

LETTER

Collective forest land rights facilitate cooperative behavior

Komal Preet Kaur¹ | Kimberlee Chang² | Krister P. Andersson³ ¹Department of Political Science,
University of Colorado at Boulder,
Boulder, Colorado²Institute of Behavioral Science,
University of Colorado at Boulder,
Boulder, Colorado³Department of Political Science, Institute
of Behavioral Science, University of
Colorado at Boulder, Boulder, Colorado

Correspondence

Krister Andersson, Department of
Political Science, Institute of Behavioral
Science, University of Colorado at
Boulder, Boulder, CO 80309.
Email: anderssk@colorado.edu

Funding information

National Science Foundation,
Grant/Award Numbers: DEB-1114984,
BCS-1115009, SMA-328688; Institute of
Behavioral Science, University of
Colorado, Boulder (2022 Graduate
Student Research Grant to K. Kaur)

Abstract

The introduction of formal collective property rights to forest lands appears to have improved both environmental and economic outcomes, but there is limited evidence on how these reforms affect cooperative behavior among local resource users. We propose that when national governments issue collective land rights, they strengthen the collective psychological ownership among coowners and produce increased levels of cooperative behavior. Analyzing data from 213 forest user groups in 10 countries, and a framed field experiment in a subset of sites, we find that collective land titling is associated with significantly higher levels of cooperative behavior including increased levels of trust, more frequent interpersonal interactions related to both forestry and nonforestry activities, more self-governing institutions, and greater equality in resource extraction patterns.

KEYWORDS

behavior, common-pool resources, cooperation, forests, governance, property rights

1 | INTRODUCTION

Insecure and weak land rights create serious problems for natural resource users and the resources they depend on. The absence of secure and substantial resource rights for local users jeopardizes their access to resources essential for sustaining their livelihoods, and consequently, can weaken their motivation to sustainably manage and protect these resources. Insecure rights can also spur fights between user groups over resources, exacerbating unsustainable land-use practices (De Oliveira, 2008).

Insecure property rights are a major barrier to improving the well-being of rural people, not just economically but also socially. For many users, the connection with their land forms the very basis for social identity and agency. In

contexts where the demand for land is high and resource users merely hold de facto rights to their land without formal judicial backing from national governments, powerful external actors can more easily challenge local groups' de facto territorial claims, leading to tenure insecurity (Bruce, 1999). Official, de jure recognition of customary land rights is foundational in alleviating concerns of competing claims, and in increasing the certainty of the users' claims to the land and its resources.

For many years, the go-to policy response to address insecure land rights was to formalize individual private property rights (Ostrom, 2000). Issuing collective rights was viewed as inferior because, from a narrow rational-choice perspective, collective rights could potentially create free-riding problems (Coase, 1960; North, 1991). Toward

This is an open access article under the terms of the [Creative Commons Attribution](https://creativecommons.org/licenses/by/4.0/) License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited.

© 2023 The Authors. Conservation Letters published by Wiley Periodicals LLC.

the end of the 20th century, however, the public policy perspective on property rights started to shift. Indigenous movements as well as a general push for community-based natural resource management—often backed by international treaties, nongovernmental organizations, and international donors—pushed national governments to recognize their claims to collective land rights^[1] (Hodgson, 2002; Yashar, 1998). As a result, a large number of national governments introduced land reforms that recognized the customary, collective land rights of Indigenous people and local communities (Segura Warnholtz et al., 2020; Wily, 2018). Unlike land reforms in the form of communes, rooted in the communist ideology (Liu & Ravenscroft, 2016), the most recent spate of land reforms (starting in the 1980s) came about as a result of social mobilization by Indigenous peoples and other rural communities demanding recognition of their historically ignored ancestral^[2] and customary land rights (Kashwan, 2017; Offen, 2003; Rugadya, 2020; Schwartzman et al., 2010).

Several studies from the Global South suggest that the introduction of formalized collective property rights has contributed to improvements in both economic and environmental outcomes (Baragwanath & Bayi, 2020; Blackman et al., 2017; Wren-Lewis et al., 2020). Less is known about how collective titling affects co-owners' behavior and their ability to work together (Velez, 2011).

