Online Appendix for: Does Land Quality Increase the Power of Traditional Leaders in Contemporary Africa?

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A Additional Results and Robustness Checks

Table A.1: Pre-colonial relationship between the power of political leaders and land quality in the 90 societies of the Standard Cross-Cultural Sample (SCCS)

	Sub-Saharan African societies			All other societies		
	(1)	(2)	(3)	(4)	(5)	(6)
Pre-colonial suitability of Soil for Agriculture	-0.01	-0.15	-0.08	0.11*	0.07	0.05
	(0.15)	(0.13)	(0.11)	(0.06)	(0.05)	(0.05)
Pre-colonial population density		0.40**	0.26†		0.17**	0.05
		(0.14)	(0.12)		(0.06)	(0.07)
Pre-colonial political centralization			0.41**			0.27*
			(0.12)			(0.12)
Latitude in Degrees			0.00			0.00
			(0.01)			(0.00)
Longitude in Degrees			-0.01			0.00
			(0.01)			(0.00)
Societies (N)	20	20	20	70	70	69
R^2	0.00	0.34	0.64	0.06	0.18	0.28
Adj. R^2	-0.06	0.26	0.51	0.04	0.16	0.22

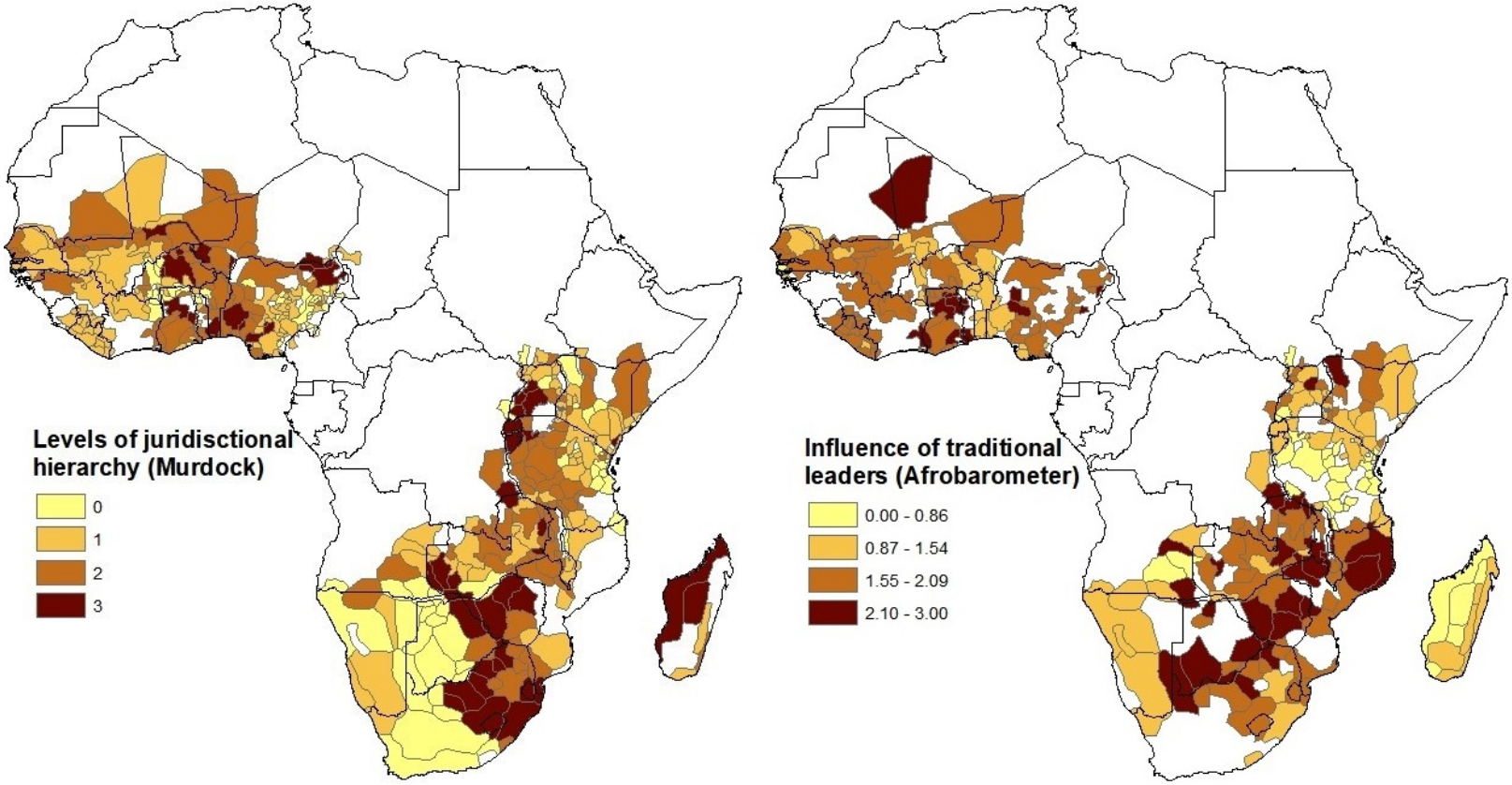
Notes: † $p < 0.10$, * $p < 0.05$, ** $p < 0.01$. Clustered standard errors by ethnic group in parentheses. This table presents three correlational findings consistent with our main claims. First, pre-colonial land quality is positively correlated with the perceived power of pre-colonial political leaders around the world but not in Africa. Additional models with different controls yield similar results. Second, as expected, population density is positively correlated with leaders' power in African and elsewhere and thus is a possible mechanism for the effect of land quality on leaders' power, as we argue is the case today. Third, and also unsurprisingly, pre-colonial political centralization (`v33` in the Africa sample, `v237` in the SCCS) is a good predictor of the perceived power of leaders ($\rho = 0.55$). This lends validity to our use of `v33` as a control and proxy for pre-colonial *influence* of leaders.

