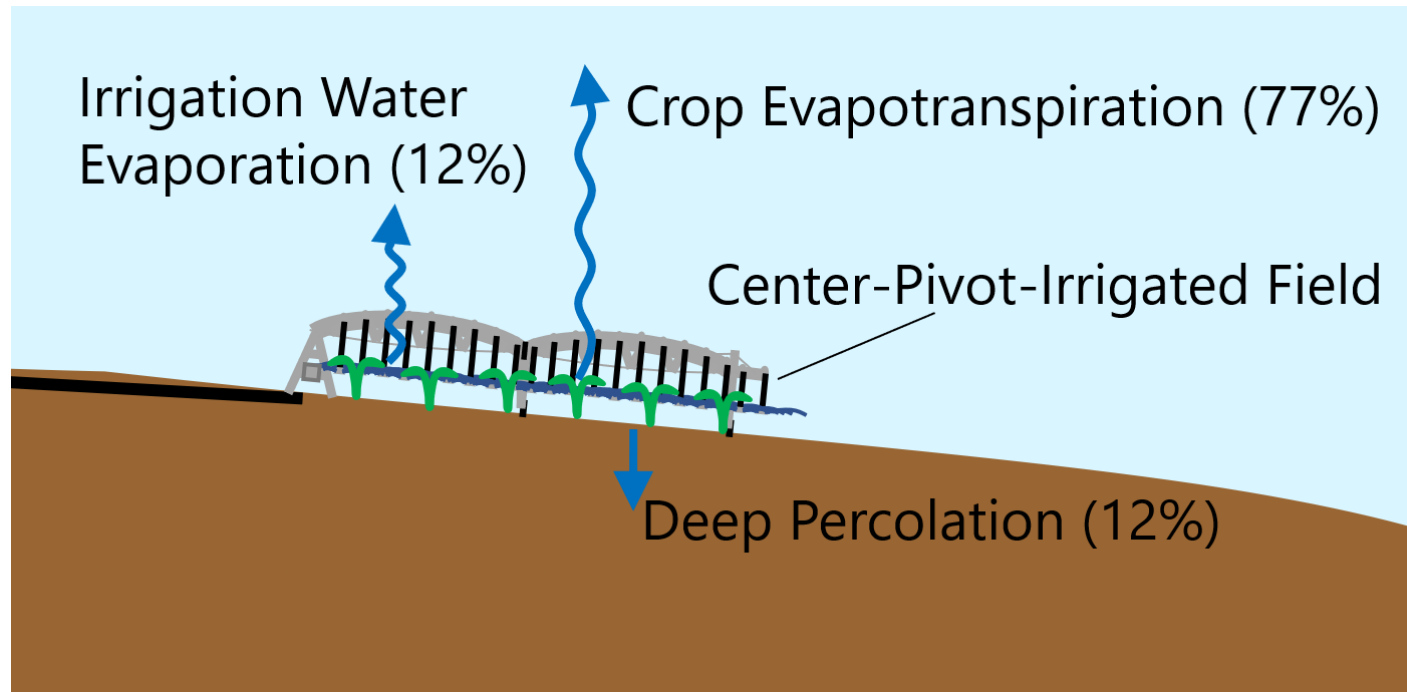


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Losses in a Gravity System



Sprinkler Inefficiencies



Irrigation is Money, Why Not Measure It?

- Optimize beneficial water use
- Optimize profitability of irrigation
- Defend water use



