Appendix

Table A1 indicates the number of observations by bid value set and payment horizon. Table A2 has a comparison of our sample with the 2017 Census of Agriculture. The share of irrigated land in rice is a bit greater in our sample (27.51%) than in the Census of Agriculture (22.73%). The share of irrigated area in soybean in our sample (53.93%) is slightly less than in the census (57.06%). Our sample has an average years of farming experience of 30.91, and this is higher than the average years operating any farm in the census (22.4 years). The discrpeancy is likely because the Census of Agriculture reports years of experience as an operator rather than all the years of farming experience that our survey asks about.

Table A3 has summary statistics for the explanatory variables drawn from the features of the sample. The marginal utility estimates $\hat{\boldsymbol{\beta}}$, $\hat{\delta}$, and $\hat{\gamma}$ to derive the MWTP are shown in Table A4. Table A5 indicates for each explanatory variable the standardized deviation from the full sample mean for four clusters from a kmeans cluster analysis with a Euclidean similarity matrix. Table A6 indicates the results for the differences in the distribution of WTP across subgroups or discounting form and also the results for the differences in the distribution of the time parameter across subgroups. There are statistically significant differences in WTP across the subgroups for the exponential discounting form. The conservationist WTP is significantly greater, and the productivist WTP is significantly lower, than the WTP of any other group. The water scarce subgroup WTP is significantly greater than the water abundant subgroup WTP. In the hyperbolic discounting form, the water scarce subgroup WTP is less patient than the water abundant subgroup WTP.

Table A1. Payment Schedule and Bid Value Sets

Bid value sets	(Initial, Upper, Lower)	Obs.	yy	yn	ny	nn
10 year payment schedule		99				
Set1	(300,450,150)	35	5	5	6	19
Set2	(500,750,250)	30	4	5	2	19
Set3	(700,1050,350)	34	2	9	4	19
20 year payment schedule		78				
Set1	(150,225,75)	24	2	5	3	14
Set2	(250,375,125)	29	2	3	4	20
Set3	(350,525,175)	25	1	2	4	18
25 year payment schedule		29				
Set1	(120,180,60)	10	1	2	1	6
Set2	(200,300,100)	8	1	0	1	6
Set3	(280,420,140)	11	2	2	1	6
30 year payment schedule		76				
Set1	(100,150,50)	27	4	8	3	12
Set2	(150,225,75)	18	0	2	4	12
Set3	(160,240,80)	9	1	2	0	6
Set4	(230,345,115)	22	2	3	2	15
Total		282	27	48	35	172

Table A2. Comparison of 2017 Census of Agriculture and the Survey Sample

	2017 Census of Agriculture	**Arkansas Irrigation Survey**
Irrigated rice	22.73%	27.51%
Irrigated soybean	57.06%	53.93%
Average years operating any farm (NASS) versus the years of farming experience (survey)	22.40	30.91

Note— USDA NASS. 2017 Census of Agriculture.

Table A3. Summary Statistics of Observed Characteristics

Variables	Definition	Mean	Std. Dev.
Irrigation and Farm Characteristics			
NUM_RES	The ratio of the number of storage reservoirs the respondent uses relative to maximum number of storage reservoirs any respondent has.	0.060	0.132
PIVOT	The sum of dummies (=1 if ever used center pivot irrigation and/or portable center pivot irrigation for row crops)	0.528	--
COVER_CROP	=1 if the respondent uses any cover crops	0.323	--
CRED_AWARE	=1 if the respondent is aware of the state tax credits program for conversions to surface water or land leveling	0.496	--
CRED_USE	=1 if the respondent has ever used the state tax credits program for conversions to surface water or land leveling	0.181	--
LCRED_USE	=1 if the respondent used the tax credits on land leveling to reduce agricultural irrigation water use	0.085	--
GW_RISE	=1 if the groundwater level rose over the last five years	0.277	--
CROWLEY	=1 if the respondent lives east of Crowley's ridge in groundwater abundant counties[a]	0.433	--
GW_SHORT	=1 if the respondent has the opinion that there is groundwater shortage problem in the state	0.713	--
Socio-demographic			
D_INC_MID_HIGH	=1 if annual household income is greater than $75,000	0.592	--
D_INC_NA	=1 if annual household income is not reported	0.199	--
D_ADV_EDU	=1 if education beyond Bachelors degree	0.089	--
D_AGRI_EDU	=1 if the respondent's has formal education related to agriculture	0.557	--
D_HIGHEXP	More than forty years of farming experience	0.287	--
D_LOWEXP	Five years or less of farming experience	0.035	--