The dearth of research on the behavioral outcomes of collective titling is problematic for several reasons. First, not knowing how the increasingly popular reforms affect cooperative behavior impedes a comprehensive understanding of reform outcomes. Considering a wider range

of outcomes (e.g., economic, environmental, and social) allows researchers to investigate the possibility that a given policy produces both advances and shortcomings depending on the outcome in question (Bellamy et al., 2001).

Second, how land reforms impact temporally distant biophysical outcomes (detectable changes on the landscape can take decades) depend on how the reforms are affecting the immediate decisions and actions of resource users. Gaining a better understanding of how collective titling affects social behavior of users will help identify and test possible causal mechanisms resulting in longer-term environmental outcomes.

Finally, understanding the causal processes of how collective titles change human behavior (e.g., interpersonal, and human–environmental interactions) can help in assessing and re-adjusting the existing policies and property rights that govern the collective management of common-pool resources so that the policy goals are more likely met.

We test our arguments analyzing data from 213 user groups in 10 countries and from a field-based behavioral game with 128 forest users in Bolivia and Uganda.

2 | HYPOTHESES

We propose that the introduction of *de jure* collective property rights to forestlands fosters greater levels of cooperative behavior among forest users. While formalizing collective rights does not guarantee tenure security against outside claims, collective titles provide increased legal protection against powerful external claimants. In addition to such tangible benefits, recent contributions to the environmental governance literature hint at possible psychological benefits of *de jure* collective rights, including strengthened agency and group cohesion (Brondizio et al., 2021; Larson et al., 2019; Rye & Kurniawan, 2017; Whelan, 2016).

The term “collective psychological ownership” in the social psychology literature elucidates how collective ownership of material goods (e.g., land or resources) can promote feelings of belonging and the willingness to act for group-based goals and possessions (Shu & Peck, 2011; Verkuyten & Martinovic, 2017). Legally recognized collective rights provide psychological validation to the collective identity by safeguarding the possibility to govern and defend against outside interests and reaffirming the group's shared history and relationships to the land as a cohesive social group (Meagher, 2020). Collective land rights can have restorative effects on the social identity of the co-owners (Chan et al., 2016), increasing the commitment to collective goals, solidarity, and group cohesion (Meagher, 2020; Verkuyten & Martinovic, 2017). In this

^[1] In the field of international law, International Labor Organization's Conventions 107 and 169 passed in 1957 and 1989 respectively pioneered codifying the rights of Indigenous people including collective land rights. Later in the year 2007, United Nations General Assembly passed the Declaration on the Rights of Indigenous Peoples. Refer to Gilbert (2007) for details on the evolution of Indigenous rights at the international level. These treaties have been a tool for Indigenous groups to defend their rights and recognition (Idrus, 2022). Other organizations and advocacy groups involved in promoting and defending indigenous rights include Nordic Saami Council, Organization of Central American Indigenous Peoples in Panama, Indian Council of South America, Working Group of Indigenous Minorities of Southern Africa, International Working Group for Indigenous Affairs, Cultural Survival, and Survival International (Saugestad, 2001, p. 47).

^[2] While there may be divergences between the legally obtained collective land rights and ancestral rights, our argument does not rest upon this distinction. Our arguments and analyses are situated in the context of developing countries with a colonial past. Broadly put, colonial governments in these countries viewed themselves as the rightful authority over forest resources leaving Indigenous Peoples and local communities bereft of their land and resources that they have been using for generations. Though postcolonial governments continued with the exclusionary policies, more recent spates of land reforms and social movements helped communities obtain legal rights to their lands. It is against this backdrop that we use the term “ancestral rights.”

sense, collective land rights represent a symbol of strengthened unity among right holders, especially in contexts where local groups have had no previous legal recognition of their stewardship of the land and its natural resources.

If collective de jure land rights strengthen the ability of groups to cooperate through the processes of strengthened psychological ownership, then we can expect group members with such rights to have stronger motivations to create and sustain several local public goods, including local governance institutions. Successful creation and enforcement of such institutions, in turn, potentially reinforce cooperative behavior associated with multiple community activities, not just land-related activities. Therefore, we expect that formal collective forest rights foster cooperative behavior in general, even beyond forestry-specific activities.

