

Supplementary Materials File S1

Links between Socio-Demographic Variables and Adaptation Responses

Table S1. Links between household income and farmers' adaptation responses

Adaptation strategies	Income groups	Respondents (frequency)		Respondents (%)		χ^2 value
		No	Yes	No	Yes	
Adjusted crop planting dates	500 - 5,000	3	83	3.5	96.5	$\chi^2 = 10.671$, df = 4, $P = 0.05$
	6,000 -10,000	2	137	1.4	98.6	
	11,000 - 25,000	3	83	3.5	96.5	
	26, 000 - 40,000	0	52	0	100	
	40,000 +	4	33	10.8	89.2	
Changes in crop types	500 - 5,000	36	50	41.9	58.1	$\chi^2 = 0.446$, df = 4, $P = 0.979$
	6,000 -10,000	55	84	39.6	60.4	
	11,000 - 25,000	32	54	37.2	62.8	
	26, 000 - 40,000	20	32	38.5	61.5	
	40,000 +	14	23	37.8	62.2	
Diversified crops	500 - 5,000	60	26	69.8	30.2	$\chi^2 = 13.974$, df = 4, $P = 0.007$
	6,000 -10,000	90	49	64.7	35.3	
	11,000 - 25,000	43	43	50	50	
	26, 000 - 40,000	26	26	50	50	
	40,000 +	28	9	75.7	24.3	
Adopted improved seeds	500 - 5,000	58	28	67.4	32.6	$\chi^2 = 2.44$, df = 4, $P = 0.655$
	6,000 -10,000	90	49	64.7	35.3	
	11,000 - 25,000	55	31	64	36	
	26, 000 - 40,000	33	19	59.6	40.4	
	40,000 +	20	17	54.1	45.9	
Adopted irrigation	500 - 5,000	73	13	84.9	15.1	$\chi^2 = 7.03$, df = 4, $P = 0.13$
	6,000 -10,000	112	27	80.6	19.4	
	11,000 - 25,000	70	16	81.4	18.6	
	26, 000 - 40,000	36	16	69.2	30.8	
	40,000 +	26	11	70.3	29.7	
Temporary migration	500 - 5,000	31	55	36	64	$\chi^2 = 0.743$, df = 4, $P = 0.946$
	6,000 -10,000	50	89	36	64	
	11,000 - 25,000	27	59	31.4	68.6	
	26, 000 - 40,000	19	33	36.5	63.5	
	40,000 +	12	25	32.4	67.6	
Other non-farm/off-farm	500 - 5,000	56	30	65.1	34.9	$\chi^2 = 1.429$, df = 4, $P = 0.828$
	6,000 -10,000	80	59	57.6	42.4	
	11,000 - 25,000	53	33	61.6	38.4	
	26, 000 - 40,000	30	22	57.7	42.3	
	40,000 +	22	15	61.6	38.4	

Table S2. Links between gender and farmers' adaptation responses

Adaptation strategies	Gender	Respondents (frequency)		Respondents (%)		χ^2 value
		No	Yes	No	Yes	
Adjusted planting dates	Female	3	118	2.5	97.5	$\chi^2 = 0.162$, df = 1, $P = 0.88$
	Male	9	270	3.2	96.8	
Changes in crop types	Female	50	71	41.3	58.7	$\chi^2 = 0.312$, df = 1, $P = 0.576$
	Male	107	172	38.4	61.6	
Diversified crops	Female	86	35	71.1	28.9	$\chi^2 = 6.386$, df = 1, $P = 0.01$
	Male	161	118	57.7	42.3	
Adopted improved seeds	Female	87	34	71.9	28.9	$\chi^2 = 5.282$, df = 1, $P = 0.022$
	Male	167	112	59.9	40.1	
Adopted irrigation	Female	104	17	86	14	$\chi^2 = 4.736$, df = 1, $P = 0.03$
	Male	213	66	76.3	23.7	
Temporary migration	Female	41	80	33.9	66	$\chi^2 = 0.057$, df = 1, $P = 0.8$
	Male	98	181	35.1	64.9	
Other non-farm/off-farm	Female	71	50	58.7	41.3	$\chi^2 = 0.179$, df = 1, $P = 0.67$
	Male	170	109	60.9	39.1	

