Supplemental Material

Table S1. Role of land certification on mitigating against shock (HH self−reported shocks).

	log (per capita food consumption expenditure)	log (per capita non−food consumption expenditure)	log (per capita education expenditure)	log (per capita total consumption expenditure)
Certification x Shock	0.105**	0.104	0.068	0.072
	(0.051)	(0.073)	(0.157)	(0.047)
Certification	0.033	0.030	−0.240**	0.025
	(0.028)	(0.040)	(0.096)	(0.025)
Natural Shock	−0.115**	−0.192***	−0.161	−0.095**
	(0.047)	(0.066)	(0.141)	(0.044)
Household FE	Yes	Yes	Yes	Yes
Year x Woreda	Yes	Yes	Yes	Yes
Other controls	Yes	Yes	Yes	Yes
Wald test (p−value)	*0.0510*	*0.0033*	*0.8335*	*0.0734*
Number of Observations	7374	7374	7374	7374
R−squared	0.659	0.731	0.752	0.700

Other controls include the literacy level of household head, household head age, number of household members, and land size. standard errors are reported in parentheses. ***, and ** indicate significance at the 1%, and 5% critical level. Shock is measured as a dummy variable indicating if the household is exposed to severe weather shock.

Table S2. Coping mechanisms against natural shocks (HH self−reported shocks).

	=1 obtained credit from others	=1 received gifts from others	=1 received food/cash for work	=1 sold assets	=1 rented out in fixed rental
Certification x Shock	0.103***	0.065**	−0.027	−0.011	0.009
	(0.036)	(0.03)	(0.019)	(0.013)	(0.014)
Certification	0.003	−0.003	−0.007	0.003	−0.007
	(0.02)	(0.017)	(0.008)	(0.007)	(0.01)
Natural Shock	−0.022	−0.055**	0.074***	0.012	−0.015
	(0.033)	(0.028)	(0.017)	(0.011)	(0.012)
Household FE	Yes	Yes	Yes	Yes	Yes
Year x Woreda	Yes	Yes	Yes	Yes	Yes
Other controls	Yes	Yes	Yes	Yes	Yes
Wald test (p−value)	*0.0001*	*0.0931*	*0.0000*	*0.5355*	*0.3688*
Number of observations	7374	7374	7308	7374	5910
R−squared	0.569	0.597	0.543	0.532	0.567

Other controls include the literacy level of household head, household head age, number of household members, and land size. standard errors are reported in parentheses. ***, and ** indicate significance at the 1%, and 5% critical level.

Table S3. Role of land certification for each type of natural shocks on consumption.

	log (per capita food	log (per capita non−food	log (per capita education expenditure)	log (per capita total consumptio

	consumption expenditure)	consumption expenditure)		n expenditure)
Drought				
Certification x Shock	0.105**	0.104	0.051	0.072
	(0.051)	(0.073)	(0.138)	(0.047)
Certification	0.033	0.03	−0.262***	0.025
	(0.028)	(0.04)	(0.087)	(0.025)
Natural Shock	−0.115**	−0.192***	−0.071	−0.095**
	(0.047)	(0.066)	(0.124)	(0.044)
Household FE	Yes	Yes	Yes	Yes
Year x Woreda	Yes	Yes	Yes	Yes
Other controls	Yes	Yes	Yes	Yes
Observations	7374	7374	7374	7374
R−squared	0.659	0.731	0.730	0.700
Floods				
Certification x Shock	*−0.22**	0.086	−0.477	−0.186
	(0.129)	(0.242)	(0.386)	(0.12)
Certification	0.052*	0.042	−0.246***	0.038
	(0.027)	(0.04)	(0.084)	(0.025)
Natural Shock	0.126	−0.202	0.328	0.100
	(0.105)	(0.172)	(.257)	(0.098)
Household FE	Yes	Yes	Yes	Yes
Year x Woreda	Yes	Yes	Yes	Yes
Other controls	Yes	Yes	Yes	Yes
Observations	7374	7374	7374	7374
R−squared	0.658	0.731	0.730	0.699
Landslides				
Certification x Shock	−0.141	−0.240	0.600	−0.134
	(0.254)	(0.384)	(0.75)	(0.246)
Certification	0.048*	0.043	−0.258***	0.035
	(0.027)	(0.04)	(0.083)	(0.025)
Natural Shock	−0.077	0.284	−0.562	−0.041
	(0.208)	(0.231)	(0.641)	(0.194)
Household FE	Yes	Yes	Yes	Yes
Year x Woreda	Yes	Yes	Yes	Yes
Other controls	Yes	Yes	Yes	Yes
Observations	7374	7374	7374	7374
R−squared	0.658	0.731	0.730	0.699

Other controls include the literacy level of household head, household head age, number of household members, and land size. standard errors are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% critical level.

Table S4. Coping mechanisms against combined and each type of natural shocks.