3 | DATA AND METHODS

We rely on two data sources: (1) a cross-sectional data set from the International Forestry Resources and Institutions (IFRI) research program comprising 213 forest user groups from 10 countries and (2) a modified version of the common-pool resource game from 128 forest users in Bolivia and Uganda. As the IFRI data set involves the same user groups who participated in the behavioral game, the two analyses complement one another, strengthening the internal validity of the analytical results.

Building on previous studies that establish the importance of repeated interactions for developing cooperative governance institutions (Andersson, 2004; Epstein et al., 2021; Keefer & Knack, 2008; Ostrom, 1990, p. 39), we use six measures of cooperative behavior among local resource users (Table 1). Our main independent variable of collective land ownership from the IFRI database captures whether local communities have de jure collective ownership of forest land or not. Our empirical analysis employs linear regression methods to estimate the effect of collective rights on varying levels of cooperation. We include a range of control variables to account for potentially confounding influences on the relationship of interest. We also performed a range of robustness checks. We provide additional details on the data sets, summary statistics for all the variables, the rationale of control variables, and robustness checks in Appendix.

4 | RESULTS

Our results provide empirical support for the proposition that establishing formal, collective property rights on forestlands used by Indigenous people and local commu-

nities are associated with increased levels of cooperative behavior among users.

1. Formal collective property rights facilitate cooperation for activities both within and outside the forest.

Consistent with the expectations, we find a positive relationship between collective de jure forest land rights and the frequency of interpersonal interactions among forest user group members both for forestry and nonforestry activities. Results show that user groups that possess de jure forest rights achieve 7.54- and 10.62-percentage points greater cooperation for forest and nonforest-related activities compared to users that do not enjoy such rights (Models 1 and 3, Table 2).

We also test how de jure rights to forest products (as opposed to land) affect cooperation. We find that de jure product rights are significantly associated with a 13.12-percentage point increase in forest-related cooperation (Model 2, Table 2); however, de jure rights to products (as opposed to land) have no statistically significant relationship with nonforestry cooperation (Model 4, Table 2). These results suggest that merely having de jure rights to forest *products* seems insufficient to bring about generalized cooperation. The difference between the relationships of rights to forestland vis-a-vis forest products is consistent with the theory of psychological ownership and how secure collective land rights bolster markers of social identity among coowners, allowing deepened, sustained, cooperative ties.

These results are robust to several alternative analytical approaches and choices, described in the robustness checks section in Appendix (Section 2). These include (1) analyzing a subsection of the countries where collective forest rights vary the most; (2) country-fixed effects to account for time-invariant factors; (3) accounting for a country's history of land reforms and whether the reforms followed a top-down or bottom-up approach; (4) exploring propensity score matching to alleviate endogeneity concerns; (5) adding more control variables (e.g., distance to market, economic dependence on forestry).

2. Formal collective property rights strengthen trust, communication, and distributional equality among coowners.

To investigate the possible psychological and behavioral mechanisms of how formal property rights induce cooperation, we turn to data from a behavioral game in the field. Comparing the decisions and actions among the forest users who live in communities that enjoy collective de jure rights with users who live in communities

TABLE 1 Dependent variables and their operationalization from the IFRI and game database.

Data source	Measurement of cooperation	Description
IFRI	Forest-related cooperation	A composite measure of the frequency of the following activities related to forestry, such as harvesting, processing, marketing, financial, monitoring, maintenance, and sanctioning activities. In the IFRI data set, the frequency of interactions is measured in the following categories: year-round, seasonally, occasionally, and never. We take the mean value across these activities and transform the variable from a scale of 1 to 4 into percentage points for easier interpretation, with 0 being the lowest and 100 being the most frequent interactions.
IFRI	Nonforest-related cooperation	A composite measure of the frequency of the following activities outside of the forest, such as those related to agricultural and commercial activities (processing, marketing, financial, monitoring, maintenance, and sanctioning activities). IFRI researchers to code this variable to capture interactions unrelated to forestry. The operationalization of this variable is the same as described above for forest-related cooperation.
Game data	Harvest Inequality	The standard deviation of harvest decision in a group-round. The smaller the value, the more equitable the harvest decision indicating that there is less variation in the amount that individuals in the group harvested.
Game data	Number of speakers	The observer recorded the number of speakers in an 8-person group during the discussion period in the group-round.
Game data	Vibrancy of discussion	The observer recorded the level of discussion in a group-round on a scale of 0 to 3 (0 being “nonexisting discussion” and 3 being “very vibrant discussion”).
Game data	Communal trust	Self-reported trust in others in the community in the pregame survey on a scale from 1 to 7. Higher the value, the greater the levels of trust.
Game data	General trust	A self-reported measure in the pre-game survey on a scale from 1 to 7 indicating whether most people can be trusted or not. Higher the value, the greater the levels of trust.