Table A.2: Ethnic group-level correlations between pre-colonial political centralization measures and agricultural variables for ethnic groups surveyed in Round 4 of the Afrobarometer

	(1)	(2)	(3)	(4)	(5)	(6)
(1) Pre-colonial political centralization (Murdock v33)	1					
(2) Pre-colonial state indicator (Paine)	0.31**	1				
(3) Pre-colonial state indicator (O'Brien)	0.31**	0.37**	1			
(4) Pre-colonial dependence on agriculture (Murdock v5)	0.19†	0.04	0.02	1		
(5) Land quality (FAO, 2002)	0.01	-0.03	-0.06	0.47**	1	
(6) Ecological diversity (FAO, 2002)	0.14**	0.14	0.10	-0.26**	-0.23**	1

Notes: †$p < 0.10$, * $p < 0.05$, ** $p < 0.01$.

Figure A.1: Pre-colonial political centralization (left) and contemporary influence of chiefs (right)



Notes: The left map plots the level of pre-colonial political centralization or jurisdictional hierarchy (v33 in Murdock's (1959) Atlas) for groups sampled in round 4 of the Afrobarometer. The right map uses the Afrobarometer Round 4 measure of chiefs' influence (q65). (Not all pre-colonial groups in Murdock are included in the Afrobarometer round 4.) The maps illustrate the two factors motivating this note: (i) the level of pre-colonial political centralization and *contemporary* chiefs' influence are not correlated ($\rho = 0.003$) and (ii) their influence varies much within countries, suggesting that standard persistence explanations and country-level explanations cannot account for much of the contemporary variation we observe.

Table A.3: Effect of land quality on traditional leaders' authority using Paine's and O'Brien's measures of pre-colonial states instead of Murdock's measure of jurisdictional hierarchy

	Influence		Land		Disputes	
	(1)	(2)	(3)	(4)	(5)	(6)
Land quality (2002)	0.10†	0.10	0.05*	0.06**	0.06**	0.06**
	(0.06)	(0.06)	(0.02)	(0.02)	(0.02)	(0.02)
Pre-colonial state indicator (Paine)	-0.10		-0.02		-0.02	
	(0.07)		(0.03)		(0.03)	
Pre-colonial state indicator (O'Brien)		-0.01		0.05*		-0.00
		(0.06)		(0.02)		(0.02)
Pre-colonial dependence on agriculture	-0.02	-0.02	0.01*	0.01†	-0.01	-0.01
	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)
Population density (2000)	-0.02	-0.01	-0.01	-0.01	-0.01	-0.01
	(0.03)	(0.03)	(0.01)	(0.01)	(0.01)	(0.01)
Additional controls	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Individuals (N)	16130	16130	17676	17676	17868	17868
R^2	0.13	0.13	0.16	0.16	0.17	0.17
Adj. R^2	0.13	0.13	0.16	0.16	0.17	0.17

Notes: † $p < 0.10$, * $p < 0.05$, ** $p < 0.01$. Clustered standard errors by ethnic group in parentheses. The models above are analogous to the models in Table 1 except for the use of Paine's and O'Brien's indicator measures of pre-colonial states instead of Murdock's ordinal measure of jurisdictional hierarchy.

Table A.4: Effect of land quality on traditional leaders' general and domain-specific authority

	Influence			Land			Disputes		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Land quality (2002)	0.08†	0.08†	0.11†	0.05**	0.05**	0.05*	0.04*	0.04*	0.06**
	(0.04)	(0.05)	(0.06)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Pre-colonial political centralization	0.01	0.01	0.02	-0.01	-0.01	-0.01	-0.02*	-0.02*	-0.03*
	(0.03)	(0.03)	(0.04)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Pre-colonial dependence on agriculture	-0.01	-0.01	-0.02	0.01	0.01†	0.01†	-0.00	0.00	-0.01
	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)	(0.00)	(0.01)	(0.01)
Population density (2000)		-0.01	-0.01		-0.01	-0.01		-0.01	-0.01
		(0.02)	(0.03)		(0.01)	(0.01)		(0.01)	(0.01)
Ecological diversity (2002)			0.00			0.04			0.05
			(0.12)			(0.04)			(0.04)
Politically powerful ethnic cluster			0.03			0.03†			0.02
			(0.07)			(0.02)			(0.02)
Distance from ethnic homeland to capital			0.00			-0.00			0.00
			(0.01)			(0.00)			(0.00)
Rural sampling unit indicator			0.23**			0.10**			0.07**
			(0.04)			(0.02)			(0.01)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individuals (N)	19050	19050	15504	20917	20917	16973	21118	21118	17147
R^2	0.11	0.11	0.12	0.13	0.13	0.16	0.17	0.17	0.17
Adj. R^2	0.11	0.11	0.12	0.13	0.13	0.15	0.17	0.17	0.17