	=1 obtained credit from others	=1 received gifts from others	=1received food/cash for work	=1 selling asset
Drought				
Certification x Shock	0.103***	0.065**	−0.027	−0.011
	(0.036)	(0.03)	(0.019)	(0.013)
Certification	0.003	−0.003	−0.007	0.003

	(0.02)	(0.017)	(0.008)	(0.007)
Natural Shock	−0.022	−0.055**	0.074***	0.012
	(0.033)	(0.028)	(0.017)	(0.011)
Household FE	Yes	Yes	Yes	Yes
Year x Woreda	Yes	Yes	Yes	Yes
Other controls	Yes	Yes	Yes	Yes
# of Obns	7374	7374	7308	7374
R−squared	0.569	0.597	0.543	0.532
Floods				
Certification x Shock	0.113	0.015	*−0.083**	0.010
	(0.091)	(0.076)	(0.046)	(0.042)
Certification	0.016	0.006	−0.008	0.001
	(0.019)	(0.016)	(0.009)	(.007)
Natural Shock	0.032	−0.014	0.093**	.003
	(0.072)	(0.056)	(0.04)	(.034)
Household FE	Yes	Yes	Yes	Yes
Year x Woreda	Yes	Yes	Yes	Yes
Other controls	Yes	Yes	Yes	Yes
# of Obns	7374	7374	7308	7374
R−squared	0.567	0.597	0.538	0.531
Landslides				
Certification x Shock	0.141	*−0.356****	−0.054	*0.195**
	(0.235)	(0.124)	(0.053)	(0.109)
Certification	0.019	0.008	−0.009	0.001
	(0.019)	(0.016)	(0.009)	(0.007)
Natural Shock	−0.113	0.114	0.003	−0.094
	(0.21)	(0.082)	(0.01)	(0.089)
Household FE	Yes	Yes	Yes	Yes
Year x Woreda	Yes	Yes	Yes	Yes
Other controls	Yes	Yes	Yes	Yes
# of Obns	7374	7374	7308	7374
R−squared	0.566	0.597	0.537	0.532

Other controls include the literacy level of household head, household head age, number of household members, and land size. standard errors are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% critical level.

Table S5. Role of land certification on consumption expenditure with alternative threshold. (35% of households as threshold).

	log (per capita food consumption expenditure)	**log (per capita non−food consumption expenditure)**	**log (per capita education expenditure)**	**log (per capita total consumption expenditure)**
Certification x Shock	0.319***	0.096	0.177	0.237***
	(0.083)	(0.109)	(0.20)	(0.079)
Certification	0.003	0.005	−0.246***	−0.003
	(0.028)	(0.04)	(0.095)	(0.025)
Natural Shock	−0.311***	−0.217**	−0.33*	−0.253***
	(0.08)	(0.106)	(0.19)	(0.077)
Household FE	Yes	Yes	Yes	Yes
Year x Woreda	Yes	Yes	Yes	Yes
Other controls	Yes	Yes	Yes	Yes

Cert x Shock + Shock	−0.007	−0.098	−0.102	−0.020
Wald test (p−value)	*0.0004*	*0.0051*	*0.1066*	*0.0041*
# Obsn.	7374	7374	7374	7374
R−squared	0.66	0.731	0.752	0.701

Other controls include the literacy level of household head, household head age, number of household members, and land size. standard errors are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% critical level.

Table S6. Effect of land certification on the mechanisms. (35% of households as threshold).

	=1 obtained credit from others	**=1 received gifts from others**	**=1 received food/cash for work**	**=1 sold assets**	**=1 rented out in fixed rental**
Certification x Shock	0.212***	0.114***	−0.006	0.01	0.006
	(0.047)	(0.043)	(0.02)	(0.016)	(0.017)
Certification	0.025	−0.006	−0.006	0.007	−0.005
	(0.02)	(0.017)	(0.009)	(0.008)	(0.01)
Natural Shock	−0.113**	−0.131***	0.063***	−0.001	−0.021
	(0.046)	(0.043)	(0.019)	(0.015)	(0.016)
Household FE	Yes	Yes	Yes	Yes	Yes
Year x Woreda	Yes	Yes	Yes	Yes	Yes
Other controls	Yes	Yes	Yes	Yes	Yes
Cert x Shock + Shock	0.084	0.5	0.048	0.004	−0.006
Wald test (p−value)	*0.0000*	*0.0084*	*0.0000*	*0.5018*	*0.1190*
Number of Observations	7374	7374	7308	7374	5910
R−squared	0.571	.0598	0.541	0.532	0.567

Other controls include the literacy level of household head, household head age, number of household members, and land size. standard errors are reported in parentheses. ***, and ** indicate significance at the 1%, and 5% critical level.