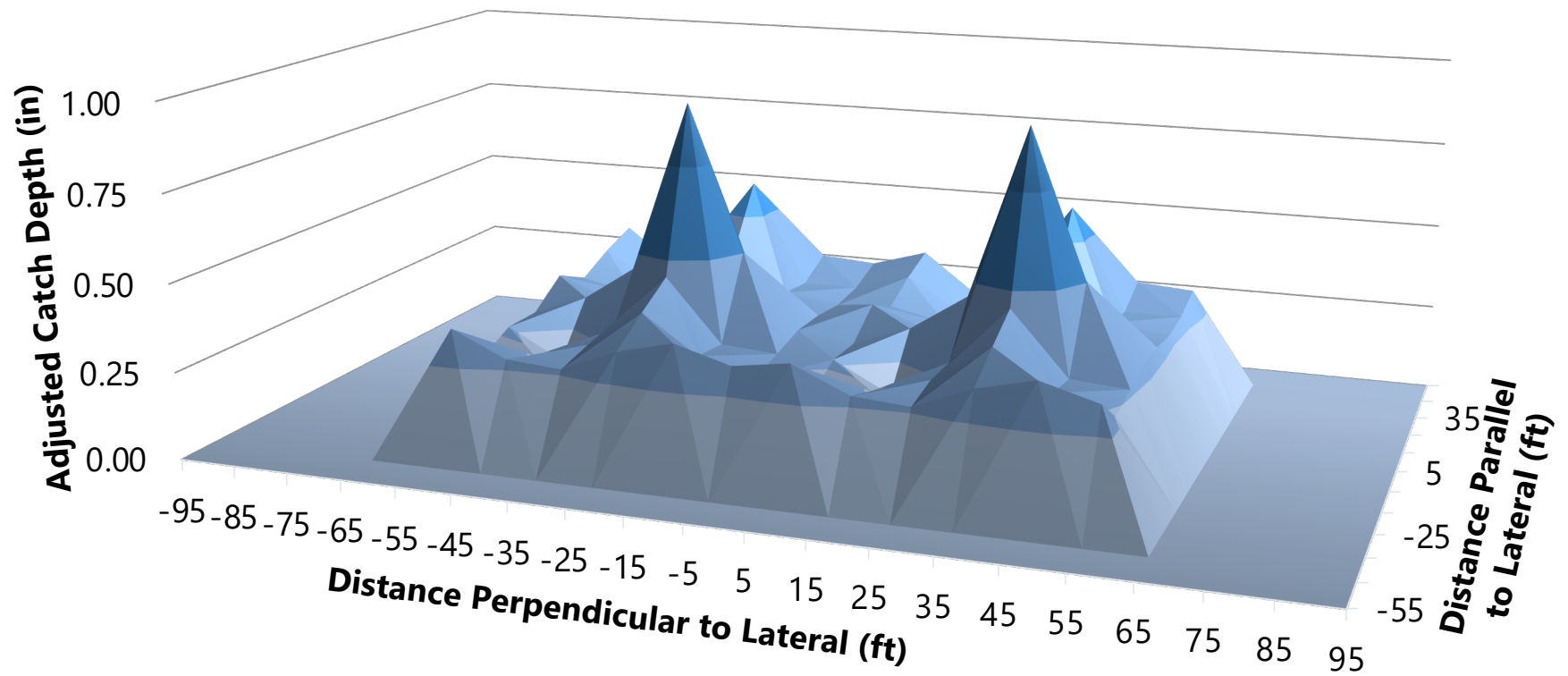
Measuring Uniformity



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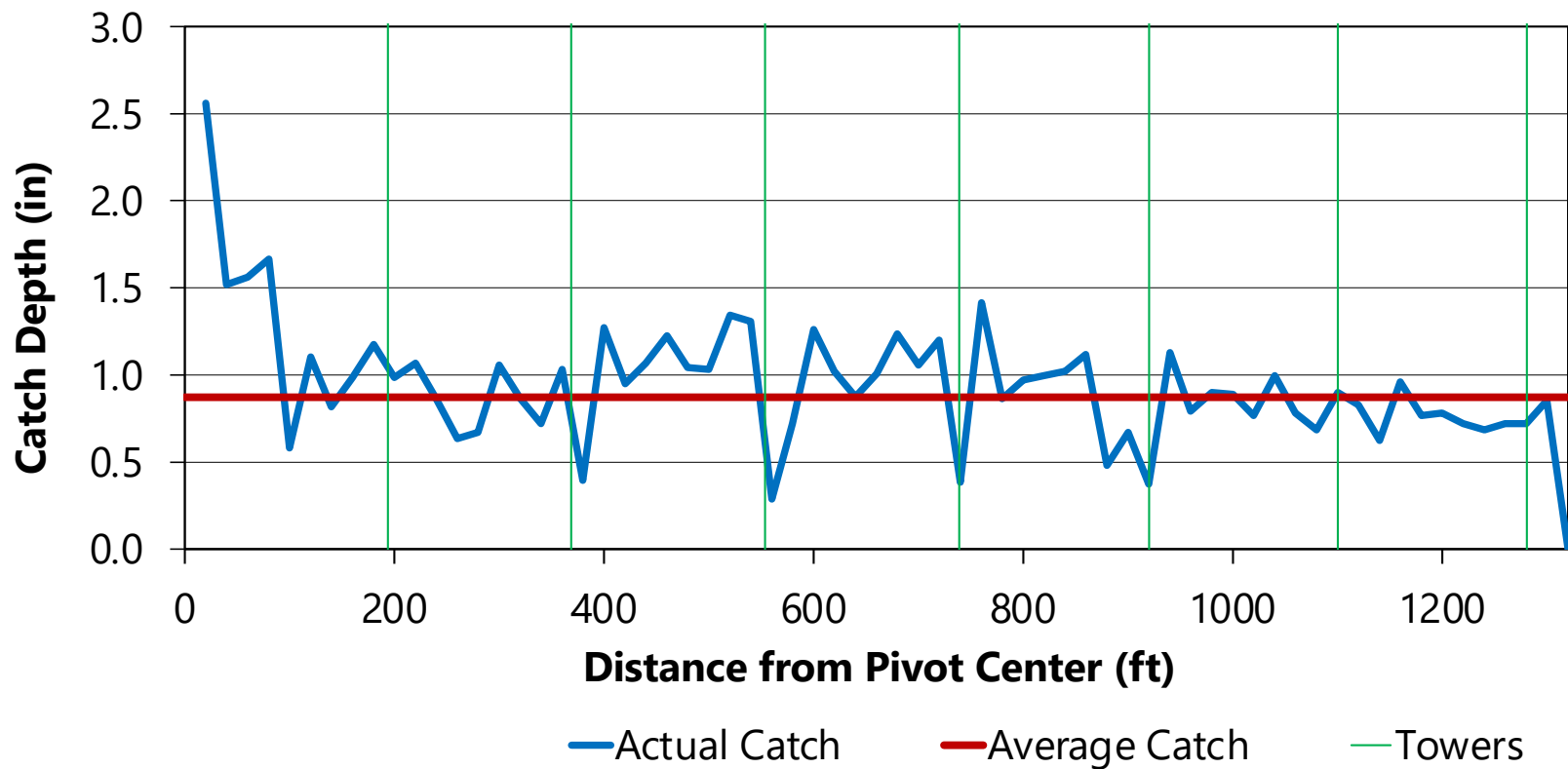
Uniformity