Table A.5: Effect of land quality on traditional leaders' authority in rural areas

	Influence			Land			Disputes		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Land quality (2002)	0.11*	0.11*	0.15†	0.06**	0.06**	0.06**	0.06**	0.06**	0.08**
	(0.05)	(0.06)	(0.08)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)
Pre-colonial political centralization	0.01	0.01	0.00	-0.01	-0.01	-0.01	-0.02†	-0.02	-0.03†
	(0.04)	(0.04)	(0.04)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Pre-colonial dependence on agriculture	-0.01	-0.01	-0.04	0.01†	0.01†	0.02*	-0.00	-0.00	-0.01
	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Population density (2000)		-0.00	-0.01		-0.01	-0.01		-0.00	-0.01
		(0.02)	(0.03)		(0.01)	(0.01)		(0.01)	(0.02)
Ecological diversity (2002)			0.00			0.04			0.06
			(0.16)			(0.05)			(0.05)
Politically powerful ethnic cluster			0.04			0.04†			0.02
			(0.08)			(0.02)			(0.03)
Distance from ethnic homeland to capital			0.01			0.00			0.00
			(0.02)			(0.00)			(0.00)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individuals (N)	12654	12654	10424	13558	13558	11207	13702	13702	11339
R^2	0.13	0.13	0.13	0.15	0.15	0.16	0.18	0.18	0.18
Adj. R^2	0.13	0.13	0.13	0.15	0.15	0.16	0.18	0.18	0.17

Notes: † $p < 0.10$, * $p < 0.05$, ** $p < 0.01$. Clustered standard errors by ethnic group in parentheses. Models 3, 6, and 9 in these tables are identical to Table 1. We provide alternative specifications with fewer controls to show that results are similar across specification and that additional theoretically-relevant controls improve the precision of our main estimate in some cases.

Table A.6: Effect of land quality on central government's authority

	Land			Disputes		
	(1)	(2)	(3)	(4)	(5)	(6)
Land quality (2002)	-0.03*	-0.03*	-0.03†	-0.02*	-0.02*	-0.03**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Pre-colonial political centralization	0.01	0.01	0.01	-0.00	0.00	0.00
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Pre-colonial dependence on agriculture	0.00	0.00	0.00	0.01	0.01†	0.01†
	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)
Population density (2000)		0.01	-0.00		-0.00	-0.01
		(0.01)	(0.01)		(0.01)	(0.01)
Ecological diversity (2002)			0.04			-0.02
			(0.04)			(0.03)
Politically powerful ethnic cluster			-0.02			0.01
			(0.02)			(0.01)
Distance from ethnic homeland to capital			-0.00			0.00
			(0.00)			(0.00)
Rural sampling unit indicator			-0.04**			-0.01
			(0.01)			(0.01)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Individuals (N)	21267	21267	17276	21468	21468	17449
R^2	0.07	0.07	0.08	0.04	0.04	0.04
Adj. R^2	0.07	0.07	0.08	0.04	0.04	0.04

Notes: † $p < 0.10$, * $p < 0.05$, ** $p < 0.01$. Clustered standard errors by ethnic group in parentheses.

Table A.7: Effect of land quality on central government's authority in rural areas

	Land			Disputes		
	(1)	(2)	(3)	(4)	(5)	(6)
Land quality (2002)	-0.03*	-0.03*	-0.03†	-0.03**	-0.03**	-0.03**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Pre-colonial political centralization	0.01	0.00	0.01	0.00	0.00	0.00
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Pre-colonial dependence on agriculture	0.00	0.00	-0.00	0.01	0.01†	0.01†
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Population density (2000)		0.01	0.01		-0.01	-0.01
		(0.01)	(0.01)		(0.01)	(0.01)
Ecological diversity (2002)			0.04			-0.02
			(0.04)			(0.03)
Politically powerful ethnic cluster			-0.03			0.01
			(0.02)			(0.02)
Distance from ethnic homeland to capital			-0.00			0.00
			(0.01)			(0.00)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Individuals (N)	13769	13769	11395	13914	13914	11528
R^2	0.08	0.08	0.08	0.05	0.05	0.05
Adj. R^2	0.08	0.08	0.08	0.05	0.05	0.04

Notes: † $p < 0.10$, * $p < 0.05$, ** $p < 0.01$. Clustered standard errors by ethnic group in parentheses.