Table S3. Links between age and farmers' adaptation responses

Adaptation strategies	Age groups	Respondents (frequency)		Respondents (%)		χ^2 value
		No	Yes	No	Yes	
Adjusted planting dates	18-25	0	21	0	100	$\chi^2 = 4.720$, df = 5, $P = 0.64$
	26-35	1	85	1.2	98.8	
	36-45	7	156	4.3	95.7	
	46-55	3	73	3.9	96.1	
	56-65	1	35	2.8	97.2	
	65+	0	18	0	100	
Changes in crop types	18-25	10	11	47.6	52.4	$\chi^2 = 7.082$, df = 5, $P = 0.25$
	26-35	29	57	33.7	66.3	
	36-45	60	103	36.8	63.2	
	46-55	39	37	51.3	48.7	
	56-65	13	23	36.1	63.9	
	65+	6	12	33.3	66.7	
Diversified crops	18-25	15	6	71.4	28.6	$\chi^2 = 11.669$, df = 5, $P = 0.04$
	26-35	60	26	69.8	30.2	
	36-45	98	65	60.1	39.9	
	46-55	45	31	59.2	40.8	
	56-65	15	21	41.7	58.3	
	65+	14	4	77.8	22.2	
Adopted improved seeds	18-25	13	8	61.9	38.1	$\chi^2 = 1.239$, df = 5, $P = 0.94$
	26-35	58	28	67.4	32.6	
	36-45	100	63	61.3	38.7	
	46-55	47	29	61.8	38.2	
	56-65	24	12	66.7	33.3	
	65+	12	6	66.7	33.3	
Adopted irrigation	18-25	21	0	100	0	

	26-35	72	14	83.7	16.3	$\chi^2 = 8.6$, df = 5, $P = 0.126$
	36-45	125	38	76.7	23.3	
	46-55	57	19	75	25.0	
	56-65	27	9	75	25	
	65+	15	3	83.3	16.7	
Temporary migration	18-25	8	13	38.1	61.9	$\chi^2 = 3.2$, df = 5, $P = 0.67$
	26-35	31	55	36	64	
	36-45	49	114	36	64	
	46-55	29	47	38.2	61.8	
	56-65	14	22	38.9	61.1	
	65+	8	10	44.4	55.6	
Other non-farm/off-farm	18-25	12	9	57.1	42.9	$\chi^2 = 6.995$, df = 5, $P = 0.221$
	26-35	58	28	67.4	32.6	
	36-45	92	71	56.4	43.6	
	46-55	45	31	59.2	40.8	
	56-65	26	10	72.2	27.8	
	65+	8	10	44.4	55.6	

Table S4. Links between educational level and farmers' adaptation responses

Adaptation strategies	Educational level	Respondents (frequency)		Respondents (percentages)		χ^2 value
Adjusted planting dates		No	Yes	No	Yes	$\chi^2 = 3.751$, df = 4, $P = 0.725$
	Do not read and write	12	331	3.5	96.5	
	Read and write	0	42	0	100	
	Primary education	0	9	0	100	
	Secondary education	0	4	0	100	
	Higher education	0	2	0	100	
Changes in crop types	Do not read and write	139	204	40.5	59.5	$\chi^2 = 8.439$, df = 4, $P = 0.077$
	Read and write	13	29	31	69	
	Primary education	5	4	55.6	44.4	
	Secondary education	0	4	0	100	
	Higher education	0	2	0	100	
Diversified crops	Do not read and write	208	135	60.6	39.4	$\chi^2 = 10.040$, df = 4, $P = 0.04$
	Read and write	31	11	73.8	26.2	
	Primary education	7	2	77.8	22.2	
	Secondary education	1	3	25	75	
	Higher education	0	2	0	100	
Adopted improved seeds	Do not read and write	219	124	63.8	36.2	$\chi^2 = 9.040$, df = 4, $P = 0.06$
	Read and write	27	15	64.3	35.7	

	Primary education	4	5	44.4	55.6	
	Secondary education	4	0	100	0	
	Higher education	0	2	0	100	
Adopted irrigation	Do not read and write	275	68	80.2	19.8	$\chi^2 = 3.787$, df = 4, $P = 0.436$
	Read and write	32	10	76.2	23.8	
	Primary education	6	3	66.7	33.3	
	Secondary education	2	2	50	50	
	Higher education	2	0	100	0	
Temporary migration	Do not read and write	115	228	33.5	65.5	$\chi^2 = 4.913$, df = 4, $P = 0.296$
	Read and write	18	24	42.9	52.1	
	Primary education	5	4	55.6	44.4	
	Secondary education	1	3	25	75	
	Higher education	0	2	0	100	
Other non-farm/off-farm	Do not read and write	203	140	59.2	40.8	$\chi^2 = 7.5$, df = 4, $P = 0.259$
	Read and write	25	17	59.5	40.5	
	Primary education	7	2	77.8	22.2	
	Secondary education	4	0	100	0	
	Higher education	2	0	100	0	

Table S5. Links between crop diversification and Family size

Type of adaptation	Family size (Number of children)	Respondent (frequency)		Respondent (%)		χ^2 value
		No	Yes	No	Yes	
Crop diversification	0	24	6	80.0%	20.0%	$\chi^2 = 15.8$, df = 4, $P = 0.003$
	1-2	45	13	77.6%	22.4%	
	3-4	71	48	59.7%	40.3%	
	5-11	104	80	56.5%	43.5%	
	8+	3	6	33.3%	66.7%	

