

APPENDIX A: MANN-WHITNEY U AND INDEPENDENT T-TEST RESULTS

Table 1: Preliminary test results showing temporal variation in proxy measures of diverse livelihood resources

Resource	Measures	Indicators	Unit of measurement	Results from non-parametric test	Independent t-test over time Null hypothesis: population means equal for both groups (2013 and 2019)				
					2013	2019	P-value	Direction	Estimated effect size (Cohen's d)
Natural	Access to land	Engagement in cultivation	Proportion	Not significant	0.841 (0.233)	0.9 (0.01)	<0.001		0.329
		Ownership of land	Proportion	Significant	0.972 (0.049)	0.971 (0.053)	0.934	Same	0.013
		Parcel for livestock	Proportion	Significant	0.696 (0.260)	0.632 (0.171)	0.021	Decrease	0.290
		Parcel for aquaculture	Proportion	Significant	0.001 (0.017)	0.788 (0.306)	<.001	Increase	0.363
		Parcel for forest/wooded land	Proportion	Significant	0.129 (0.243)	0.048 (0.068)	<.001	Decrease	0.455
	Access to water	Engagement in fish catching	Proportion	Not significant	0.265 (0.306)	0.247 (0.298)	0.68		0.061
	Access to forest	Engagement in forestry	Proportion	Significant	0.002 (0.014)	0.869 (0.196)	<.001	Increase	0.623
Human	Access to laborers	Total household members available for e	Number	Significant	4.652 (0.654)	4.19 (0.52)	<.001	Decrease	0.782
	Access to education	Education of HH head	Proportion	Significant	0.902 (0.169)	0.805 (0.110)	<.001	Decrease	0.683
	Access to knowledge and skills	Experiences in farming	Years	Significant	48.598 (4.961)	46.737 (3.374)	<.001	Decrease	0.439
		Access to agricultural information	Proportion	Not significant	0.357 (0.114)	0.361 (0.155)	0.855		0.030
Financial	Wealth	TLU	TLU	Significant	1.5 (1.06)	5.664 (16.035)	0.072	Increase	0.366
	Access to credit	Access to credit/loan for agricultural pur	Proportion	Significant	0.175 (0.065)	0.474 (0.165)	<.001	Increase	1.387
	Access to banking facilities	Household using bank for credit	Proportion	Significant	0.147 (0.203)	0.329 (0.248)	<.001	Increase	0.804
	Access to microfinance		Proportion	Significant	0.488 (0.292)	0.525 (0.245)	0.322	Increase	0.138
Physical	Access to irrigation facilities	Household with irrigation facilities	Proportion	Significant	0.243 (0.329)	0.32 (0.133)	0.002	Increase	0.306
	Access to market	Household using market either for sale o	Proportion	Significant	0.218 (0.051)	0.006 (0.022)	<.001	Decrease	0.534
	Access to school	Household with members attending scho	Proportion	Significant	1.132 (0.300)	0.195 (0.110)	<.001	Decrease	0.415
Social	Access to informal networks for credit	Relatives/friends	Proportion	Significant	0.253 (0.248)	0.01 (0.027)	<.001	Decrease	1.379
		money lender	Proportion	Significant	0.201 (0.226)	0.047 (0.083)	<.001	Decrease	0.906
	Access to network for agricultural information	Main source of agricultural information- t	Proportion	Not significant	0.306 (0.310)	0.263 (0.174)	0.135		0.173
		Main source of agricultural information- t	Proportion	Significant	0.573 (0.334)	0.099 (0.102)	<.001	Decrease	1.922

APPENDIX B: MIXED EFFECT MODEL RESULTS

Table 2: Mixed effect model results (N= 483)

