

Gender, institutions and sustainability in the context of forest decentralisation reforms in Latin America and East Africa

Yan Sun¹, Esther Mwangi² and Ruth Meinzen-Dick¹

Introduction

Women's participation in decision making at the user-group level and in forest committees has been demonstrated to have a positive impact on forest sustainability. For example, women's participation enhances forest regeneration and reduces illegal harvesting through improved monitoring. Their presence in forest user groups increases the groups' capacity to manage and resolve conflicts, which in turn increases the likelihood that resource users will comply with and respect harvesting and use rules. These insights have been especially useful in informing policy and project interventions designed to strengthen and amplify women's participation.

The research presented in this brief advances our knowledge of how women may influence forest management. It explores the different effects on forest management by groups with different male–female composition (i.e. female-dominated, mixed-gender and male-dominated user groups). The study investigates each type of group's property rights to forest resources, harvesting preferences, participation in rule making, relative investments in forest management and the outcomes of these activities. The research, conducted in four countries in Latin America and East Africa, adopts a comparative approach, which is intended to identify synergies within regions and to create a learning environment that may lead to improved forest management.

The context

The study was conducted in Bolivia, Mexico, Kenya and Uganda. Although all four of these countries have decentralised their forestry sectors during the past 15 years, their relevant institutions differ in their design. Bolivia introduced forestry reforms in 1996 that transferred substantial power and resources to local governments, but retained national ownership of all forest resources. Mexico has decentralised some of its forest governance functions and ownership rights to communities, but has retained more political and financial control at the federal and state levels. Uganda, which has implemented forest decentralisation reforms since 1996, has

devolved authority to the district level, with state-centred control of budgets and revenues. Kenya's 2005 reform was to devolve authority to community associations but with responsibility in nested hierarchies that overlap both governance/administrative levels and ecological scales.

The conditions leading to the governance reforms in these four countries are diverse. Mexico has a long history of community involvement in forest management, whereas Kenya has the longest history of state control over forest resources. Uganda has historically oscillated between state and local control of forest resources, and Bolivia exhibits the most progressive and most numerous formal institutions for community control. Whereas the East African countries have a long history of protectionist objectives, the Latin American countries have a long history of community forestry enterprises and of the struggle for more inclusive forestry practice and equitable distribution of benefits from forestry enterprises.

What we studied and what we found

The analysis in this brief is based on information, collected using participatory methods, encompassing:

- institutions affecting resource use such as *de jure* and *de facto* property rights to forest resources, enforcement of rights and legal ownership of forests;
- resource users' participation in rule making and enforcement (e.g. monitoring and sanctioning) and their exclusion of other groups from harvesting from 'their' forests;
- user group efforts at forest management, for example, investments in forest improvements and other activities such as ensuring regeneration;
- socio-economic and demographic status such as size, gender composition, wealth differentiation, population, forest dependence and land ownership; and
- forestry officials' and users' perceptions of forest condition, i.e. vegetation diversity and density.

Data were collected for 39 forests in Bolivia, Mexico, Kenya and Uganda, during two separate visits to each forest between 1993 and 2008. In total, 290 user groups were divided into three categories based on the proportion of women in each group.

¹ International Food Policy Research Institute (IFPRI)

² Center for International Forestry Research (CIFOR)

These categories were: male dominated (women comprising one-third or less of the group), mixed (women comprising between one-third and two-thirds of the group) and female dominated (women comprising two-thirds or more of the group). These three categories accounted for 40%, 37% and 23% of the 290 user groups, respectively.

The following sections discuss the findings of the data analysis. See Table 1 for definitions of variables.