without such rights, communicate more with one another. We find that having de jure rights is associated with a reduction of 1.60 in the standard deviation of group harvest (Model 1, Table 3), where the standard deviation of an average group round is 1.01 in a range of 0 to 2.98 (Table A4). The number of speakers in the eight-person games as well as the vibrancy of discussion is greater among users with collective de jure rights, indicating higher levels of social behavior (Model 2, Table 3). Communal trust is significantly higher (2.15%, $p < 0.001$) among users having collective de jure land rights compared to those with no collective forest land rights (Model 4, Table 3). There was no difference in generalized trust between the groups (Model 5, Table 3) indicating that the prosocial effects of de jure collective land rights are limited to the confines of the local community of users. Overall, these results indicate that the formalization of collective land rights can lead to more prosocial behaviors within the user group, including the reduction of disparities in the distribution of resources within groups.

To investigate the possibility that collective forestland rights increase nonforest-related group interactions partly through users' participation in forest governance activities,

we conducted a causal mediation analysis. This analysis tests the extent to which the existence of community-level forest governance institutions for monitoring and sanctioning mediates the effect of collective de jure rights on cooperative behavior beyond forestry activities. The results show that these governance institutions significantly mediate 20.5% of the effect of de jure land rights on nonforest-related cooperation (a 7-percentage point increase). Note that 79.62% of the effect of collective property rights is unmediated, directly increasing out-of-forest cooperation (Figure 1).

5 | DISCUSSION

We have shown that formal collective forestland rights can bring about increased cooperative behavior among forest users. As such, formalized de jure collective rights can be instrumental in advancing social and environmental justice, boosting self-confidence and empowerment at both individual and group levels.

Our results are in line with the field experiments conducted in Benin where granting land ownership to the

TABLE 2 Formal collective property rights facilitate increased interactions among users in both forestry and nonforestry activities.

	Dependent variable			
	(1)	(2)	(3)	(4)
	Forest-related cooperation		Nonforest-related cooperation	
De jure land rights (dummy)	7.541 ⁺		10.617***	
	(4.370)		(2.843)	
De jure product rights (dummy)		13.119***		0.985
		(2.010)		(4.925)
User group age	−0.040*	−0.042*	0.011	−0.002
	(0.017)	(0.017)	(0.014)	(0.010)
User group size	0.008	0.004	−0.001	−0.003
	(0.006)	(0.007)	(0.003)	(0.004)
User group wealth difference (dummy)	3.365	0.401	0.207	−1.602
	(4.146)	(4.803)	(5.664)	(5.835)
User group literacy rate	2.520	2.168	11.412*	14.132***
	(4.156)	(5.078)	(4.995)	(3.104)
User group female proportion	−26.109*	−26.778 ⁺	−18.388**	−21.850**
	(12.543)	(14.199)	(6.578)	(6.809)
Constant	37.156***	33.131***	20.807**	25.734***
	(9.684)	(9.905)	(6.419)	(6.808)
Observations	214	192	213	192
R ²	0.131	0.188	0.082	0.063
Adjusted R ²	0.105	0.161	0.055	0.032
Residual std. error	22.637	22.046	21.954	22.363
F statistic	5.180***	7.122***	3.055**	2.060 ⁺

Note: Parentheses include robust standard errors clustered at the country level. The outputs are based on linear regression. Models 1 and 2 assess the relation of de jure collective forestland rights and de jure forest product rights on forest-related cooperation respectively. The dependent variable for Models 3 and 4 reflects the user group's nonforest-related cooperation. The key independent variables in Models 3 and 4 are de jure collective forest land rights and de jure collective forest product rights, respectively.