Variables	Natural		Social		Human		Financial		Physical	
	B	EXP (B)	B	EXP (B)	B	EXP (B)	B	EXP (B)	B	EXP (B)
Dam effect	-0.44*** (0.06)	0.64	0.08 (0.08)	1.08	0.11' (0.05)	1.12	-0.38*** (0.06)	0.68	0.27*** (0.04)	1.31
Impact zone 1	-0.09** (0.03)	0.91	0.06 (0.04)	1.06	0.01 (0.04)	1.01	-0.03 (0.03)	0.97	0.05* (0.02)	1.05
Impact zone 2	-0.02 (0.02)	0.98	-0.08* (0.04)	0.92	0.01 (0.03)	1.01	-0.03 (0.02)	0.97	0.02 (0.02)	1.02
Dam type [IRR =1]	0.02 (0.02)	1.02	-0.13*** (0.03)	0.88	-0.01 (0.03)	0.99	0.02 (0.02)	1.02	0.03 (0.02)	1.03
Nightlight Interaction	0.03* (0.01)	1.03	0.02 (0.02)	1.02	0.01 (0.01)	1.01	0.01 (0.01)	1.01	0 (0.01)	1.00
[dam effect * Impact zone1]	0.05 (0.08)	1.05	-0.02 (0.08)	0.98	-0.13 (0.08)	0.88	0.3*** (0.08)	1.35	-0.04 (0.06)	0.96
[dam effect * impact zone 2]	0.13 (0.08)	1.14	0.13 (0.12)	1.14	-0.02 (0.08)	0.98	0.29*** (0.09)	1.34	0.01 (0.07)	1.01
Interaction [dam effect * dam type=IRRI]	-0.27*** (0.07)	0.76	0.24** (0.09)	1.27	0.06 (0.07)	1.06	0.02 (0.07)	1.02	-0.05 (0.05)	0.95
R ²	0.7		0.61		0.91		0.14		0.79	
Adj. R ²	0.69		0.6		0.9		0.13		0.79	

Note: value in parentheses is Standard Error (SE)

***p < 0.001; **p < 0.01; *p < 0.05

Table 3: Mixed effect model results (N= 100)

Variables	Natural	Social	Human	Financial	Physical
Dam effect	-0.50*** (-0.07)	0.08 (-0.09)	0.12* (-0.06)	-0.40** (-0.15)	0.27*** (-0.05)
Impact zone 1	-0.13 (-0.08)	0.09 (-0.09)	-0.01 (-0.06)	-0.04 (-0.15)	0.03 (-0.05)
Impact zone 2	-0.08 (-0.09)	-0.07 (-0.1)	0.08 (-0.07)	-0.01 (-0.16)	-0.05 (-0.05)
Dam type [IRR =1]	-0.01 (-0.07)	-0.17* (-0.07)	-0.01 (-0.05)	0.01 (-0.13)	0.06 (-0.04)
Nighlight	0.02 (-0.01)	0.01 (-0.01)	0.01 (-0.01)	0 (-0.02)	0 (-0.01)
Interaction [dam effect * Impact zone=1]	0.07 (-0.1)	-0.05 (-0.13)	-0.13 (-0.08)	0.3 (-0.22)	-0.03 (-0.07)
Interaction [dam effect * Impact zone=2]	0.18' (-0.11)	0.12 (-0.14)	-0.05 (-0.09)	0.27 (-0.23)	0.06 (-0.08)
Interaction [dam effect * dam type=IRRI]	-0.23** (-0.08)	0.28** (-0.11)	0.06 (-0.07)	0.03 (-0.18)	-0.07 (-0.06)
R ²	0.7	0.27	0.19	0.13	0.45
Adj. R ²	0.67	0.2	0.12	0.05	0.4

Note: Value is unstandardized Beta coefficient and value in parentheses is Standard Error (SE)

***p < 0.001; **p < 0.01; *p < 0.05

APPENDIX C: RESULTS FROM THEMATIC CODING

Table 4: Responses to the question “Why did you make those farm related changes” (Household survey, 2022)

Themes	Responses (%)
Increase rice yield/get better rice yield	15.6
Increase in insects/pest/weeds	50.6
Decrease in soil fertility/maintain soil fertility	48.1
Drought/no rain	16.9
Change in rice plantation method	45.5
Facilitate farming/save time	28.6
Changes in water availability	13
Irrigation canal nearby farm	2.6
No money	9.1

Table 5: Cross-tabulation between responses on “What changes have you made in your farming practices over past few years” and “Why did you make those farm related changes?”