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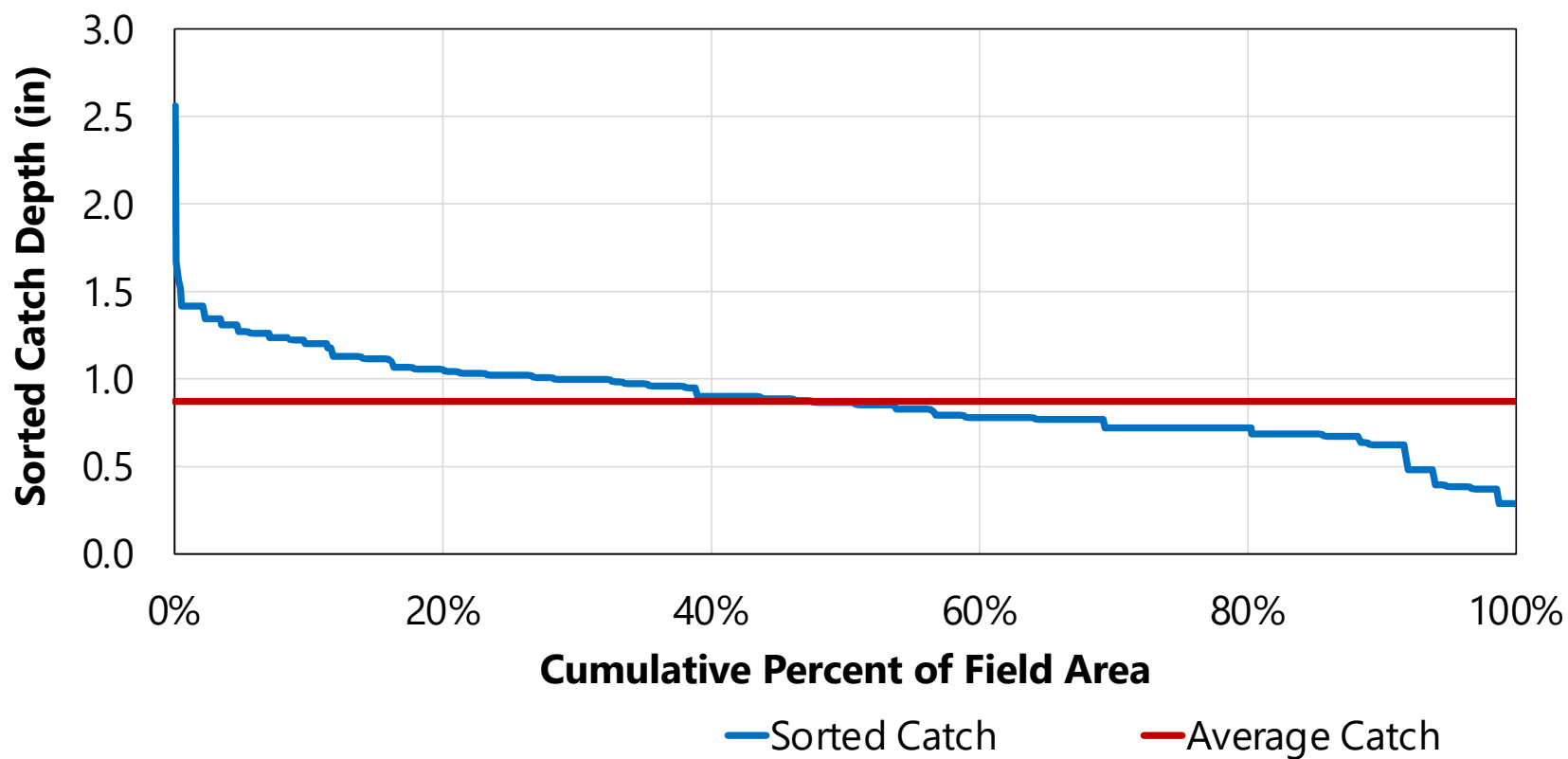
Uniformity



