

APPENDIX 4

Detailed Regression models explaining different individual and group decisions

Table A.4 List of variables

Personal Information (Individual level variables)	
<i>Education level</i>	Education level of the participant (01 = No formal education; 02 = Started school; 03 = Finished primary school; 04 = finished secondary school; 05 = Further education (college/university/ polytechnic))
<i>Age</i>	Age of the participant
<i>Size of Land holdings</i>	The amount of land held by the participants (in Acres)
<i>Member dominant Baradari</i>	Whether participant belongs to one of the top three influential baradaris of the area (Dummy variable 0=No & 1 = Yes)
<i>Owning private tube well</i>	Whether the participant owns or has access to water from private tube well (Dummy variable 0=No & 1 = Yes)
<i>Feel accepted in community</i>	Participants views about whether he feels accepted as part of the village community (0= Don't know 1= Strongly agree; 2= Agree ; 3= Disagree; 4= Strongly Disagree)
<i>Trust index</i>	Participants views about his fellow villager's honesty and trustworthiness (0= Don't know 1= Strongly agree; 2= Agree ; 3= Disagree; 4= Strongly Disagree)
Group level variables	
<i>Network density of social relations</i>	The relationship status between different group members
<i>No. of casts in group</i>	number of different castes in the group
<i>σ age</i>	Standard deviation of age in the group, meant to capture variation in age between different group members
<i>σ education level</i>	Standard deviation of education level in the group, meant to capture variation in education between different group members
<i>σ size land holding</i>	Standard deviation of land holdings in the group, meant to capture variation in land holdings between different group members
Village level variables	
<i>No. of households</i>	Population of the village in terms of households
<i>Head- or tail-end location</i>	Position of the village along the canal/irrigation system (1= Head-end 2= Middle 3= Tail-end)
<i>Distance to market</i>	Distance to the nearest major agricultural commodities market (in kilometers)
<i>Frequency of water disputes</i>	Average number of water disputes brought to the irrigation officials in the last three years
Game variables	

<i>Position number</i>	The position occupied by the player
<i>Extraction (t-1)</i>	Amount of water extracted (in minutes) in last round
<i>Group Investment (t-1)</i>	Number of tokens invested by the group in the last round
<i>Gini-coeff. Investment (t-1)</i>	Gini-coefficient of investment in the last round. Indicates inequality in investments
<i>Gini-coeff. Earnings (t-1)</i>	Gini-coefficient of Earnings in the last round. Indicates inequality in Earnings
<i>Period</i>	Period is a binary variable. 0=Baseline Phase 1= Treatment phase
<i>Interaction C & treatment phase</i>	Indicates treatment phase of communication groups
<i>Interaction TA & treatment phase</i>	Indicates treatment phase of Traditional authority groups
<i>Interaction P & treatment phase</i>	Indicates treatment phase of external sanction groups
<i>Interaction IC & treatment phase</i>	Indicates treatment phase of Institutional choice groups
<i>Received C treatment (t-1)</i>	Indicates whether or not participant received Communication Treatment in the previous round
<i>Received TA treatment (t-1)</i>	Indicates whether or not participant received Traditional authority Treatment in the previous round
<i>Received P treatment (t-1)</i>	Indicates whether or not participant received Punishment Treatment in the previous round
<i>Initiated TA treatment (t-1)</i>	Indicates whether or not participant initiated a Traditional authority Treatment against one or more of their group members in the previous round
<i>Initiated C treatment (t-1)</i>	Indicates whether or not participant initiated a Communication Treatment against one or more of their group members in the previous round
<i>Initiated P treatment (t-1)</i>	Indicates whether or not participant initiated a Punishment Treatment against one or more of their group members in the previous round

Table A4.1. Mixed-effects regression results of individual amounts invested and earned (coefficients with robust standard errors in parentheses; * p < 0.1, ** p < 0.05, *** p < 0.01)

	Investment (Round 2-18)	Investment (Round 2-18)	Earnings (Round 2-18)	Earnings (Round 2-18)
Individual-level variables				
Education level	-0.0885* (0.0508)	-0.0857 (0.0530)	0.181** (0.0783)	0.160** (0.0761)
Age	0.00687	0.00684	-0.0125	-0.0127