+ $p < 0.1$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

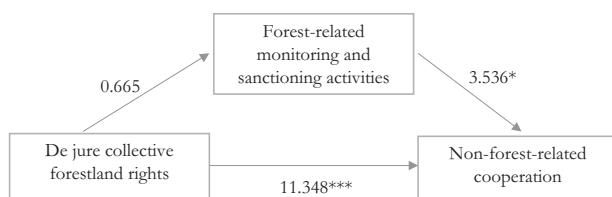


FIGURE 1 Causal mediation analysis suggesting that collective forest rights improve cooperation through forest-based monitoring and sanctioning activities. Note: We estimate the significance of the indirect effect using bootstrapping with a sample size of 1000. The bootstrapped indirect effect is 2.323 [CI: 0.45–4.81, $p < 0.01$] (see also Section 3 of Appendix). + $p < 0.1$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

community are linked with lower levels of interhousehold and intervillage conflicts, and higher trust in institu-

tions in resolving land disputes (Wren-Lewis et al., 2020). Researchers have made similar arguments in the contexts of urban settlements, about the potential impacts of tenure security in fostering group cohesion (Durand-Lasserve & Selod, 2009), showing that robust institutions facilitate cooperation and successful efforts to address persistent collective action problems (Harring et al., 2021). The results also highlight the importance of recent reforms' recognition of customary land rights, as our findings offer a potential explanation as to why Soviet-style, top-down land reforms of creating communes largely failed in increasing economic productivity and sustaining natural resources; these reforms tended to ignore the social identity of the groups and their cultural linkages with the land (Yin, 1998). Our results also contribute to the literature on the Relational Values framework, which considers forests to not only have instrumental values but also shape collective

TABLE 3 Results from behavioral field game: the impact of formal collective property rights on cooperation.

	Dependent variable				
	(1) Harvest inequality	(2) Number of speakers	(3) Vibrancy of discussions	(4) Communal trust	(5) General trust
De jure collective forestland rights (dummy)	-1.604*** (0.188)	0.691** (0.219)	0.776*** (0.199)	2.145*** (0.400)	0.170 (0.532)
User group age	-0.004 (0.016)	-0.026+ (0.014)	-0.024+ (0.013)	0.012 (0.038)	-0.043* (0.022)
User group size	0.00004 (0.001)	-0.0003 (0.002)	0.001 (0.001)	0.003 (0.003)	0.001 (0.001)
User group wealth difference (dummy)	0.917*** (0.163)	-0.178 (0.111)	-0.422* (0.186)	0.230 (0.395)	0.178 (0.701)
Group received payment-to-ecosystem services treatment (dummy)	-0.043 (0.130)	0.007 (0.091)	0.264* (0.125)	-0.297 (0.263)	0.332 (0.317)
Proportion of women in the game group	-2.976*** (0.492)	0.409 (0.351)	1.047+ (0.595)	-3.250* (1.400)	-1.915 (1.730)
Group average of schooling (in years)	0.014 (0.050)	-0.019 (0.046)	0.065 (0.040)	-0.290** (0.090)	-0.192* (0.078)
Constant	2.987** (0.960)	3.202** (1.006)	1.789* (0.806)	6.184** (2.056)	6.381*** (1.412)
Observations	80	80	80	16	16
R ²	0.683	0.449	0.380	0.887	0.502
Adjusted R ²	0.653	0.395	0.320	0.789	0.066
Residual std. error	0.509	0.468	0.533	0.530	0.535

Note: Robust standard errors in parentheses. The model outputs are based on linear regression. For the first three models, the analysis is based on five rounds of the game. The unit of analysis is at a group-round level for Models 1–3; i.e., dependent variables are measured for a user group for a round. Communal and general trusts were measured pregame. As the independent variables and control variables are measured at the group level, we report communal and general trust at the group level.

+ $p < 0.1$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

identity and social relationships (Chan et al., 2016; Yuliani et al., 2022).