Forest condition, property rights to resources and conservation measures

Over the study period, forest condition, in terms of vegetation and species diversity, remained constant in about one-third of the forests, improved in another third and declined in the remaining third, as shown in Figures 1 and 2. However, as the figures illustrate, such changes were minor. Furthermore, most forests appear to have adopted more restrictive conservation measures to protect resources and increased restrictions on access rules (Figures 3 and 4). Of those

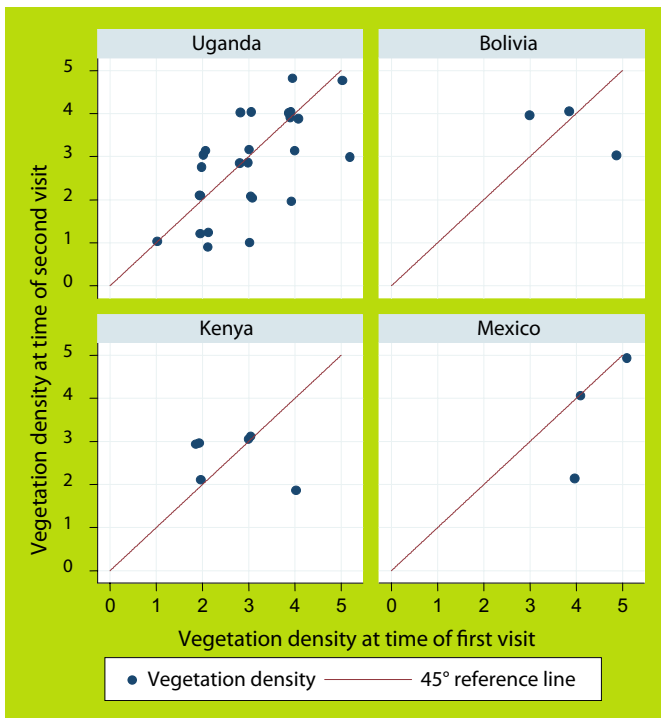


Figure 1. Vegetation density during two visits

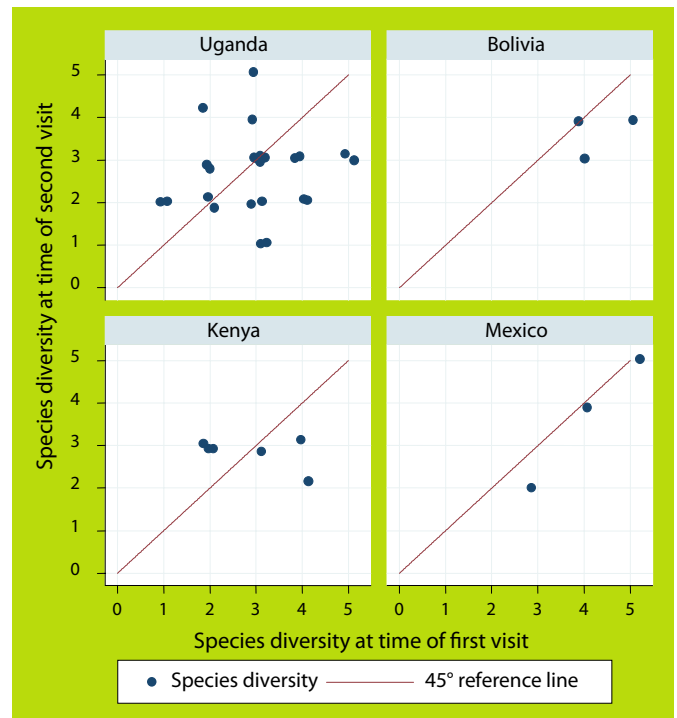


Figure 2. Species diversity during two visits

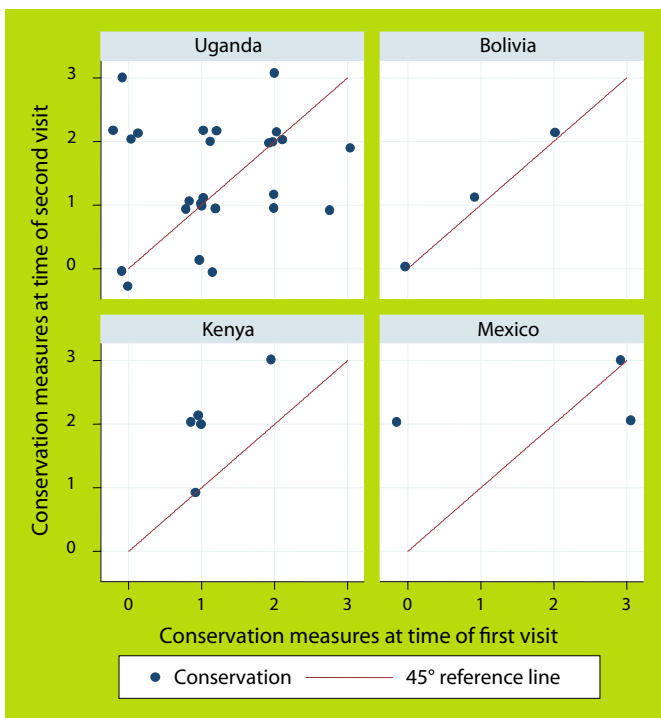


Figure 3. Conservation measures during two visits

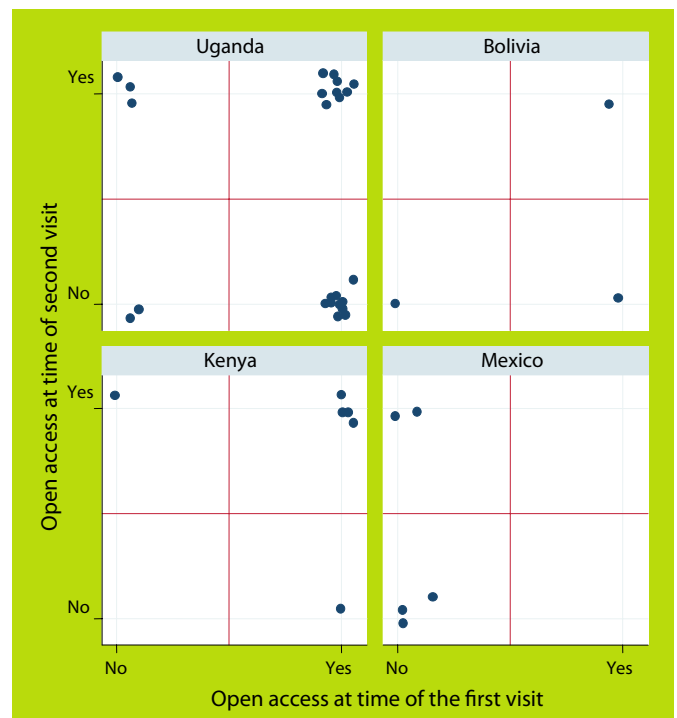


Figure 4. Access by other groups during two visits

Table 1. Definitions and descriptive statistics of the variables

Category	Definition	Obs.	Mean	Min.	Max.
Dependent variables					
Property rights and harvest rules					
Right to harvest trees	dummy, 1=yes	242	0.55	0	1
Right to harvest bushes	dummy, 1=yes	215	0.68	0	1
Right to harvest soil, stones and minerals	dummy, 1=yes	188	0.35	0	1
Right to harvest wildlife	dummy, 1=yes	206	0.32	0	1
Fuelwood harvested	% of group's fuelwood needs harvested from forest	258	65%	0	100%
Timber harvested	% of group's timber needs harvested from forest	252	39%	0	100%
Investment, management and outcome					
Regeneration activity	dummy, 1=yes, undertaking regeneration activities	290	0.24	0	1
Improvement activity	dummy, 1=yes, undertaking improvement activities	290	0.27	0	1
Participation	dummy, 1=yes, members involved in forest-related decision making	257	0.30	0	1
Sanctioning and monitoring	dummy, 1=yes, sanction regularly	282	0.23	0	1
Other groups' rights to harvest from forest	dummy, 1=yes, other groups have right to harvest	254	0.89	0	1
Independent variables					
User groups' gender dummies					
Mixed-gender group (base is male dominated)	dummy, 1=user group is gender mixed, 0=otherwise	290	0.36	0	1
Female-dominated group (base is male dominated)	dummy, 1=user group is female dominated, 0=otherwise	290	0.23	0	1
Other user group characteristics					