B Land quality, agricultural land, and population density

Table A.8: Effect of land quality on traditional leaders' authority in rural areas: majority vs. minority agricultural ethnic homelands

	Majority agricultural land			Minority agricultural land		
	(1) Influence	(2) Land	(3) Disputes	(4) Influence	(5) Land	(6) Disputes
Land quality (2002)	0.24*	0.09**	0.09*	-0.03	0.00	0.01
	(0.12)	(0.03)	(0.04)	(0.07)	(0.03)	(0.03)
Additional controls	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Individuals (N)	6793	7386	7488	3631	3821	3851
R^2	0.17	0.21	0.17	0.08	0.09	0.21
Adj. R^2	0.17	0.20	0.17	0.07	0.09	0.20

Notes: † $p < 0.10$, * $p < 0.05$, ** $p < 0.01$. Clustered standard errors by ethnic group in parentheses. We divide the sample between ethnic homelands where 50% or more of pixels are devoted to agricultural land and those where that value is below 50%. The effect of land quality is driven by higher population density homelands, as shown in Table 2, and by agricultural homelands, as shown in this table. The coefficients are less precisely estimated if we include urban areas.

Table A.9: Effect of land quality on traditional leaders' general and domain-specific authority: Controlling for ethnic homeland's proportion of agricultural land

	Full sample			Rural sample		
	(1)	(2)	(3)	(4)	(5)	(6)
	Influence	Land	Disputes	Influence	Land	Disputes
Land quality (2002)	0.12	0.05†	0.06*	0.16	0.07*	0.08**
	(0.08)	(0.03)	(0.03)	(0.10)	(0.03)	(0.03)
Agricultural proportion of homeland	-0.01	-0.02	-0.05	-0.11	-0.04	-0.06
	(0.22)	(0.07)	(0.07)	(0.27)	(0.08)	(0.09)
Pre-colonial political centralization	0.02	-0.01	-0.03*	0.00	-0.01	-0.03†
	(0.04)	(0.01)	(0.01)	(0.04)	(0.01)	(0.01)
Pre-colonial dependence on agriculture	-0.02	0.01†	-0.01	-0.03	0.02*	-0.01
	(0.02)	(0.01)	(0.01)	(0.03)	(0.01)	(0.01)
Population density (2000)	-0.01	-0.01	-0.00	-0.00	-0.01	-0.00
	(0.03)	(0.01)	(0.01)	(0.03)	(0.01)	(0.02)
Ecological diversity (2002)	0.00	0.04	0.04	-0.02	0.03	0.05
	(0.13)	(0.04)	(0.04)	(0.16)	(0.05)	(0.05)
Politically powerful ethnic cluster	0.03	0.03†	0.02	0.04	0.04†	0.02
	(0.07)	(0.02)	(0.02)	(0.08)	(0.02)	(0.03)
Distance from ethnic homeland to capital	0.00	-0.00	0.00	0.01	0.00	0.01
	(0.01)	(0.00)	(0.00)	(0.02)	(0.00)	(0.01)
Rural sampling unit indicator	0.23**	0.10**	0.07**			
	(0.04)	(0.02)	(0.01)			
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Individuals (N)	15504	16973	17147	10424	11207	11339
R^2	0.12	0.16	0.17	0.13	0.16	0.18
Adj. R^2	0.12	0.15	0.17	0.13	0.16	0.18

Notes: $\dagger$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$. Clustered standard errors by ethnic group in parentheses. These table shows the main results, as in Table 1, but controlling for each ethnic homeland's proportion of agricultural land. The new variable is insignificant and results are substantively the same as those in Table 1. The main difference is that the effect of land quality on the influence of chiefs is no longer significant because—although the point estimate remains the same—the confidence interval is wider. This is expected given that the correlation between land quality and proportion of agriculture is 0.6.

Table A.10: Effect of land quality on traditional leaders' authority in rural areas: high vs. low population density ethnic homelands with a lower cutoff

	Population density $\geq 25/km^2$			Population density $< 25/km^2$		
	(1)	(2)	(3)	(4)	(5)	(6)
	Influence	Land	Disputes	Influence	Land	Disputes
Land quality (2002)	0.18	0.08**	0.08*	0.01	-0.01	0.02
	(0.11)	(0.03)	(0.03)	(0.11)	(0.04)	(0.03)
Additional controls	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Individuals (N)	8399	9228	9368	2025	1979	1971
R^2	0.14	0.17	0.19	0.10	0.16	0.14
Adj. R^2	0.14	0.17	0.19	0.09	0.15	0.14

Notes: † $p < 0.10$, * $p < 0.05$, ** $p < 0.01$. Clustered standard errors by ethnic group in parentheses. This Table is analogous to Table 2 but now we split the sample at the lower cutoff which classifies 25 or more inhabitants per km^2 as high population density. In this case, 75% observations are classified as high population density and only 25% as low.