	(0.0116)	(0.0115)	(0.0137)	(0.0139)
Size of land holdings	0.00708 (0.00936)	0.00690 (0.00924)	-0.00214 (0.00827)	-0.00185 (0.00824)
Owning private tube well	0.0296 (0.177)	0.0325 (0.176)	-0.137 (0.250)	-0.147 (0.243)
Member dominant Baradari	0.0190 (0.350)	0.0219 (0.347)	1.249*** (0.474)	1.248*** (0.471)
Feel accepted in community	-0.0606 (0.195)	-0.0565 (0.200)	0.0109 (0.278)	0.0167 (0.283)
Trust index	-0.0264 (0.270)	-0.0203 (0.267)	0.0522 (0.347)	0.0332 (0.348)
Group variables				
No. of casts in group	0.0203 (0.115)	0.0254 (0.116)	0.0416 (0.303)	0.0228 (0.294)
Network density of social relations	0.0834 (0.125)	0.0879 (0.123)	-0.00640 (0.0656)	-0.0314 (0.0683)
Game variables				
Round	0.0103 (0.0191)	0.0127 (0.0174)	0.160** (0.0655)	0.157** (0.0663)
1st player position	-	-	-	-
2nd player position	0.0119 (0.336)	0.0170 (0.335)	-0.536 (0.508)	-0.514 (0.514)
3rd player position	0.246 (0.349)	0.259 (0.355)	-1.263*** (0.442)	-1.241*** (0.430)
4th player position	-0.341 (0.392)	-0.320 (0.399)	-1.267* (0.766)	-1.259* (0.764)
5th player position	-0.0455 (0.333)	-0.0282 (0.340)	-3.229*** (1.007)	-3.250*** (0.997)
Extraction (t-1)	-0.0232*** (0.00647)	-0.0233*** (0.00658)	0.119*** (0.0185)	0.119*** (0.0188)
Gini-coeff. earnings (t-1)	-1.669* (0.933)	-1.569 (0.975)	-4.086 (2.854)	-4.671 (3.015)
Share in investment			-13.64*** (3.079)	-13.49*** (2.979)
Mean extraction except me (t-1)			-0.0865*** (0.0302)	-0.0915*** (0.0326)
Group investment (t-1)	0.0746*** (0.0154)	0.0760*** (0.0161)		
Interaction C & treatment phase	0.0701 (0.372)	-0.0565 (0.334)	-0.639 (1.070)	-0.686 (1.037)
Interaction TA & treatment phase	0.0221 (0.328)	-0.0223 (0.305)	-0.226 (0.902)	-0.389 (0.871)
Interaction P & treatment phase	-0.291 (0.445)	-0.211 (0.435)	-1.798* (1.038)	-2.154* (1.040)
Interaction IC & treatment phase	-0.147 (0.228)	-0.154 (0.219)	-1.032 (0.874)	-1.250 (0.901)
Received C treatment (t-1)		0.694** (0.284)		0.0171 (0.616)
Received TA treatment (t-1)		-0.0290 (0.373)		1.066 (0.789)
Received P treatment (t-1)		-0.112		0.475

		(0.375)		(0.634)
Initiated TA treatment (t-1)		0.406		0.786
		(0.312)		(1.096)
Initiated C treatment (t-1)		0.173		0.553
		(0.345)		(1.139)
Initiated P treatment (t-1)		-0.628		2.269^{***}
		(0.638)		(0.879)
Constant	5.445^{***}	5.308^{**}	17.54^{***}	17.98^{***}
	(1.124)	(1.136)	(1.167)	(1.178)
Random-effects Parameters				
Village	-14.83	-16.55	-13.06	-16.21
	(124.2)	(103.3)	(126.7)	(85.38)
Group	-0.507^{***}	-0.514^{**}	0.562^{***}	0.577
	(0.159)	(0.257)	(0.209)	(0.470)
Residual	0.840^{***}	0.838^{**}	1.829^{***}	1.827^{***}
	(0.0568)	(0.0583)	(0.0599)	(0.0743)
No. of players	160	160	160	160
No. of observations	2410	2410	2410	2410

Table A4.2. Mixed-effects regression models explaining the tokens invested for provision of CPR by player position over all experiment rounds (coefficients with robust standard errors in parentheses; * p < 0.1, ** p < 0.05, *** p < 0.01).