User group size (no. of members)	total number of members in the user group	290	536	3	32000
User group wealth differentials	dummy, 1= wealth difference within the group	279	0.42	0	1
User group ownership of agricultural land	% of households in user group that own agricultural land	255	0.58	0	1
Distance individuals in group live from forest	dummy, 1=within 1 km, 2=1-5 km, ..., 4=>10 km	256	1.73	1	4
Forest characteristics					
Forest size	Size of the forest in hectares	268	2829	2.3	44900
Forest topography	dummy, 1=flat, 2=flat with rolling terrain, ..., 5=steep terrain	275	3.1	1	5
Government owns the forestland	dummy, 1=landowner is gov't, ref=land is privately owned	273	0.74	0	1
Community owns the forestland	dummy, 1=landowner is community, ref=land is privately owned	273	0.19	0	1
Forest owner has right to harvest	dummy, 1=forest owner has right to harvest from forest	281	0.71	0	1
Forest has open access	dummy, 1=forest has open access, 0=not open access	274	0.73	0	1
External enforcement					
External enforcement, gov't. organisations	number of gov't. organisations in the forest area	231	0.75	0	5
External enforcement, community-based org.	number of comm-based organisations in the forest area	231	1.48	0	4
External enforcement, forest-specific org.	number of forest-specific organisations in the forest area	231	0.93	0	4
External enforcement, private org. external	number of private organisations external to the forest	231	0.56	0	5
Other dummies					
Decentralisation	dummy, 1=in or after year of decentralisation, 0=otherwise	290	0.29	0	1
Year of the visit		290	2000	1993	2009
Regional dummy, Latin America (base is Africa)	dummy, 1=Latin America, 0=Africa	290	0.28	0	1

that have not, two-thirds restricted access for other user groups. This suggests that, over time, both more restrictive conservation measures and stricter access rules have been adopted in the forests. However, the gender composition of user groups appears to have little or no effect on vegetation density, species diversity or even on the nature of conservation measures.

Property rights to harvest and actual amounts harvested