Our results seemingly contradict those of a recent sub-national study from Peru (Carter, 2021), which finds that in some Peruvian contexts, de jure collective property rights have weakened traditional institutions, decreasing political mobilization during national elections. The author argues that de jure collective land rights incentivize individual gains from agricultural production and greater market integration, thereby degrading cooperative behavior otherwise supported by traditional institutions. Although Carter (2021) compared de facto with de jure rights (not the absence of de jure rights like we do) and restricted the study to Indigenous land areas in Peru (not a multicountry study that also included non-Indigenous

groups like ours), the study still suggests that there may be contextual factors not captured by our analysis that can help determine the effect of collective titling on cooperation. Future studies would benefit from incorporating measures of such individualistic behaviors to complement the measures that we use here to gauge group behaviors.

Future work would also benefit from addressing the methodological limitations of our work. Our analysis relied on cross-sectional observational data that limits our ability to measure the temporal effects of collective titling on cooperation. Even though we have included many relevant control variables, and our results are consistent across multiple measures of cooperative behavior and different model specifications as well as screening our sample by using matching techniques (see Appendix),

potential endogeneity concerns remain as the “treatment” of issuing collective property rights was not randomly assigned. For instance, it seems possible that groups that have engaged in long struggles to secure collective titling may have bolstered their group’s cohesion in the process of those struggles. To test this alternative explanation to our results, we take into consideration the country-wise history of forest tenure reforms. User groups in Bolivia, Guatemala, and Mexico received collective de jure forest land rights through sweeping national reforms that recognized the rights of Indigenous and other rural communities by significantly lowering the barriers to acquire de jure collective rights. In contrast, user groups in our sample from India and Uganda face considerably higher barriers to receiving such collective rights as their national government agencies issue such rights only to groups that pass a case-by-case review.^[3]

If the alternative explanation—that cooperative behavior is not a consequence of formal titling, but rather a cause—is true, then we would expect the association between collective rights and cooperation to be weaker for user groups in Bolivia, Guatemala, and Mexico (where barriers to de jure rights are lower) compared to the groups in India and Uganda (where barriers to acquire de jure rights are usually higher). We find no statistical support for this alternative explanation but find that user groups in all countries—regardless of reform type—see higher levels of cooperation (Model 3, Table A6). These results provide additional, albeit partial, support for our findings that introducing collective titling boosts cooperation among co-owners. It is important to note, however, that there is considerable heterogeneity within each country when it comes to the process of issuing formal collective rights to forestlands (it is often driven by a messy mix of top-down and bottom-up pressures), and in light of such heterogeneity it seems reasonable to infer from our analyses that there is a mutually reinforcing relationship between recent efforts to issue collective titles and cooperative behaviors.

In conclusion, existing studies have shown that formally recognizing a user group’s land rights can demonstrably improve economic and environmental outcomes, but research to date has been silent on how these reforms affect the behavior of co-owners. Here, we show that when user groups enjoy formally recognized collective land rights, they behave more cooperatively demonstrating the use-

fulness of considering behavioral aspects when analyzing public policy reforms.