Table S6. Links between adaptation motivation and Education level

Adaptation strategy	Crop diversification motivation	Education level	Respondents (frequency)		Respondent (%)		χ^2 value
			No	yes	No	Yes	
Crop diversification	To minimize market risks	Do not read and write	241	102	70.3	29.7	$\chi^2 = 9.330$, $df = 4$, $P = 0.05$
		Read and write	32	10	76.2	23.8	
		Primary education	7	2	77.8	22.2	
		Secondary education	1	3	25	75	
		Higher education	0	2	0	100	
	Climate related factor	Do not read and write	244	99	71.1	28.9	$\chi^2 = 5.3$, $df = 4$, $P = 0.257$
		Read and write	32	10	76.2	23.8	
		Primary education	7	2	77.8	22.2	
		Secondary education	1	3	25	75	
		Higher education	1	1	50	50	
	To control pests and diseases and improve soil fertility	Do not read and write	276	67	80.5	19.5	$\chi^2 = 12.2$, $df = 4$, $P = 0.01$
		Read and write	37	5	88.1	11.9	
		Primary education	7	2	77.8	22.2	
		Secondary education	2	2	50	50	
		Higher education	0	2	0	100	
	To balance food demand	Do not read and write	277	66	80.8	19.2	$\chi^2 = 2.65$, $df = 4$, $P = 0.62$
		Read and write	37	5	88.1	11.9	
		Primary education	7	2	77.8	22.2	
		Secondary education	3	1	75	25	
		Higher education	1	1	50	50	

Supplementary Materials File S2: Household Survey

Questionnaire Table

Section S1: Demographic details of survey respondents.

Gender	Male <input type="checkbox"/>
	Female <input type="checkbox"/>
Marital status	Single <input type="checkbox"/> Divorced <input type="checkbox"/>
	Married <input type="checkbox"/> Widow/ widower <input type="checkbox"/>
Age	-----
Educational level	Don't read and write <input type="checkbox"/> Primary education <input type="checkbox"/>
	Read and write <input type="checkbox"/> Secondary education <input type="checkbox"/>
	Higher education <input type="checkbox"/>
Religion	Orthodox Christian <input type="checkbox"/> Muslim <input type="checkbox"/>
How many children do you have?	-----
Main source of household income?	Labour on own/ other farm <input type="checkbox"/> Casual off-farm labour <input type="checkbox"/> Trading/ business <input type="checkbox"/> Civil service /official <input type="checkbox"/> School teacher <input type="checkbox"/> Household/ domestic/ housewife <input type="checkbox"/> Remittances <input type="checkbox"/> Unemployed <input type="checkbox"/>

Section S2: Household income (Farm and non-farm sources).

In the last 12 months, have you or your household been involved in the following activities listed below? If yes, please enter household annual income in Birr (from November 2015 – October 2016).

Description			Quantity	Unit price	Remark
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Farm income	Milk produced (litters)				
	Eggs produced				
	Crops produced in (quintal or Kg)	1.....			
		2.....			
		3.....			
		4.....			
	Land rent				
	Others				
Non-farm incomes	Petty trading				
	Craft activities				
	Daily labour				
	Remittance				
	Food for work				
	Seasonal migration				
	Others				

Section S3. Farm household adaptation to climatic and non-climatic stressors and opportunities.

3.1. Farm-related adaptation strategies

Have you conducted the following farming practices over the last five years?	If yes, please state your reasons (motivations) (Multiple responses are possible)													
	Climate-related reason	Low market price	Low (high) yield	Poor soil	Pest and disease	Small land	Labour constraint	High market demand	Desire for more income	Government support	Desire for more income	To balance food demand	To avoid reliance on rain-fed agriculture	Other reasons, please specify
Changed crop types														
Adopted improved seeds														
Diversified crops														
Adjusted planting dates														
Adopted irrigation														
Others, please specify														

3.2. If possible, please explain in detail one specific reason for conducting one of the farming strategies you have conducted so far.

3.3. Non-farm/off-farm related adaptation strategies

Have you conducted the following non-farm/off-farm strategies over the last five years?	If you yes, please mention your reasons (motivations) (Multiple responses are possible)				
	Climate related	Poor agricultural market	Lack of access to agricultural land (land shortage)	Desire to earn more income	Other, please specify
Owning-small shops					
selling local food and traditional alcohol drinks					
Wage employment					
Working on other agricultural farms					
collecting and selling firewood					
Other, please specify					

3.4. If you have conducted one of the non-farm or off-farm strategies above, please explain in detail your rationale for engaging in that activity.

3.5. Non-farm related adaption strategy (Migration)

Reasons for conducting migration	If you or your family members have conducted temporary migration) over the last 5 years, please state your reasons motivations
Land scarcity/landlessness	
Unfavourable climate condition	
Lack of employment opportunities	
To repay fertilizer debt	
For education reason	
Family reason (marriage)	
Other, please specify	

3.6. If you or your family members have conducted temporary migration over the last five years, please specify one of your reasons in detail.