DUCKORG	=1 if the respondent belongs to a duck hunting organization	0.539	--
Social Learning			
PEER_DRAIN	The sum of dummies (=1 if close family members, friends or neighbor producers has used the following practice in the past 10 years) for using surge irrigation and/or precision leveling	1.301	0.582
PEER_EFF	The sum of dummies (=1 if close family members, friends or neighbor producers has used the following practice in the past 10 years) for using center pivot, zero grade leveling and/or alternate wetting and drying for rice irrigation	1.791	0.973

Note: [a] These counties are Mississippi, Crittenden, Clay, Craighead, Greene, Poinsett, Phillips, Lee, St. Francis, and Cross.

Table A4. Marginal Utility Estimates ($\hat{\boldsymbol{\beta}}$, $\hat{\delta}$, and $\hat{\gamma}$)

	Random time parameter with eight observed characteristics for time parameter		Fixed time parameter with seventeen observed characteristics for time parameter	
	Exponential	Hyperbolic	Exponential	Hyperbolic
INTERCEPT	0.064 (0.89)	0.157 (0.75)	0.670 (0.14)	0.699 (0.14)
NUM_RES	-5.262 (0.00)[a]	-5.752 (0.00)[c]	-5.635 (0.00)[a]	-6.113 (0.00)[a]
PIVOT	0.253 (0.06)[c]	0.272 (0.06)[c]	-0.276 (0.05)[b]	-0.334 (0.02)[b]
COVER_CROP	0.748 (0.00)[a]	0.682 (0.00)[a]	0.126 (0.55)	0.097 (0.65)
LCRED_USE	-2.504 (0.01)[a]	-2.871 (0.00)[a]	-4.805 (0.00)[a]	-5.332 (0.00)[a]
CRED_AWARE	-0.270 (0.19)	-0.291 (0.19)	-0.292 (0.28)	-0.301 (0.20)
CRED_USE	4.089 (0.00)[a]	4.665 (0.00)[a]	4.623 (0.00)[a]	5.222 (0.00)[a]
GW_RISE	-0.636 (0.01)[a]	-0.755 (0.00)[a]	0.081 (0.74)	0.103 (0.68)
CROWLEY	-0.731 (0.01)[a]	-0.781 (0.00)[a]	-0.755 (0.00)[a]	-0.713 (0.00)[a]
GW_SHORT	0.096 (0.66)	0.034 (0.88)	-0.586 (0.02)[b]	-0.638 (0.02)[b]
D_INC_MIDHIGH	0.175 (0.56)	0.075 (0.82)	0.839 (0.00)[a]	0.848 (0.00)[a]
D_INC_NA	0.610 (0.07)[c]	0.555 (0.12)	0.487 (0.13)	0.365 (0.30)
AGRI_EDU	0.755 (0.03)[b]	1.126 (0.00)[a]	0.018 (0.93)	0.103 (0.65)
D_ADV_EDU	-0.437 (0.25)	-0.702 (0.10)[c]	1.226 (0.00)[a]	1.254 (0.00)[a]
HIGH_EXPER	0.711 (0.00)[a]	0.741 (0.00)[a]	-0.439 (0.08)[c]	-0.483 (0.07)[b]
DUCKORG	0.554 (0.02)[b]	0.667 (0.01)[a]	1.289 (0.00)[a]	1.369 (0.00)[a]
PEER_DRAIN	-0.278 (0.25)	-0.144 (0.60)	-0.257 (0.19)	-0.227 (0.25)
PEER_EFF	-0.147 (0.28)	-0.235 (0.14)	-0.139 (0.26)	-0.205 (0.12)
SHIFT ($\hat{\delta}$)	-0.337 (0.02)[b]	-0.381 (0.02)[b]	-0.281 (0.03)[b]	-0.272 (0.04)[b]
$\hat{\gamma}$	-0.033 (0.00)[a]	-0.030 (0.03)[b]	-0.035 (0.00)[a]	-0.022 (0.03)[b]