	Investments by player position				
	Player 1	Player 2	Player 3	Player 4	Player 5
Individual-level variables					
Education level	0.152	-0.0833	-0.0553	-0.280^{**}	0.254
	(0.159)	(0.104)	(0.101)	(0.112)	(0.274)
Age	0.0123	0.0155	-0.0109	-0.0183	-0.00289
	(0.0271)	(0.0217)	(0.00923)	(0.0113)	(0.00778)
Size of Land holdings	0.0192	-0.00907	-0.00704	0.00723	-0.0104
	(0.0267)	(0.0186)	(0.0108)	(0.00970)	(0.0193)
Owning private tube well	-0.175	-0.115	0.499	0.00765	0.0777
	(0.268)	(0.248)	(0.448)	(0.233)	(0.209)
Member dominant Baradari	-0.224	0.792	-0.368	1.424	-0.762
	(0.354)	(0.521)	(0.669)	(0.904)	(0.725)
Feel accepted in community	0.322	-0.249	-1.438^{***}	0.104	0.407^{***}
	(0.394)	(0.330)	(0.271)	(0.327)	(0.138)
Trust index	-0.0488	0.853	0.0819	-0.392	-0.246
	(0.359)	(0.709)	(0.196)	(0.323)	(0.649)
Group variables					
No. of casts in group	0.0643	0.116	-0.130	-0.124	0.160
	(0.282)	(0.257)	(0.142)	(0.278)	(0.323)
Network density of social relations	-0.0197	0.398^{**}	-0.0429	0.0301	0.106
	(0.164)	(0.160)	(0.0952)	(0.214)	(0.191)
Game variables					
Round	0.0224	0.0159	0.0176	0.00162	0.00897
	(0.0428)	(0.0296)	(0.0307)	(0.0562)	(0.0344)

Extraction (t-1)	-0.0150 (0.0140)	-0.0124 (0.00792)	-0.0188 (0.0128)	-0.0268 ^{***} (0.00902)	-0.0112 (0.00823)
Group investment (t-1)	0.0763 ^{***} (0.0163)	0.0953 ^{***} (0.00967)	0.0803 ^{***} (0.0172)	0.0778 ^{***} (0.0281)	0.0220 (0.0294)
Gini-coefficient Earnings (t-1)	-1.036 (1.173)	-0.0205 (0.754)	0.0799 (1.133)	-3.153 (1.968)	-3.077 (1.970)
Interaction C & treatment phase	-0.00326 (0.636)	0.229 (0.429)	-0.235 (0.255)	-0.210 (0.505)	0.0450 (0.906)
Interaction TA & treatment phase	-0.341 (0.441)	-0.491 (0.353)	-0.109 (0.443)	0.403 (0.632)	0.365 (0.597)
Interaction P & treatment phase	-0.451 (0.700)	0.372 (0.625)	-0.612 (0.469)	-0.358 (0.597)	0.310 (0.509)
Interaction IC & treatment phase	-0.292 (0.360)	0.323 (0.412)	-0.152 (0.343)	-0.468 (0.553)	-0.150 (0.503)
Received C treatment (t-1)	0.420 (0.574)	0.167 (0.199)	-0.165 (0.354)	0.935 (0.572)	0.932 (0.616)
Received TA treatment (t-1)	0.640 (0.686)	-0.372 (0.400)	0.189 (0.452)	-0.0808 (0.514)	-0.0335 (0.649)
Received P treatment (t-1)	0.463 (0.343)	-1.089 [*] (0.576)	0.308 (0.862)	-1.394 (1.379)	-0.0645 (0.925)
Initiated TA treatment (t-1)	0.824 (1.126)	0.798 (0.709)	0.202 (0.405)	0.447 (0.448)	-0.147 (0.759)
Initiated C treatment (t-1)	1.081 [*] (0.639)	1.014 (0.705)	0.270 (0.678)	-1.343 (1.093)	0.334 (0.662)
Initiated P treatment (t-1)	0.616 ^{**} (0.295)	-1.596 (1.226)	-2.213 (1.596)	0.388 (0.717)	-0.138 (0.621)
Constant	3.616 ^{**} (1.626)	1.596 (2.419)	8.893 ^{***} (1.194)	6.750 ^{***} (1.373)	6.504 ^{***} (1.369)
Random-effects Parameters					
Village	-19.77 (70.31)	-11.33 (78.79)	-15.34 (93.26)	-19.95 (.)	-12.32 (218.1)
Group	-0.151 (0.248)	0.275 (0.198)	-0.618 (0.393)	-0.0628 (0.200)	-0.0371 (0.883)
Residual	0.723 ^{***} (0.102)	0.563 ^{***} (0.0576)	0.664 ^{***} (0.186)	0.788 ^{***} (0.0826)	0.818 (0.735)
No. of players	32	32	32	32	32
No. of observations	482	482	482	482	482

Table A4.3. Mixed effects regression models explaining the total tokens earned from water extraction by player position (coefficients with robust standard errors in parentheses; * p < 0.1, ** p < 0.05, *** p < 0.01).