Table A.11: Effect of land quality on traditional leaders' authority in the full sample: high vs. low population density ethnic homelands

	Population density $\geq 50/km^2$			Population density $< 50/km^2$		
	(1) Influence	(2) Land	(3) Disputes	(4) Influence	(5) Land	(6) Disputes
Land quality (2002)	0.17	0.09**	0.08*	0.01	0.01	0.04*
	(0.11)	(0.03)	(0.04)	(0.05)	(0.02)	(0.02)
Additional controls	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Individuals (N)	8570	9658	9810	6934	7315	7337
R^2	0.10	0.17	0.13	0.15	0.14	0.21
Adj. R^2	0.10	0.17	0.13	0.15	0.14	0.21

Notes: † $p < 0.10$, * $p < 0.05$, ** $p < 0.01$. Clustered standard errors by ethnic group in parentheses. . These results include urban sampling units in addition to rural sampling units.

Table A.12: Effect of land quality on traditional leaders' authority: high vs. low population density ethnic homelands with a lower cutoff

	Population density $\geq 25/km^2$			Population density $< 25/km^2$		
	(1) Influence	(2) Land	(3) Disputes	(4) Influence	(5) Land	(6) Disputes
Land quality (2002)	0.14	0.07**	0.07*	-0.00	-0.02	0.02
	(0.09)	(0.03)	(0.03)	(0.07)	(0.04)	(0.03)
Additional controls	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Individuals (N)	12521	13941	14130	2983	3032	3017
R^2	0.12	0.16	0.18	0.13	0.15	0.15
Adj. R^2	0.12	0.16	0.18	0.13	0.14	0.15

Notes: † $p < 0.10$, * $p < 0.05$, ** $p < 0.01$. Clustered standard errors by ethnic group in parentheses. These results include rural and urban sampling units, as in Table A.11, but now we split the sample at the lower cutoff which classifies 25 or more inhabitants per km^2 as high population density. In this case, over 75% observations are classified as high population density and less than 25% as low.

C Land Quality and Customary Land Tenure Regimes

Table A.13: Effect of land quality on traditional leaders' general and domain-specific authority: Controlling for customary land tenure regimes

	Full sample			Rural sample		
	(1) Influence	(2) Land	(3) Disputes	(4) Influence	(5) Land	(6) Disputes
Land quality (2002)	0.11†	0.05*	0.06*	0.15†	0.06*	0.08**
	(0.07)	(0.02)	(0.02)	(0.08)	(0.02)	(0.03)
Customary land tenure indicator	0.01	0.01	0.02	-0.02	0.00	0.03
	(0.08)	(0.03)	(0.03)	(0.09)	(0.04)	(0.04)
Pre-colonial political centralization	0.02	-0.01	-0.03*	0.00	-0.01	-0.02†
	(0.04)	(0.01)	(0.01)	(0.04)	(0.01)	(0.01)
Pre-colonial dependence on agriculture	-0.02	0.01†	-0.01	-0.04	0.02*	-0.01
	(0.02)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)
Population density (2000)	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01
	(0.03)	(0.01)	(0.01)	(0.03)	(0.01)	(0.02)
Ecological diversity (2002)	0.00	0.04	0.05	0.00	0.04	0.06
	(0.12)	(0.04)	(0.04)	(0.16)	(0.05)	(0.05)
Politically powerful ethnic cluster	0.03	0.03†	0.02	0.04	0.04†	0.02
	(0.07)	(0.02)	(0.02)	(0.08)	(0.02)	(0.03)
Distance from ethnic homeland to capital	0.00	-0.00	0.00	0.01	0.00	0.00
	(0.01)	(0.00)	(0.00)	(0.02)	(0.00)	(0.01)
Rural sampling unit indicator	0.22**	0.09**	0.06*			
	(0.08)	(0.03)	(0.02)			
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Individuals (N)	15504	16973	17147	10424	11207	11339
R^2	0.12	0.16	0.17	0.13	0.16	0.18
Adj. R^2	0.12	0.15	0.17	0.13	0.16	0.18

Notes: † $p < 0.10$, * $p < 0.05$, ** $p < 0.01$. Clustered standard errors by ethnic group in parentheses. These table shows the main results, as in Table 1, but controlling for customary land tenure. Customary land tenure and rurality are highly correlated ($\rho = 0.88$). In models 1-3, customary land tenure increases the authority of chiefs if we don't control for rural status. Further, the interaction between land quality and customary land regime is not significantly positive either in the full sample or in the rural-only sample.