Note: *p*-values for the coefficients shown in parentheses beside the coefficients. We round *p*-values less than 0.001 to 0.00. [a,b,c] indicate significance at the 1%, 5%, and 10% levels, respectively.

Table A5. Standardized Deviations from the Full Sample Mean for Four Clusters from a kmeans Cluster Analysis with a Euclidean Similarity Matrix

	Cluster			
	(1) Reservoir user	(2) Pivot user	(3) Low efficient peer	(4) High efficient peer
Number of Observations	10	34	45	63
Variables				
NUM_RES	3.08	-0.42	-0.13	-0.17
PIVOT	-0.45	1.46	-0.48	-0.37
COVER_CROP	0.59	0.25	-0.02	-0.21
LCRED_USE	0.05	0.43	-0.23	-0.08
CRED_AWARE	0.43	0.32	-0.17	-0.12
CRED_USE	0.84	0.15	-0.17	-0.09
GW_RISE	0.48	-0.11	0.11	-0.10
CROWLEY	-0.85	0.40	0.00	-0.08
GW_SHORT	0.20	-0.14	-0.15	0.15
D_INC_MIDHIGH	-0.17	0.06	-0.06	0.04
D_INC_NA	0.01	0.09	0.06	-0.10
AGRI_EDU	0.11	0.03	-0.20	0.11
D_ADV_EDU	-0.30	0.22	-0.07	-0.02
HIGH_EXPER	-0.21	-0.26	0.32	-0.06
DUCKORG	0.12	-0.26	0.03	0.10
PEER_DRAIN	0.18	0.60	-0.66	0.12
PEER_EFF	-0.41	0.47	-1.20	0.67

Note: The highlighted cells indicate the largest standardized deviation in absolute value terms of all the explanatory variables in each column.

Table A6: Probability Values for Differences in the Distribution of WTP (top half) or the Distribution of the Time Parameter (bottom half)

	Mean	Reservoir user	Pivot user	Low efficient peer	High efficient peer
Differences in the distribution of WTP					
Mean	0.15	0.11	0.02	0.09	0.39
Reservoir user	0.14	0.04	0.47	0.05	0.08
Pivot user	0.02	0.38	0.01	0.01	0.01
Low efficient peer	0.17	0.02	0.00	0.31	0.13
High efficient peer	0.45	0.12	0.02	0.19	0.19
Differences in the distribution of the time parameter					
Mean	--	0.13	0.04	0.11	0.35
Reservoir user	0.14	--	0.29	0.01	0.07
Pivot user	0.04	0.25	--	0.00	0.02
Low efficient peer	0.08	0.02	0.00	--	0.17
High efficient peer	0.39	0.09	0.02	0.11	--

Note—The lower triangle gives results of the method of convolutions approach (Poe et al. 2005) with the FTPw model for the differences within the hyperbolic discounting form. Likewise, the upper triangle indicates results with the FTPw model for the differences within the exponential discounting form. The diagonal tests for differences in WTP estimates between the hyperbolic and exponential discounting forms. All tests are one-sided and use 1000 normal random draws of the mean and standard error estimates. We round *p*-values less than 0.001 to 0.00.