Extraction earnings by player position					
	Player 1	Player 2	Player 3	Player 4	Player 5
Individual-level variables					
Education level	-0.158 (0.202)	0.226 (0.312)	-0.0622 (0.199)	0.602 ^{***} (0.171)	0.0149 (0.370)
Age	-0.0478	0.0121	-0.0394	0.0594 ^{***}	0.00986

	(0.0314)	(0.0343)	(0.0242)	(0.0201)	(0.0280)
Size of Land holdings	0.0855*	-0.0572	0.0275	0.0177	0.0431*
	(0.0437)	(0.0372)	(0.0380)	(0.0158)	(0.0261)
Owning private tube well	-0.256	0.113	-0.507	0.126	-0.119
	(0.586)	(0.371)	(0.327)	(0.409)	(0.575)
Member dominant Baradari	1.510	4.225***	-0.305	0.278	2.435***
	(1.208)	(1.175)	(1.190)	(0.462)	(0.710)
Feel accepted in community	0.544	0.0634	-0.489	-0.295	-0.552
	(0.521)	(0.983)	(0.583)	(0.272)	(0.412)
Trust index	1.439***	-0.296	-0.149	-0.957***	1.739*
	(0.471)	(0.783)	(0.550)	(0.338)	(0.922)
Group variables					
No. of casts in group	-0.343	0.0270	-0.506	0.427*	0.0688
	(0.616)	(0.496)	(0.328)	(0.220)	(0.546)
Network density of social relations	0.0325	-0.507	-0.889***	0.0999	-0.131
	(0.260)	(0.691)	(0.208)	(0.507)	(0.391)
Game variables					
Group investment	0.553***	0.577***	0.740***	0.807***	0.700***
	(0.0813)	(0.0470)	(0.0395)	(0.0338)	(0.0414)
Round	0.140*	-0.0340	0.225**	0.166**	0.137**
	(0.0829)	(0.0712)	(0.0966)	(0.0830)	(0.0566)
Gini- coefficient Earnings (t-1)	-1.915	-3.986	2.623	3.448	-1.958
	(3.510)	(4.085)	(2.102)	(2.364)	(2.328)
Mean extraction except me (t-1)	-0.0705**	0.00602	-0.101*	-0.0568*	-0.0603
	(0.0301)	(0.0464)	(0.0599)	(0.0333)	(0.0445)
Extraction (t-1)	0.0487**	-0.0359	0.0713*	0.0306	0.0667**
	(0.0199)	(0.0516)	(0.0371)	(0.0267)	(0.0330)
Interaction C & treatment phase	1.325	-1.304*	-1.137	-3.765**	4.461***
	(1.140)	(0.767)	(1.482)	(1.514)	(1.233)
Interaction TA & treatment phase	-0.697	-0.120	2.050	1.663	2.638**
	(1.128)	(1.454)	(1.524)	(2.931)	(1.289)
Interaction P & treatment phase	-0.545	1.746	4.042***	2.311**	0.613
	(1.569)	(1.443)	(1.493)	(1.091)	(1.576)
Interaction IC & treatment phase	-4.434**	-0.195	0.620	2.652*	0.905
	(1.900)	(0.593)	(2.237)	(1.578)	(0.911)
Received C treatment (t-1)	0.295	0.918	2.261*	2.185**	-3.815**
	(0.817)	(3.377)	(1.215)	(0.929)	(1.799)
Received TA treatment (t-1)	5.266***	1.797	-0.696	1.761	1.126
	(1.393)	(3.944)	(1.322)	(1.608)	(1.046)
Received P treatment (t-1)	-1.942***	0.459	-2.104***	-0.327	-0.449
	(0.717)	(1.117)	(0.804)	(1.399)	(1.581)
Initiated TA treatment (t-1)	-1.177	-0.199	-1.279	1.410	0.744
	(0.873)	(0.953)	(1.182)	(1.062)	(1.275)
Initiated C treatment (t-1)	-3.932***	-1.155	-2.201	-0.797	0.681
	(1.495)	(0.950)	(1.437)	(0.877)	(1.621)
Initiated P treatment (t-1)	-0.151	-1.161	-1.074	-1.767*	-1.472

Constant	(0.865) -7.017*** (2.528)	(1.073) -7.633* (4.284)	(0.695) -9.329*** (3.556)	(0.914) -21.74*** (2.888)	(1.325) -20.77*** (3.071)
Random-effects Parameters					
Village	0.0529 (0.386)	0.689** (0.279)	0.285 (0.406)	-1.087 (4.728)	0.241 (0.249)
Group	-0.0172 (0.559)	0.660** (0.257)	-17.40 (81.92)	-0.0601 (0.727)	-0.587 (1.006)
Residual	1.631*** (0.0952)	1.484*** (0.0946)	1.567*** (0.0777)	1.529*** (0.0431)	1.620*** (0.0450)
No. of players	32	32	32	32	32
No. of observations	482	482	482	482	482

Table A4.4. Mixed effects regression models explaining the total tokens invested and earned from water extraction by groups (coefficients with robust standard errors in parentheses; * p < 0.1, ** p < 0.05, *** p < 0.01).

