Agriculture With Less Water – Economic Considerations

By
Dennis A. Kaan
Agriculture and Business Management Specialist

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Spreadsheet Program

- Objective is to help determine optimal cropping patterns with reduced quantities of irrigation water.

- Evaluate yield response function of different crops and cost of production of those crops.

Water Response Function

Ac.-In. Applied	Corn	Dry Beans	Wheat
	(bu/acre)	(cwt/acre)	(bu/acre)
0	60	xxxxxx	32
2	100	xxxxxx	55
4	125	xxxxxx	64
6	155	13	70
8	175	17	70
10	179	20	67
12	180	22	xxxxxxx
14	180	22	xxxxxxx
16	175	20	xxxxxxx

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Cash Price Received

	Greeley	Eastern Plains	Loan Rate
Corn ($/bu)	$1.99 – 2.01	$1.58 – 1.84	$2.03
Wheat ($/bu)	$3.07	$3.29 – 3.32	$2.70
Dry Beans ($/cwt)	$15.50	$15.50	

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Net Returns per Acre

Acre Inches Applied	Corn	Dry Beans	Wheat
0	$ (17.69)	xxxxxx	$ 2.79
2	$ (83.92)	xxxxxx	$ (36.70)
4	$ (52.42)	xxxxxx	$ (21.47)
6	$ (13.57)	$ (57.93)	$ (13.07)
8	$ 10.59	$ (3.37)	$ (18.30)
10	$ 11.23	$ 36.25	$ (30.36)
12	$ 7.46	$ 60.91	xxxxxx
14	$ 2.22	$ 55.67	xxxxxx
16	$ (10.36)	$ 20.53	xxxxxx

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Basic Assumptions

- Irrigating 132 acre field with a center pivot system.
- 12 inches precipitation in the growing season.
- 12 acre-inches per acre irrigation allocation (1,584 acre inches).
- Acre-inch adjustment intervals of two inch segments.
- Assume irrigation allocation reduced to 7.57 acre inches (1,000 acre inches).

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Evaluation Scenarios

- Three Scenarios
  - Irrigated/Dry Land combination
  - Two Crop Rotation
  - User Defined

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Irrigated/Dry Land Cropping Scenario

Irrigated/Dry	Water (ac. In.)	Acres	Water (ac. In.)	Acres
	(1)	(2)	(3)	(4)
Crop				
Corn (Irrigated)	8	118.8	10	88
Corn (Dryland)	xxxxxx	13.2	xxxxxx	44
Totals	950.4	132	880	132
Available Supplies	1000	132	1000	132
Net Returns		$ 1,024.15		$ 209.80

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Two-Crop Rotation Cropping Scenario

Two Crop Rotation	Water (ac. In.)	Acres	Water (ac. In.)	Acres
	(1)	(2)	(3)	(4)
Crop				
Corn	0	66	0	33
Dry Beans	12	66	10	99
Totals	792	132	990	132
Available Supplies	1000	132	1000	132
Net Returns		$ 2,852.78		$ 3,004.78

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User Defined Cropping Scenario

User Defined	Water (ac. In.)	Acres	$ per Acre	Total $
	(1)	(2)	(3)	(4)
Crop				
Corn	10	66	$ 11.23	$ 740.96
Dry Beans	10	33	$ 36.25	$ 1,196.13
Wheat	0	33	$ 2.79	$ 92.13
Total	**990**	**132**	xxxxx	$ 2,029.22
Available Supplies	1000	132		

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Summary of Net Returns

Scenario	Net Returns	
	Optimal	User Adjusted
Irrigated/Dry Land	$1,024.15	$209.80
Two-Crop Rotation	$2,852.78	$3,004.78
User Defined		$2,029.22

Limited Irrigation Spreadsheet

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- Program available at the following website after January 1, 2006:

goldenplains.colostate.edu

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