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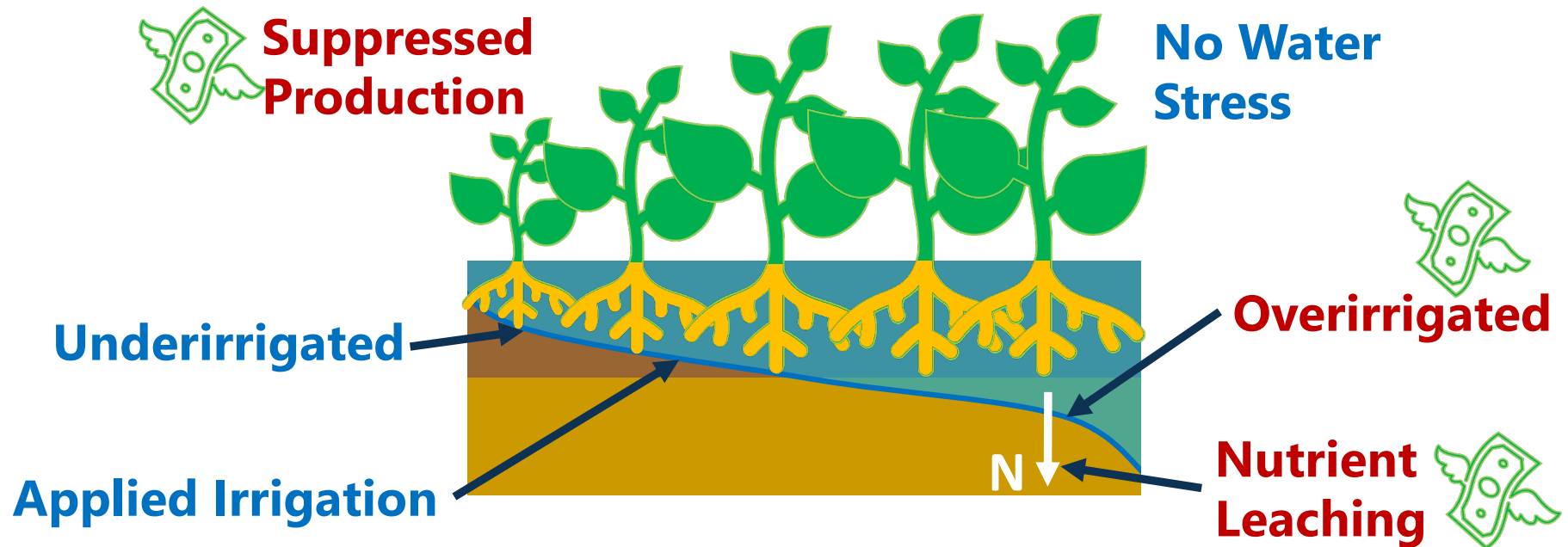
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Uniformity



So, What?

Application Efficiency is related to uniformity



Flow Measurement



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Evaporation Losses

Applied Irrigation – Irrigation Reaching the Soil



Leaks?



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Is Improving Uniformity Worth It?

