**Economic and State Budget Cost of
Reducing Consumptive Use of Water
in the Platte and Republican Basins**

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Objectives

Develop a tool for addressing the following
consequences of reducing consumptive
use of water by irrigation:

1. On-farm economic cost
2. Off-farm costs (statewide economy)
3. Community level effects on employment,
population and property taxes.
4. Potential state budget costs.

Need for Reductions in CU

- Platte Basin; Coop Agreement
- Republican Basin; Compliance with Compact
- Correct for Over Appropriation (LB962)

CU Reduction Costs Depend on:

- How CU is reduced (policy options)
  - Land retirement by purchase, with premium to induce a voluntary sale (Willing buyer-willing seller).
  - Land retirement by purchase at market value (Equivalent to acreage regulation with compensation.)
  - Land retirement by leasing, with premium to induce a voluntary lease.
  - Land retirement by leasing at market value.
  - Water allocation at alternative compensation levels.

CU Reduction Costs Also Depend on:

- How much reduction is needed
- When the reduction is needed and for how long (Considered 10, 25 and 50 year programs with reductions occurring at different distances from the river).
- Economic conditions such as crop prices, energy and other input costs, and yields.

Policy Options Considered

Land retirement by lease, WB-WS

Land retirement by lease, Market Comp.

Land retirement by purchase, WB-WS

Land retirement by purchase, Market Compensation.

Allocation, 100% Compensation

Allocation, 50% Compensation

Methodology for On-Farm Costs

Economic cost is equal to the difference in net returns with and without the water.

Used indicators of on-farm costs of land retirement:

Land sales market

Land rental market

Budget calculations

No market indicators for allocation, so used budget calculations only.

Table 2. On-Farm Economic Cost of Retiring Irrigated Acres

Representative Counties	Calculated Cost $/Acre/Yr	Cash Rent Market $/Acre/Yr	Land Mkt $/Acre	Best Estimate $/Acre/Yr	Cu In/Acre	$/AF of Depletion to Basin
Morrill	$65	$76	$547	$70	15.4	$55
Lincoln	$73	$80	$719	$76	12.8	$71
Phelps	$98	$75	$810	$86	8.8	$118
Platte Avg.	$72	$77	$639	$74	13.7	$69
Chase	$78	$80	$719	$79	10.4	$91
Red Willow	$94	$80	$719	$87	11.8	$88
Franklin	$80	$83	$739	$81	8.4	$116
Repub. Avg.	$83	$80	$725	$82	10.2	$98

Notes:
1. Cash rent and land market values are from the annual land survey by Bruce Johnson, averaged for center pivot and gravity irrigated land.
2. Republican Basin calculations based on current allocation levels.
3. Basin averages are weighted by acres in reach.

Calculation of On-Farm Cost for Allocation

	Required CU Reduction	Regulated Acres	Base Allocation	New Allocation	Cost/AF of CU Reduction
Above Kingsley	40,086	424,906	25.1	22.4	$66
Kingsley to Lexinton	24,721	262,037	18.6	15.7	$132
Lexinton to HW 183	10,194	108,052	14.7	12.5	$188
Platte Basin	75,000	794,995			$104
URNRD	41,140	448,717	13.5	12.1	$121
MRNRD	28,605	312,000	13.0	11.4	$163
LRNRD	30,255	330,000	11.0	9.4	$195
Republican Basin	100,000	1,090,717			$155

Methodology for Off-Farm Costs

- Off-farm costs are the statewide effects on farm input suppliers, grain handlers etc. as the ripple effect occurs.
- Estimated using Lamphear's I/O model.
- Best measure is payments to households.

Calculation of Off-Farm Costs from Land Retirement

Representitive Counties	Dryland $/Acre/Year	Irrigated $/Acre/Year	Difference $/Acre/Year	Difference $/AF CU/Year	In Short Run $/Acre/Yr	In Short Run $/AF Depletion to Basin
Morrill	106	437	$331	$257	$223	$174
Lincoln	208	473	$265	$248	$195	$182
Phelps	285	455	$169	$232	$144	$197
Platte Avg	164	451	$287	$251	$203	$180
Chase	151	417	$266	$271	$188	$192
Red Willow	219	427	$208	$298	$160	$229
Franklin	278	438	$160	$188	$137	$161
Repub. Avg	209	426	$217	$254	$164	$193

Calculation of Off-Farm Cost from Allocation

	Required CU Reduction	Regulated Acres	Reduced Ag Output $/Acre	Short Run Cost $/AF CU
Above Kingsley	40,086	424,906	$26	$131
Kingsley to Lexington	24,721	262,037	$28	$137
Lexington to HW 183	10,194	108,052	$24	$117
Platte Basin	75,000	794,995	$27	$131
URNRD	41,140	448,717	$27	$139
MRNRD	28,605	312,000	$41	$208
LRNRD	30,255	330,000	$38	$196
Republican Basin	100,000	1,090,717	$35	$176

Duration of Off-Farm Costs

Off-farm effects from irrigation, called secondary or indirect, are transitory.