Results of the data analysis (Table 2) confirm that the gender composition of user groups influences the right to harvest trees and bushes, but not the right to harvest soil and stones or wildlife, even after controlling for a wide range of user group and forest characteristics. Female-dominated groups are 33% more likely than male-dominated groups to have the right to harvest either trees or bushes. Female-dominated groups collect more fuelwood and less timber from the forest than do male-dominated groups. Decentralisation significantly reduces the actual amounts of fuelwood harvested. Decentralisation reforms have had a positive impact on user groups' likelihood of having property rights to harvest bushes and wildlife.

The results show that formal ownership of a resource (whether government, communal or private) does not necessarily preclude a property right to harvest. Users have rights to harvest resources regardless of ownership structures. This finding demonstrates that property rights of forests extend beyond 'ownership' to include other types of rights that do not necessarily involve formal ownership. It also demonstrates that full resource ownership is not the only or most relevant right in all resource settings nor is it the only property arrangement that creates incentives for sustainable use and management.

The impact of external actors varies. Community-based organisations (e.g. local entities, including not-for-profit and for-profit organisations) strengthen user groups' rights to harvest bushes but constrain rights to harvest timber; by contrast, government organisations in general (e.g. agricultural agencies) have no effect either on substantive rights or on harvesting levels. Forest-specific government organisations (e.g. a forestry agency of a national government), however, limit rights to woody forest products such as trees and bushes, whilst external private organisations weaken user groups' rights to trees and wildlife.

Decentralisation tends to significantly expand rights to bushes and wildlife and to shrink rights to fuelwood, even though we observe an increasing trend in such harvests over the years. Moreover, over time, user groups become less likely to have property rights to harvest trees, soil and stones and wildlife, which supports our earlier observation that access rules to forest products became more restrictive over time. Thus, although decentralisation strengthens the rights of users to some products, users appear to constrain themselves by adopting stricter access rules.