ORCID

Krister P. Andersson  <https://orcid.org/0000-0002-9320-8155>

REFERENCES

- Andersson, K. P. (2004). Who talks with whom? The role of repeated interactions in decentralized forest governance. *World Development*, 32(2), 233–249.
- Baragwanath, K., & Bayi, E. (2020). Collective property rights reduce deforestation in the Brazilian Amazon. *Proceedings of the National Academy of Sciences of the United States of America*, 117(34), 20495–20502. <https://doi.org/10.1073/pnas.1917874117>
- Bellamy, J. A., Walker, D. H., McDonald, G. T., & Syme, G. J. (2001). A systems approach to the evaluation of natural resource management initiatives. *Journal of Environmental Management*, 63(4), 407–423. <https://doi.org/10.1006/jema.2001.0493>
- Blackman, A., Corral, L., Lima, E. S., & Asner, G. P. (2017). Titling indigenous communities protects forests in the Peruvian Amazon. *Proceedings of the National Academy of Sciences of the United States of America*, 114(16), 4123–4128. <https://doi.org/10.1073/pnas.1603290114>
- Brondizio, E. S., Andersson, K., De Castro, F., Futeemma, C., Salk, C., Tengö, M., Londres, M., Tourne, D. Cm., Gonzalez, T. S., Molina-Garzon, A., Russo Lopes, G., & Siani, S. M. O. (2021). Making place-based sustainability initiatives visible in the Brazilian Amazon. *Current Opinion in Environmental Sustainability*, 49, 66–78.
- Bruce, J. W. (1999). Legal bases for the management of forest resources as common property. Community Forestry Note.
- Carter, C. L. (2021). The representational effects of communal property: Evidence from Peru’s indigenous groups. *Comparative Political Studies*, 54(12), 2191–2225.
- Chan, K. M. A., Balvanera, P., Benessaiah, K., Chapman, M., Díaz, S., Gómez-Baggethun, E., Gould, R., Hannahs, N., Jax, K., Klain, S., Luck, G. W., Martín-López, B., Muraca, B., Norton, B., Ott, K., Pascual, U., Satterfield, T., Tadaki, M., Taggart, J., & Turner, N. (2016). Why protect nature? Rethinking values and the environment. *Proceedings of the National Academy of Sciences*, 113(6), 1462–1465.
- Coase, R. H. (1960). The problem of social cost. *The Journal of Law & Economics*, 3, 1–44.
- Puppim De Oliveira, J. A. (2008). Property rights, land conflicts and deforestation in the Eastern Amazon. *Forest Policy and Economics*, 10(5), 303–315.
- Durand-Lasserve, A., & Selod, H. (2009). The formalization of urban land tenure in developing countries. In S. V. Lall, M. Freire, B. Yuen, R. Rajack, & J.-J. Helluin (Eds.), *Urban land markets: Improving land management for successful urbanization* (pp. 101–132). Dordrecht: Springer Netherlands. https://doi.org/10.1007/978-1-4020-8862-9_5
- Epstein, G., Gurney, G., Chawla, S., Anderies, J. M., Baggio, J., Unnikrishnan, H., Villamayor Tomas, S., & Cumming, G. S. (2021). Drivers of compliance monitoring in forest commons. *Nature Sustainability*, 4, 450–456. <https://doi.org/10.1038/s41893-020-00673-4>

^[3] Though we acknowledge the long history of social movements and protests in Bolivia, Guatemala, and Mexico, we argue that user groups received collective land rights in more of a wholesale manner and based on customary rights claims in these countries; that is, many user groups that did not participate in the social movements still received the collective land rights as a result of national level land reforms. Section 4 in the Appendix provides more details on the sample communities.