D Land Quality and Extractive Behavior

Table A.14: Effect of land quality on traditional leaders' extractive behavior

	Full sample				Rural sample			
	(1) Chief corrupt	(2) Chief listens	(3) Chief trusted	(4) Empower chiefs	(5) Chief corrupt	(6) Chief listens	(7) Chief trusted	(8) Empower chiefs
Land quality (2002)	0.03	0.09†	0.01	0.09†	-0.00	0.15*	0.02	0.16*
	(0.02)	(0.05)	(0.05)	(0.06)	(0.03)	(0.06)	(0.06)	(0.06)
Pre-colonial political centralization	0.00	-0.05*	-0.05†	0.01	0.01	-0.07*	-0.06†	0.00
	(0.01)	(0.03)	(0.03)	(0.04)	(0.01)	(0.03)	(0.03)	(0.04)
Pre-colonial dependence on agriculture	-0.02†	0.04†	0.04*	0.02	-0.01	0.02	0.05*	0.00
	(0.01)	(0.02)	(0.02)	(0.02)	(0.01)	(0.02)	(0.02)	(0.03)
Population density (2000)	0.04**	-0.07*	-0.09**	-0.03	0.04*	-0.04	-0.09**	-0.04
	(0.01)	(0.03)	(0.02)	(0.03)	(0.02)	(0.03)	(0.03)	(0.04)
Ecological diversity (2002)	0.05	-0.00	-0.04	-0.09	0.06	-0.17	0.01	-0.09
	(0.05)	(0.11)	(0.10)	(0.12)	(0.06)	(0.12)	(0.11)	(0.14)
Politically powerful ethnic cluster	-0.04	0.04	0.11*	0.06	-0.04	0.02	0.12*	0.06
	(0.03)	(0.06)	(0.05)	(0.07)	(0.04)	(0.07)	(0.06)	(0.08)
Distance from ethnic homeland to capital	0.00	0.02	0.00	-0.00	0.01	0.03†	0.00	0.00
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)
Rural sampling unit indicator	-0.09**	0.26**	0.28**	0.15**				
	(0.02)	(0.04)	(0.03)	(0.03)				
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individuals (N)	14435	15654	16075	15221	9460	10461	10641	10203
R^2	0.10	0.11	0.11	0.07	0.09	0.11	0.10	0.07
Adj. R^2	0.10	0.10	0.11	0.07	0.09	0.11	0.10	0.07

Notes: † $p < 0.10$, * $p < 0.05$, ** $p < 0.01$. Clustered standard errors by ethnic group in parentheses. These table shows the main results, as in Table 1, but changing to outcomes to test the alternative explanation that higher land quality areas may allow the chiefs to extract more. We use three proxies for extraction: more extractive chiefs should be *more* corrupt (ordinal variable ranging from 0 = None are corrupt to 3 = All are corrupt); more extractive chiefs should listen *less* (from 0 = Never listen to 3 = Always listen); and more extractive chiefs should be *less* trusted (from 0 = Not trusted at all to 3 = Trusted a lot). Finally, if chiefs were more extractive citizens would like them to have *less* influence (from 1 = Decrease a lot to 5 = Increase a lot). We observe that land quality does not change two of these proxies for extraction (corruption and trust). If anything, chiefs in higher land quality areas listen to the citizens more, not less, and citizens want them to have more influence, not less.

E Review of Ethnopedology and the Local Soil Knowledge (LSK) Literature on sub-Saharan Africa

The field of "ethnopedology" or "local soil knowledge" examines "the knowledge of soil properties and management possessed by people living in in a particular environment for some period of time" (Winklerprins, 1999, p. 151). The term "ethnopedology" was first coined in 1981 by Williams and Ortiz-Solorio (1981), and it has generated a vibrant research program due to the importance of decisions made by local farmers and producers for productive and sustainable land use management. One branch of ethnopedology focuses specifically on the correspondence between local soil knowledge and scientific classification schemes (Huynh et al., 2020). Below, we review the published research on this correspondence in sub-Saharan Africa between 2009-2018 using 10 studies identified in Huynh et al. (2020). We find that the literature indicates a high degree of correspondence between local soil knowledge and scientific classifications and that farmers adjust their land management strategies as would be expected from scientific classifications.

E.1 Annotated Literature Review

1. Brinkmann, Katja, Laetitia Samuel, Stephan Peth, and Andreas Buerkert. (2018). "Ethnopedological knowledge and soil classification in SW Madagascar." Geoderma regional 14 (2018): e00179.

This study finds that local soil classifications generally correspond with differences in the soil and chemical properties of soil (Table 4, p. 6) and overall perceptions of low fertility soil corresponded with scientific assessment.

2. Buthelezi, N. N., J. C. Hughes, and A. T. Modi. (2013). "The use of scientific and indigenous knowledge in agricultural land evaluation and soil fertility studies of two villages in KwaZulu-Natal, South Africa." African Journal of Agricultural Research 8, no. 6: 507-518.

This study finds a correlation between the indigenous and scientific land classification schemes, land suitability evaluations and land fertility assessments.

3. Buthelezi-Dube, Nkosinomusa Nomfundo, Jeffrey Charles Hughes, and Pardon Muchaonyerwa (2018). "Indigenous soil classification in four villages of eastern South Africa." Geoderma 332: 84-99.

This study compares the correlation between local soil classification schemes, the South African soil classification scheme and the World Reference base scheme, generally finding moderate or high levels of correlation with the exception of one floodplain village, although they do note that farmers pay less attention to subsoil characteristics in most cases. Otherwise, they find that local soil classifications are more nuanced.