Although decentralisation expands user groups' rights to harvest, it reduces the amount user groups actually do harvest. Whereas granting free access to other users constricts a user group's right to harvest trees, it increases the actual amount of fuelwood collected

from the forest. Over time, however, user groups' rights to harvest declined, even though the amounts they collected rose.

Investment activities and management

Where the government owns the forestland, there is a high likelihood of users undertaking regeneration activities (Table 3). By contrast, external enforcement by community-based organisations or other forest-specific organisations depresses the likelihood of regeneration investments. External private organisations increase the likelihood of regeneration activities. Furthermore, wealth differentiation within user groups is associated with the tendency to conduct resource improvements.

User groups in Latin America are more likely to adopt investment activities than are those in East Africa, as shown in Table 4. For example, user groups in Africa have a 9% probability of being involved in regeneration activities, compared with 65% for user groups in Latin America. This pattern applies across all three gender categories. For example, male-dominated groups in Latin America are 15 times more likely than those in Africa to invest in regeneration activity (6% in Africa versus 89% in Latin America), and twice as likely to invest in improvements (18% in Africa versus 47% in Latin America). Overall, mixed-gender groups invest more than other groups.

In terms of investment, regional differences are much more dominant than gender differences. Property rights and ownership structures differ quite markedly (i.e. community ownership in Latin America versus government ownership in East Africa) across the two regions and may influence incentives to invest. However, we find that legal ownership does not generally influence actual investments (except for regeneration investments). It is likely that the difference in investments between Latin America and East Africa is linked to the distribution of benefits derived from forest resources. As noted above, Latin American countries are continuing to experiment with timber management and extraction under community concessions, and it is likely that some revenues generated will be invested back into forest maintenance. By contrast, revenues from East African forests are rarely invested back into forest management; they mostly revert to the central government treasury (as in Kenya). Even when revenues are retained at the district level (as in Uganda), forests must compete with needs such as health care and education infrastructure, which are accorded a higher priority.

With regard to management, mixed-gender groups are more likely to participate in rule making than male-dominated ones; they are also more likely to exclude other groups (see Table 3). Female-dominated groups are less likely to participate in monitoring and sanctioning. Decentralisation reforms increased user groups' participation in forest rule making and in monitoring and sanctioning processes. This result is consistent with the intent of such reforms, which are aimed at actively engaging communities in management decision making and responsibility.

Wealth differentiation amongst users in groups has a positive impact on rule making and sanctioning, as does the number of