Reasons	Respondents reporting increased use of these practices (%)				
	Irrigation	Pesticide	Fertilizer	Planting time	New farm equipment
Increase rice yield/get better rice yield	0.86	13.79	18.10	13.79	4.31
Increase in insects/pest/weeds	7.76	51.72	46.55	41.38	14.66
Decrease in soil fertility/maintain soil fertility	3.45	41.38	46.55	37.07	10.34
Drought/no rain	4.31	12.07	12.07	12.07	4.31
Change in rice plantation method	5.17	37.93	36.21	43.10	16.38
Facilitate farming/save time	5.17	23.28	19.83	25.86	14.66
Changes in water availability	5.17	2.59	5.17	10.34	2.59
Irrigation canal nearby farm	1.72	0.00	0.86	0.86	1.72
No money	0.00	1.72	6.90	6.03	0.86

Note:

- Highlighted cells denote the significant association based on chi-square at p-value <0.05
- Color denotes the strength of association based on Cramer value



Note: Moderate strength refers to value between 0.3 to 05 and strong refers to value greater than 0.5 (Cohen, 1988)

APPENDIX D: RESULTS FROM PROBIT AND POISSON MODELS, AND MARGINAL EFFECTS TESTING

Table 6: Results from Poisson and Probit models (N=198)

Variables	Adaptation intensity (IRR) (Model a)	Adaptation choice (AME)		
		Irrigation use (Model b)	Pesticide use (Model c)	Fertilizer use (Model d)
Perceived peer exposure (PPE)	1.055*** (1.012)	0.019 (0.012)	0.052*** (0.014)	0.012 (0.016)
Ties-NGO	1.384* (1.146)	0.211** (0.068)	-0.205* (0.083)	-0.153' (0.085)
Ties-Government	1.579** (1.174)	0.084 (0.079)	0.091 (0.089)	0.033 (0.098)
Ties-Private	1.858*** (1.154)	0.119 (0.093)	0.118 (0.090)	0.199* (0.093)
PEE*Ties-NGO	0.947* (1.022)	0.062* (0.029)	-0.023 (0.033)	-0.045 (0.032)
PPE*Ties- Government	0.966 (1.023)	0.06 (0.047)	0.004 (0.034)	0.0002 (0.039)
PPE*Ties-Private	0.927*** (1.018)	-0.099 * (0.044)	-0.039 (0.029)	-0.014 (0.031)
Previous experience to multiple shocks	1.093' (1.049)	0.013 (0.026)	-0.016 (0.042)	-0.071 (0.044)
Crop productivity	0.844* (1.076)	-0.052 (0.043)	-0.099 (0.064)	-0.034 (0.069)
Land ownership	1.090 (1.058)	0.018 (0.016)	0.060' (0.032)	0.046 (0.034)
Wealth index	0.925* (1.033)	-0.027 (0.02)	-0.014 (0.028)	-0.033 (0.030)
Age	0.993* (1.003)	-0.001 (0.002)	-0.003 (0.003)	-0.003 (0.003)
AIC	744.996	136.129	248.125	279.205
log-likelihood	-359.498	-55.0647	-111.06	-126.603
Nagelkerke pseudo-R ²	0.219	0.344	0.271	0.105

Notes: ***, **, *, ' showing significant at <1%, 1%, 5%, and 10% probability level, respectively; robust standard errors are in parentheses.

Table 7: Results for how adaptation intensity is associated with informal and formal networks: tests of Average Marginal effects (AMEs) and second differences (N = 198)

Formal network	Informal peer network	First difference in AME		Second difference
		Without	With	
Ties- NGO	Perceived peer exposure	0.103**	-0.059	0.162'
Ties- Government	Perceived peer exposure	0.078*	-0.027	0.105
Private	Perceived peer exposure	0.100**	-0.157'	0.257**

Note: '***', '**', '*', '' refers to p-value <0.001, <0.01, <0.05 and <0.1 respectively

Table 8: Results for farmers' adaptation decision (specific behavior) are associated with informal and formal network: tests of average marginal effects (AMEs) and second differences (N = 198)

Model	Formal network	Informal peer network	First difference in AME		Second difference
			Without	With	
Irrigation	Ties- NGO	Perceived peer exposure	0.004	0.062*	-0.057'
	Ties- Government	Perceived peer exposure	0.015	0.047	-0.045
	Private	Perceived peer exposure	0.038*	-0.099***	0.138***
Pesticide	Ties- NGO	Perceived peer exposure	0.078***	-0.023	0.101**
	Ties- Government	Perceived peer exposure	0.061***	0.0002	0.061
	Private	Perceived peer exposure	0.067***	-0.039	0.108***
Fertilizer	Ties- NGO	Perceived peer exposure	0.0295'	-0.045	0.074'
	Ties- Government	Perceived peer exposure	0.014	0.0002	0.014
	Private	Perceived peer exposure	0.017	-0.014	0.031

*Note: '***', '**', '*', '' refers to p-value <0.001, <0.01, <0.05 and <0.1 respectively*