4. Dawoe, E.K., J. Quashie-Sam, M.E. Isaac and S.K. Oppong (2012). "Exploring farmers' local knowledge and perceptions of soil fertility in the Ashanti Region of Ghana." Geoderma 179-180: 96-103.

This study finds a strong similarity between farmers' assessments of soil as fertile and infertile and scientific measurement (Table 8, p. 100). It also finds that farmers' knowledge corresponds with how they manage their land.

5. Karltun, E., Mulugeta Lemenih, and Motuma Tolera. (2013). "Comparing Farmers' Perception of Soil Fertility Change with Soil Properties and Crop Performance in Beseku, Ethiopia." Land Degradation & Development 24, no. 3: 228-235.

Farmers' aggregate ranking of soil fertility is very highly correlated with the soil organic matter (Figure 1, p. 232) and the results of a biotest experiment.

6. Laekemariam, Fanuel, Kibebew Kibret, and Tekalign Mamo. (2017). "Farmers' soil knowledge, fertility management logic and its linkage with scientifically analyzed soil properties in southern Ethiopia." Agriculture & Food Security 6, no. 1: 1-12.

This study finds that farmers' classification of soil types accords with differences in most physiochemical properties (Table 2, p. 7-8), and farmers allocates crops and inputs in a rational manner given the soil properties (p. 9).

7. Nethononda, L. O., and J. J. O. Odhiambo. (2011). "Indigenous soil knowledge relevant to crop production of smallholder farmers at Rambuda irrigation scheme, Vhembe District South Africa." African Journal of Agricultural Research 6, no. 11: 2576-2581.

Local farmers' soil classification was consistent with but more nuanced than the soil classification used by the South African Soil Classification Working Group because it also included information on soil texture.

8. Raji, B. A., W. B. Malgwi, F. R. Berding, and V. O. Chude. (2011). "Integrating indigenous knowledge and soil science approaches to detailed soil survey in Kaduna State, Nigeria." Journal of Soil Science and Environmental Management 2, no. 3: 66-73.

This study finds a high degree of similarity between farmers' maps of soil types and scientists' maps of soil types. The farmers' and scientists' perceptions of soil fertility were similar. Scientists' classification scheme was more nuanced.

9. Rushemuka, N. P., R. A. Bizoza, J. G. Mowo, and Laurent Bock. (2014). "Farmers' soil knowledge for effective participatory integrated watershed management in Rwanda: toward soil-specific fertility management and farmers' judgmental fertilizer use." Agriculture, ecosystems & environment 183: 145-159.

The study shows a high degree of correlation between the farmers' soil mappings and the technical soil classification (Figure 7, p. 1530), and that farmers' manage soil according to its fertility.

10. Tesfahunegn, Gebreyesus Brhane, Lulseged Tamene, and Paul LG Vlek. "Evaluation of soil quality identified by local farmers in Mai-Negus catchment, northern Ethiopia." Geoderma 163, no. 3-4 (2011): 209-218.

Soil identified by local farmers as high, medium and low quality significantly differed from one another on physical and many chemical attributes (Table 2, p. 212 and Table 3, p. 213). Overall, farmer evaluations accorded well with physical and chemical attributes determined scientifically.

F Creating a Dataset on Customary Land Rights

No existing data set maps customary land tenure zones vs. private leasehold tenure zones in sub-Saharan Africa. We have constructed this data for the 19 countries included in Round 4 of the Afrobarometer data set that included questions about traditional leadership. The following pages detail the coding procedure.

F.1 Countries with less than 15 percent of rural land under private leasehold tenure

We have collected data on the total amount of rural land under private leasehold tenure for each of the countries based on the discussion in Alden Wily (2012) and the LandMark National-level data set (Alden Wily and Dubertret, 2015), which Alden Wily was instrumental in creating. We distinguish between countries where less than 15 percent of rural land is under private leasehold tenure and countries where 15 percent or more of rural land is under private leasehold tenure.

In the set of countries where less than 15 percent of rural land is under private leasehold tenure, we assume very few farmers have registered private land titles and customary tenure regimes apply across our entire rural sample. For example, Zambia and Malawi have the highest percentage of rural land registered (13 percent each) among the countries below the 15 percent threshold. However, only 8 percent of smallholder households in Zambia said they had a registered title to their land in a 2012 nationally representative survey (Sitko, Chamberlin and Hichaambwa, 2014). Only 2 percent of households in Malawi reported formal documents for agricultural land in a 2016-2017 nationally representative survey (while 4-7 percent of these households had formal documents for non-agricultural land) (Deininger et al., 2021).

F.2 Countries with more than 15 percent of rural land under private leasehold tenure

There are six countries where more than 15 percent of rural land is under private leasehold tenure: Kenya, Liberia, Namibia, South Africa, Uganda and Zimbabwe. For these, we collected sub-national data on the location of communal lands. Our goal was to code subnational units (provinces, regions, districts, or counties) as majority communal land if the majority of rural dwellers in these subnational units lived on communal or customary land as identified by their country's formal land classification schemes.

F.2.1 Kenya

We coded each county and found that 24 out of 47 counties are considered to have large portions of community land.