- Alfalfa @ \$300/ton
- 7.4-acre field
- Wheel line
- 200 feet of pumping lift from well
- Energy @ \$0.053/kWh (Rocky Mountain)
- Target production 5 ton/acre yield
- Alfalfa at 27 in/year net requirement
- DU = 37%, Evaporation/Wind = 19%, Efficiency = 38%
- Target DU = 60%, Evaporation/Wind = 19%, Efficiency = 56%

Is Improving Uniformity Worth It?

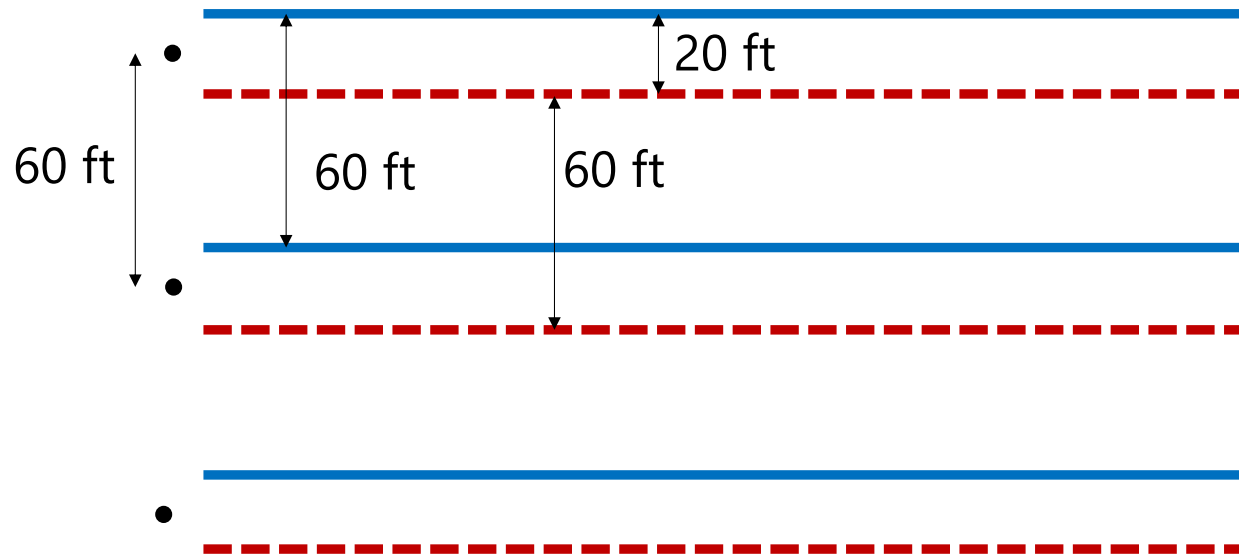
ESTIMATED PUMPING ENERGY COST AND GROSS YIELD IMPROVEMENT		
Description	Actual	Target
Pump Total Dynamic Head (ft):	327	327
Gross Water Requirement (in/yr):	70	47
Annual Energy Use (kWh/acre/yr):	2,952	2,003
Annual Energy Cost (\$/acre/yr):	\$155	\$105
Estimated Annual Production (ton/acre):	4.6	4.8
Estimated Annual Crop Revenue (\$/acre):	\$1,380	\$1,425
Net Revenue (\$/acre):	\$1,225	\$1,320
Possible Benefit, Excluding Harvest Costs(\$/acre):		\$95





Alternating Sets

Alternating sets is worth \$30 alone!



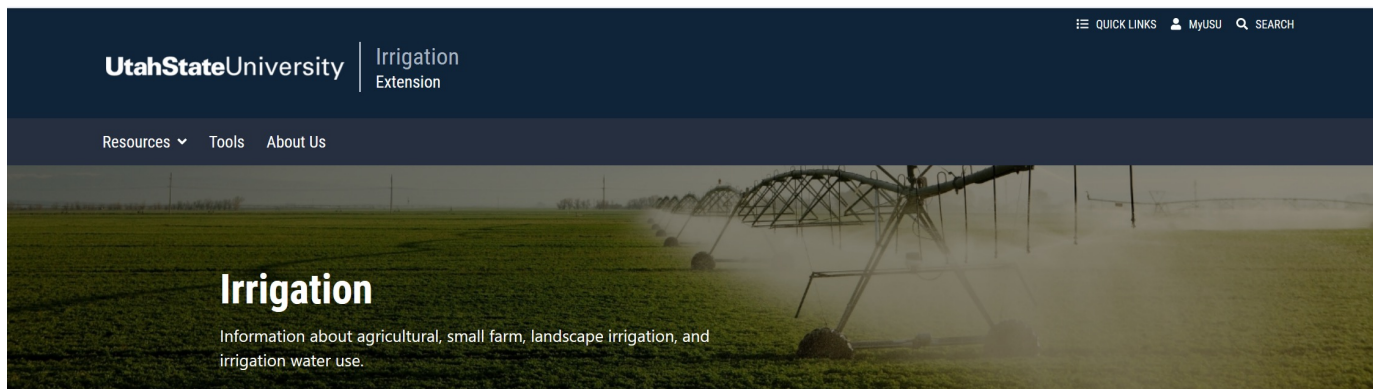
Is Improving Uniformity Worth It?