	Group investment (Round 8-18)	Group investment (Round 2-18)	Group Extraction (Tokens) (Round 8-18)	Group Extraction (Tokens) (Round 2-18)
σ age	0.135* (0.0741)	-0.458 (0.371)	-0.458 (0.371)	-0.265 (0.398)
σ size land holding	-0.0894 (0.0870)	-0.165 (0.311)	-0.165 (0.311)	-0.195 (0.318)
σ education level	0.0521 (1.375)	-1.276 (3.716)	-1.276 (3.716)	-1.278 (4.045)
No. of casts in group	0.459 (0.794)	-0.865 (3.093)	-0.865 (3.093)	-0.409 (2.616)
Network density of social relations	4.807 (3.175)	3.086 (8.918)	3.086 (8.918)	2.021 (8.670)
Village variables				
No. of households	-0.00637 (0.00445)	-0.0028 (0.0034)	-0.0161 (0.0137)	-0.003 (0.012)
Head- or tail-end location	-0.950 (0.805)	0.394 (0.719)	-1.665 (1.984)	0.436 (1.986)
Distance to market	0.124** (0.0587)	0.152** (0.0629)	-0.255 (0.204)	-0.108 (0.232)
Frequency of water disputes	0.690** (0.296)	-0.00150 (0.293)	2.487 (1.556)	0.935 (1.634)
Game variables				

Round	0.112 (0.121)	0.816** (0.369)	0.623*** (0.200)	0.634*** (0.160)
Gini-coeff. Investment (t-1)	-14.64* (7.997)	-20.83** (9.810)	-6.041 (11.97)	6.530 (11.44)
Group investment	-	-	3.296*** (0.153)	3.424*** (0.179)
Gini-coeff. Extraction (t-1)	-	-	0.898 (5.400)	0.885 (4.076)
Gini-coeff. Earnings (t-1)	-18.28*** (7.084)	-17.25 (21.03)	-	-
Interaction C & treatment phase	2.047 (1.533)	0.0754 (1.796)	8.888 (5.565)	-2.251 (5.322)
Interaction TA & treatment phase	2.156 (1.754)	-0.0712 (1.594)	6.386 (6.213)	-1.244 (4.167)
Interaction P & treatment phase	0.107 (2.508)	-1.447 (2.299)	-1.208 (7.946)	-9.033* (5.466)
Interaction IC & treatment phase	-	-1.049 (1.349)	-	-5.456 (4.526)
Constant	34.61*** (2.340)	35.40*** (4.242)	83.67*** (10.46)	84.38*** (12.18)
Random-effects Parameters				
Village	-23.95 (84.50)	-15.98 (66.2)	-13.34*** (2.905)	-15.50 (228.1)
Group		0.960** (0.378)	2.178*** (0.360)	2.073 (3.449)
Residual	1.909*** (0.0579)	1.826*** (0.0548)	2.453*** (0.0457)	2.479*** (0.0297)
No. of Groups	32	32	32	32
No. of observations	290	482	290	482

Table A4.5. Tobit models explaining the decision to initiate treatment against other players (coefficients with standard errors in parentheses; * p < 0.1, ** p < 0.05, *** p < 0.01).

	(1) frequency how often player initiated treatment	(2) frequency how often player received treatment
Position number	0.589 (0.306)	-0.767*** (0.180)
Education level	0.588* (0.253)	-0.0785 (0.177)
Age	0.0170 (0.0248)	-0.0158 (0.0122)
Size of Land holdings	0.0150 (0.0139)	0.00330 (0.0128)

Member dominant Baradari	-1.223 (1.078)	-0.219 (0.548)
Degree kinship	0.401 (0.275)	0.127 (0.194)
Constant	-5.393*** (1.583)	3.295*** (0.768)
<hr/>		
sigma		
Constant	3.051*** (0.457)	1.957*** (0.234)
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Observations	160	160
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