List of 24 counties: Baringo, Elgeyo-Marakwet, Embu, Garissa, Homa Bay, Isiolo, Kajiado, Kilifi, Kitui, Kwale, Laikipia, Lamu, Mandara, Marsabit, Meru, Narok, Samburu, Siaya, Taita-Taveta, Tana River, Tharaka-Nithi, Turkana, Wajir, West Pokot.

The government has stated that they would have civic education on the land law in the 24 counties with significant communal land (Mwangi and Ronoh, 2021). Further, the government has established community registration units in the 24 counties as of 2021, per the Kenya Gazettes, so this is where we consider significant community land to exist (Republic of Kenya, 2021*a*,*b*).

F.2.2 Liberia

In Liberia, all land that is more than 40 miles away from the coast is considered customary land (Christensen, Hartman and Samii, 2021). We coded each county based on whether the majority of it was more or less than 40 miles away from the coast.

List of customary land counties: Lofa, Gbarpolu, Bong, Nimba, Grand Gedeh, River Gee.

List of non-customary land counties: Grand Cape Mount, Bomi, Montserrado, Margibi, Grand Bassa, River Cess, Sinoe, Grand Kru and Maryland.

Alden Wily (2008, p. 144) finds little evidence of land titling outside of the original coastal Littoral Liberia. Note that the Republic of Liberia's (2006) survey found that majorities of households reported deeds in only two Southern counties (Grand Cape Mount and Margibi) suggesting that, in practice, many rural households rely on customary claims to land even in coastal Liberia.[1]

F.2.3 Namibia

We coded by region. Of the 13 regions, only Khomas, Hardap and Karas are considered not to be majority customary land. This is because of the high prevalence of commercial farms over communal farms in those three regions.

In northern regions (north of the Red Line or veterinary cordon fence), there are only communal farms. These regions are Oshikoto, Kavango East, Kavango West, Ohangwena, Omusati, Oshana and Zambezi regions.

In other regions, most farms are communal. These regions are Kunene, Erongo, Otjozondjupa and Omaheke(Namibia Statistics Agency, 2018). See also LandMark Indigenous and Community Lands Map (Alden Wily and Dubertret, 2015).[2]

F.2.4 South Africa

We coded South Africa by province. The following provinces are considered to have majority customary rural land: Eastern Cape, KwaZulu-Natal, Limpopo, Mpumalanga, Northwest. The remaining ones are not: Free State, Gauteng, Northern Cape, Western Cape.

The coding is based on the Government's 2011 report (Republic of South Africa, 2011), the South African Former Homelands shapefile (Republic of South Africa, 2022), and information on

[1]For scholars who want to be very conservative in coding non-customary tenure, an alternative coding would be to code only these two counties as non-customary land in Liberia.

[2]Original data therein from the Directorate of Survey and Mapping, Ministry of Land Reform, Government of Namibia. 2007. Communal Lands. Windhoek, Namibia.

the proportion of the population living on the former homelands compared to other non-urban areas in 1997 as explained in the 1997 Rural Survey (Statistics South Africa, 1999).

The 1997 Rural Survey (Statistics South Africa, 1999) provides information on the total population of former homelands of South Africa, indicating separately the total numbers living in rural, semi-rural and semi-urban environments within these homelands by province (with the last category including only a very small proportion of the population). These numbers can be compared to the non-urban population estimated for each province in the 1996 census (Statistics South Africa, 1998) to assess which provinces are majority customary land. Finally, LandMark (Alden Wily and Dubertret, 2015) provides the map of the South African Former Homelands as their map of community lands in South Africa.[3]

F.2.5 Uganda

We code Uganda by region. The Central region (coterminous with the Kingdom of Buganda) is the only province considered not to be majority customary land because of the introduction of "mailo" tenure during the colonial period (even if registered title is very low).

The Western region is considered to be majority customary land, although customary land title is very individualized in this area, as is the case in the Eastern and Northern regions. In the National Development Plan (The Republic of Uganda, 2010), very little land is considered customary land in Central region, while slightly more households report living on customary land as compared to (either registered or unregistered) freehold land in Western Uganda.

F.2.6 Zimbabwe

We code Zimbabwe by province. Bulawayo is an entirely urban province, so there is no rural land. Harare is also entirely urban in our sample.[4]

[3] Original data therein from Department of Rural Development and Land Reform (DRDLR). 1994. South African Former Homelands.

[4] However, the small fraction of rural land in Harare is majority communal. Therefore, scholars who wish to apply our coding scheme to other samples may code Harare as communal.

A majority of land in all rural provinces other than Mashonaland West is communal. Mashonaland West is the only province where the majority of the rural sector is non-communal per the 2012 census (see Table 2.2 in ZimStat (2012) for share of communal land in each of the 10 provinces and LandMark Indigenous and Community Lands Map (Alden Wily and Dubertret, 2015)[5].

List of communal land provinces: Manicaland, Mashonaland Central, Mashonaland East, Masvingo, Matabeleland North, Matabeleland South, Midlands.

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