- Alfalfa @ \$200/ton
- 1,320-ft Pivot (126 Acres)
- ½ mile, 8-in, pipeline
- 20 ft of elevation gain
- Energy @ \$0.053/kWh (Rocky Mountain)
- Target 5 ton/acre yield
- Alfalfa at 32 in/year net requirement
- DU = 69%, Evaporation/Wind = 10%, Efficiency = 68%
- Target DU = 80%, Evaporation/Wind = 10%, Efficiency = 77%

Is Improving Uniformity Worth It?

ESTIMATED PUMPING ENERGY COST AND GROSS YIELD IMPROVEMENT		
Description	Actual	Target
Pump Total Dynamic Head (ft):	136	136
Gross Water Requirement (in/yr):	47	41
Annual Energy Use (kWh):	102,897	90,870
Annual Energy Cost (\$):	\$5,410	\$4,777
Annual Energy Cost (\$/acre):	\$43	\$38
Estimated Annual Production (ton/acre):	4.8	4.9
Estimated Annual Crop Revenue (\$/acre):	\$1,200	\$1,225
Net Revenue (\$/acre):	\$1,157	\$1,187
Possible Benefit, Excluding Harvest Costs(\$/acre):		\$30.0

Resources



USU Extension Irrigation News

Check out the [Irrigation Technology Cost/Benefit Analysis Calculator](#) on the USU Extension Crops site.

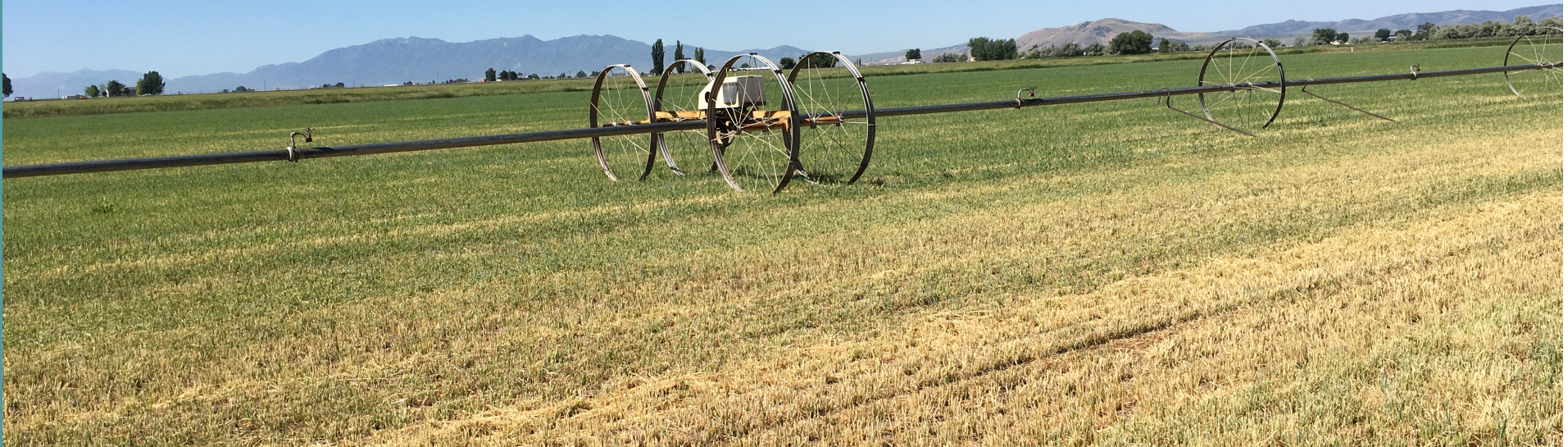
Irrigation Resources



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