- Gilbert, J. (2007). Indigenous rights in the making: The United Nations declaration on the rights of indigenous peoples. *International Journal on Minority and Group Rights*, 14(2–3), 207–230.
- Harring, N., Jagers, S. C., & Löfgren, Å. (2021). COVID-19: Large-scale collective action, government intervention, and the importance of trust. *World Development*, 138, 105236.
- Hodgson, D. L. (2002). Introduction: Comparative perspectives on the indigenous rights movement in Africa and the Americas. *American Anthropologist*, 104(4), 1037–1049.
- Idrus, R. (2022). Competing for the 'Indigenous' Slot. *Sojourn: Journal of Social Issues in Southeast Asia*, 37(1), 58–84.
- Kashwan, P. (2017). *Democracy in the woods: Environmental conservation and social justice in India, Tanzania, and Mexico*. Oxford University Press.
- Keefer, P., & Knack, S. (2008). Social capital, social norms and the new institutional economics. In C. Ménard, & M. M. Shirley (Eds.), *Handbook of new institutional economics* (pp. 701–725). Springer.
- Larson, A. M., Monterroso, I., Liswanti, N., Herawati, T., Banana, A., Canturias, P., Rivera, K., & Mwangi, E. (2019). Models for formalizing customary and community forest lands: The need to integrate livelihoods into rights and forest conservation goals. *CIFOR*, 253(2021). <https://doi.org/10.17528/cifor/007273>
- Liu, P., & Ravenscroft, N. (2016). Collective action in China's recent collective forestry property rights reform. *Land Use Policy*, 59, 402–411. <https://doi.org/10.1016/j.landusepol.2016.09.011>
- Meagher, B. R. (2020). Ecologizing social psychology: The physical environment as a necessary constituent of social processes. *Personality and Social Psychology Review*, 24(1), 3–23. <https://doi.org/10.1177/1088868319845938>
- North, D. C. (1991). Institutions. *Journal of Economic Perspectives*, 5(1), 97–112.
- Offen, K. H. (2003). The territorial turn: Making black territories in Pacific Colombia. *Journal of Latin American Geography*, 2, 43–73.
- Ostrom, E. (1990). *Governing the commons: The evolution of institutions for collective action*. Cambridge University Press.
- Ostrom, E. (2000). Collective action and the evolution of social norms. *Journal of Economic Perspectives*, 14(3), 137–158.
- Persha, L., Agrawal, A., & Chhatre, A. (2011). Social and ecological synergy: Local rulemaking, forest livelihoods, and biodiversity conservation. *Science (New York, N.Y.)*, 331(6024), 1606. <https://doi.org/10.1126/science.1199343>
- Rugadya, M. A. (2020). Land tenure as a cause of tensions and driver of conflict among mining communities in Karamoja, Uganda: Is secure property rights a solution? *Land Use Policy*, 94, 104495. <https://doi.org/10.1016/j.landusepol.2020.104495>
- Rye, S. A., & Kurniawan, N. I. (2017). Claiming indigenous rights through participatory mapping and the making of citizenship. *Political Geography*, 61, 148–159.
- Saugestad, S. (2001). *The inconvenient indigenous: Remote area development in Botswana, donor assistance and the first people of the Kalahari*. Nordic Africa Institute.
- Schwartzman, S., Alencar, A., Zarin, H., & Santos Souza, A. P. (2010). Social movements and large-scale tropical forest protection on the Amazon frontier: Conservation from chaos. *The Journal of Environment & Development*, 19(3), 274–299.
- Segura Warnholtz, G., Molnar, A. A., & Ahuja, N. (2020). Forest communities in control: Are governments and donors prepared to help them thrive? *International Forestry Review*, 22(1), 17–28. <https://doi.org/10.1505/146554820829523989>
- Shu, S. B., & Peck, J. (2011). Psychological ownership and affective reaction: Emotional attachment process variables and the endowment effect. *Journal of Consumer Psychology*, 21(4), 439–452. <https://doi.org/10.1016/j.jcps.2011.01.002>
- Velez, M. A. (2011). Collective titling and the process of institution building: The new common property regime in the Colombian Pacific. *Human Ecology*, 39(2), 117–129. <https://doi.org/10.1007/s10745-011-9375-1>
- Verkuyten, M., & Martinovic, B. (2017). Collective psychological ownership and intergroup relations. *Perspectives on Psychological Science*, 12(6), 1021–1039. <https://doi.org/10.1177/1745691617706514>
- Whelan, Y. (2016). *Heritage, memory and the politics of identity: New perspectives on the cultural landscape*. Routledge.
- Alden Wily, L. (2018). Collective land ownership in the 21st century: Overview of global trends. *Land*, 7(2). <https://doi.org/10.3390/land7020068>
- Wren-Lewis, L., Becerra-Valbuena, L., & Hounghbedji, K. (2020). Formalizing land rights can reduce forest loss: Experimental evidence from Benin. *Science Advances*, 6(26), 1–9. <https://doi.org/10.1126/sciadv.abb6914>
- Yashar, D. J. (1998). Contesting citizenship: Indigenous movements and democracy in Latin America. *Comparative Politics*, 31, 23–42.
- Yin, R. (1998). Forestry and the environment in China: The current situation and strategic choices. *World Development*, 26(12), 2153–2167. [https://doi.org/10.1016/S0305-750X\(98\)00106-5](https://doi.org/10.1016/S0305-750X(98)00106-5)
- Yuliani, E. L., Moeliono, M., Labarani, A., Fisher, M. R., & Tias, P. A., Sunderland, T. (2022). Relational values of forests: Value-conflicts between local communities and external programmes in Sulawesi. *People and Nature*, 1–17.

SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

How to cite this article: Kaur, K. P., Chang, K., & Andersson, K. P. (2023). Collective forest land rights facilitate cooperative behavior. *Conservation Letters*, e12950. <https://doi.org/10.1111/conl.12950>