Transitory because the displaced resources eventually find alternative employment.

Therefore federal policies do not permit inclusion of secondary costs or benefits.

Most economists agree and choose to ignore them completely.

Duration of Off-Farm Costs

- We concur that they are transitory, but believe there is some long term effect.
- USDA-ERS economists found that after 6 to 8 years there were no observable effects of CRP land on county employment.
- We assumed that off-farm costs linearly decrease from 100% of I/O estimates to 15% in 10 years, then remain at 15%.

Combined On and Off-Farm Economic Cost of Reducing Consumptive Use (Depletions to Basin)

	Short Run Costs	10-Year Program	25-Year Program	50-Year Program
	Average Cost, $ per AF Reduction in Consumptive Use			
Land Retirement				
Platte Basin	$248	$185	$132	$114
Repub. Basin	$292	$225	$167	$147
Allocation				
Platte Basin	$235	$160	$146	$143
Repub. Basin	$331	$230	$212	$207

Local Community Impacts

- Question: Will irrigation reductions affect employment, population and property taxes by enough to be of policy concern?
- Answer: Effects small enough to be of little concern as long as CU reduction programs are not concentrated in a small part of basin.

Depletions to Basin Vs. Depletions to River

- Only part of the reduction in CU shows up as a change in depletions to the river within the relevant time period. Depends on aquifer properties and on where the reduction in CU.
- Therefore, costs per AF of change in depletions to the river will depend on where irrigation is reduced (Proximity to river).

State Budget Costs

- Presented as $/AF reduction in CU, $/AF depletion to river, annual cost and total up-front cost.
- Up-front cost is how much money would need to be appropriated in year 1 to cover long term costs, amortized at 4%.
- Administrative costs are not included.

Annual State Budget Costs for Platte Basin Programs

	Reduction in CU (Acre-Feet)	$/AF Reduction in CU	Total Annual Cost
Platte Basin			
Land Retirement, Annual Lease, Voluntary	75,000	$103	$7,733,113
Land Retirement, Annual Lease, Required with Compensation Equal to on-farm Cost	75,000	$69	$5,155,409
Land Retirement, Water Right Purchase, Voluntary	75,000	$64	$4,778,924
Land Retirement, Water Right Purchase, Required, with Compensation Equal to Market Value	75,000	$42	$3,185,949
Allocation, Regulation with Compensation Equal to 100% of Reduced Farm Income	75,000	$104	$7,825,187
Allocation, Regulation with Compensation Equal to 50% of Reduced Farm Income	75,000	$52	$3,912,593

Observations: Annual program costs are independent of program length. Least expensive is land retirement if it can be achieved without paying a premium in compensation. Most expensive is allocation with 100% compensation.

Platte - Long Term Program
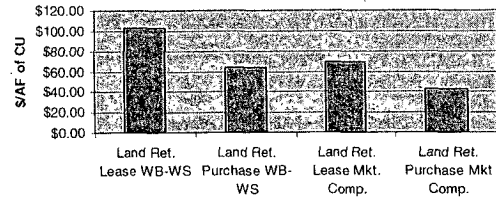
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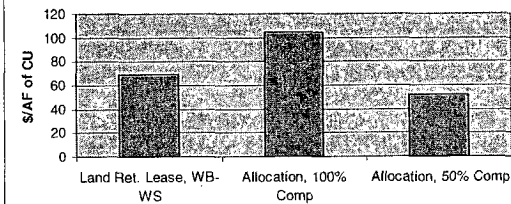
Summary Observations

- Land markets provide the best indication of actual on-farm value of irrigation.
- The on-farm cost of reducing consumptive use averaged $69 per acre-foot in the Platte Basin.
- Off-farm costs are substantial in the first years, but diminish as the displaced resources move to alternative uses.

Summary Observations

- Off-farm costs are lower for allocation than for land retirement.
- Total statewide economic costs for the Platte Basin ranged from $185 per AF for a 10 year program to $114 for a 50 year program.
- Costs of reducing depletions to river are much lower if irrigation is reduced in close proximity to river.

Summary Observations

- Policy makers can minimize the cost of reducing consumptive use from irrigation and augmenting stream-flow by purchasing rather than leasing irrigation rights, by using a regulatory instead of a willing buyer and willing seller approach, and by reducing irrigation at locations close to the river

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Summary Observations

- Allocation, with compensation, merits serious consideration as an alternative to irrigated land retirement programs.
- Cost uncertainties are due primarily to unknowns regarding the type of program(s) that will be used to meet management objectives.

Thanks for Listening!

Questions???