Table S7. Role of land certification on consumption expenditure with alternative threshold. (45% of households as threshold).

	log (per capita food consumption expenditure)	**log (per capita non−food consumption expenditure)**	**log (per capita education expenditure)**	**log (per capita total consumption expenditure)**
Certification x Shock	0.344***	0.228***	0.298*	0.321***
	(0.051)	(0.072)	(0.167)	(0.046)
Certification	0.05*	0.029	−0.132	0.057**
	(0.029)	(0.042)	(0.095)	(0.026)
Natural Shock	−0.257***	−0.28***	−0.355**	−0.254***
	(0.047)	(0.063)	(0.14)	(0.043)
Household FE	Yes	Yes	Yes	Yes
Year x Woreda	Yes	Yes	Yes	Yes
Other controls	Yes	Yes	Yes	Yes
Certification x Shock + Shock	0.089	−0.099	−0.026	0.016

Wald test (p−value)	*0.0000*	*0.0001*	*0.0401*	*0.0000*
Number of Observations	7374	7374	7374	7374
R−squared	0.663	0.732	0.752	0.705

Other controls include the literacy level of household head, household head age, number of household members, and land size. standard errors are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% critical level.

Table S8. Effect of land certification on the mechanisms (45% of households as threshold).

	=1 obtained credit from others	**=1 received gifts from others**	**=1 received food/cash for work**	**=1 sold assets**	**=1 rented out in fixed rental**
Certification x Shock	0.04	0.081**	0.016	−0.012	0.028**
	(0.036)	(0.036)	(0.023)	(0.015)	(0.014)
Certification	0.004	−0.018	0.017**	−0.005	−0.028***
	(0.02)	(0.017)	(0.008)	(0.007)	(0.01)
Natural Shock	0.04	−0.086***	0.049***	0.014	−0.032***
	(0.031)	(0.031)	(0.019)	(0.014)	(0.011)
Household FE	Yes	Yes	Yes	Yes	Yes
Year x Woreda	Yes	Yes	Yes	Yes	Yes
Other controls	Yes	Yes	Yes	Yes	Yes
Certification x Shock + Shock	0.077	0.019	−0.06	0.001	0.003
Wald test (p−value)	*0.0069*	*0.0233*	*0.0000*	*0.5617*	*0.0091*
Number of Observations	7374	7374	7308	7374	5910
R−squared	0.568	0.598	0.542	0.532	0.568

Other controls include the literacy level of household head, household head age, number of household members, and land size. standard errors are reported in parentheses. ***, and ** indicate significance at the 1%, and 5% critical level.

Table S9. Role of land certification on mitigating against shock controlling for Social Capital (Enumeration Area shocks).

	log (per capita food consumption expenditure)	**log (per capita non−food consumption expenditure)**	**log (per capita education expenditure)**	**log (per capita total consumption expenditure)**
Certification x	0.256***	0.157*	0.161	0.193***
Shock	(0.07)	(0.092)	(0.171)	(0.067)
Certification	0.016	0.009	−0.261***	0.008
	(0.028)	(0.04)	(0.095)	(0.025)
Natural Shock	−0.251***	−0.276***	−0.313*	−0.213***
	(0.068)	(0.089)	(0.162)	(0.064)
Household FE	Yes	Yes	Yes	Yes
Year x Woreda	Yes	Yes	Yes	Yes
Other controls	Yes	Yes	Yes	Yes
Wald test (p−value)	*0.0008*	*0.0007*	*0.0898*	*0.0040*
# Obsens	7374	7374	7374	7374
R−squared	0.661	0.736	0.753	0.702

Other controls include the literacy level of household head, household head age, number of household members, Social capital and land size. standard errors are reported in parentheses. ***, and * indicate significance at the 1%, and 10% critical level.

Table S10. Coping mechanisms against natural shocks controlling for Social Capital (Enumeration Area shocks).

	=1 obtained credit from others	**=1 received gifts from others**	**=1 received food/cash for work**	**=1 sold assets**	**=1 rented out in fixed rental**
Certification x Shock	0.141***	0.13***	−0.014	−0.014	0.007
	(0.043)	(0.04)	(0.024)	(0.016)	(0.016)
Certification	0.008	−0.009	−0.007	0.003	−0.007
	(0.019)	(0.017)	(0.008)	(0.007)	(0.01)
Natural Shock	−0.049	−0.141***	0.068***	0.018	−0.021
	(0.042)	(0.039)	(0.022)	(0.014)	(0.015)
Household FE	Yes	Yes	Yes	Yes	Yes
Year x Woreda	Yes	Yes	Yes	Yes	Yes
Other controls	Yes	Yes	Yes	Yes	Yes
Wald test (p−value)	*0.0000*	*0.0016*	*0.0000*	*0.4369*	*0.1160*
Number of observations	7374	7374	7308	7374	5910
R−squared	0.569	0.599	0.544	0.532	0.567

Other controls include the literacy level of household head, household head age, number of household members, Social capital and land size. standard errors are reported in parentheses. *** indicate significance at the 1% critical level.