Table 2. Empirical results for property rights and actual harvest^a

Category	Variable description	Property rights (probit)						Harvested from forest (OLS)					
		Right to trees		Right to bushes		Right to soil, stones		Right to wildlife		Fuelwood		Timber	
		M.E. ^b	t Stat. ^c	M.E.	t Stat.	M.E.	t Stat.	M.E.	t Stat.	M.E.	t Stat.	M.E.	t Stat.
Gender dummies	Mixed-gender group (base is male dominated)	0.01	0.11	1.00	1.00	-0.01	-0.05	0.01	0.16	5.39	0.69	3.17	0.35
	Female dominated (base is male dominated)	0.33	2.93 ^f	0.32	3.12 ^f	-0.09	-0.62	-0.03	-0.36	26.19	4.45 ^f	-15	(-1.73) ^d
User groups characteristics	No. of members in user group (log form)	0.02	0.57	0.01	0.16	0.01	0.28	0.01	0.24	-0.23	-0.12	2.13	0.9
	User group wealth differentials (1=yes)	0.04	0.44	0.15	1.67 ^d	0.07	0.69	-0.02	-0.34	0.02	0.00	-10	-1.5
	User group owns agricultural land	0.01	0.09	-0.05	-0.53	0.06	0.46	0.05	0.62	4.16	0.72	10.2	1.2
	Distance individuals in group live from forest	0.13	1.46	0.08	1.01	0.02	0.20	0.02	0.49	-2.48	-0.62	-8.8	(-1.75) ^d
Forest characteristics	Forest size (log form)	0.10	2.95 ^f	0.04	1.19	0.04	0.95	0.02	0.88	3.68	2.14 ^e	4.42	1.91 ^d
	Forest topography (1=flat ... 5=steep)	-0.09	(-2.08) ^e	-0.08	(-2.25) ^e	-0.08	(-2.04) ^e	-0.03	-1.46	4.10	2.11 ^e	-3.4	-1.28
	Government owns forestland (ref.=privately owned)	-0.21	-0.82	-0.17	-0.69	0.06	0.21	-0.18	-0.76	-9.73	-0.66	21.4	1.47
	Community owns forestland (ref.=privately owned)	0.08	0.20	-0.26	-0.70	-0.59	(-6.69) ^f	0.08	0.35	-36.74	(-1.84) ^d	30.9	1.45
	Forest owner has right to harvest (1=yes)	0.20	1.80 ^d	0.08	0.68	0.11	0.80	0.19	2.53 ^e	8.04	1.35	-3.6	-0.44
	Forest has open access (1=yes, 0=no)	-0.46	(-3.26) ^f	0.08	0.58	-0.17	-1.05	-0.1	-1.09	15.89	2.05 ^e	12	1.2
External enforcement of forest	External enforcement, govt. organisations	-0.06	-0.94	0.02	0.32	-0.05	-0.57	0.02	0.46	2.09	0.62	-3	-0.66
	External enforcement, community-based org.	-0.04	-0.78	0.15	3.42 ^f	0.02	0.38	0.04	1.29	-2.76	-1.10	-5.2	(-1.73) ^d
	External enforcement, forest-specific org.	-0.21	(-1.98) ^e	-0.16	(-1.82) ^d	-0.17	-1.28	0.09	1.22	-2.11	-0.52	-9	-1.51
	External enforcement, private org. external	-0.16	(-1.77) ^d	-0.10	-1.45	0.02	0.27	-0.13	(-3.16) ^f	-3.41	-0.85	7.18	1.41
Other dummies	Decentralisation (dummy, 1=in or after year of decentralisation, 0=otherwise)	0.24	1.26	0.36	2.72 ^f	0.22	1.00	0.3	1.80 ^e	-27.12	(-2.56) ^e	-18	-1.34
	Year of the visit	-0.04	(-2.07) ^e	0.00	-0.08	-0.05	(-2.36) ^e	-0.03	(-3.09) ^f	4.54	3.97 ^f	0.14	0.11
	Regional dummy, Latin America (base is Africa)	0.13	0.59	0.15	0.92	0.90	1.23	0.52	2.46 ^e	-0.91	-0.07	-14	-0.93
Number of observations		157		141		127		133		170		167	
Pseudo R2 for probit (or R-square for OLS)			0.2795		0.3173		0.2741		0.5113		0.3881		0.2108

a. All regressions are corrected for heteroscedasticity; b. M.E. is mean error; c. t Stat is Student t-test; d. significance at 10%; e. significance at 5%; f. significance at 1%.

Table 3. Probit results for investments, participation, sanctioning and outcomes^a

Category	Explanatory variables	Investments				Management activity				Outcome	
		Regeneration act.	Improving act.	Participation	Monitoring & sanctioning	Other groups harvesting					
		M.E. ^b	t Stat. ^c	M.E.	t Stat.	M.E.	t Stat.	M.E.	t Stat.	M.E.	t Stat.
Gender dummies	Mixed-gender group (base is male dominated)	0.03	0.78	0.06	0.52	2.61 ^f	0.05	0.70	-0.02	(-1.61) ^d	
	Female dominant (base is male-dominated)	0.03	0.84	0.08	0.77	0.67	-0.11	(-1.62) ^d	0.00	0.24	
User group characteristics	No. of members in user group (log form)	-0.01	-0.73	0.00	-0.06	(-2.41) ^e	-0.03	-1.43	0.00	-0.28	
	User group's wealth differentials (1=yes)	-0.02	-1.13	0.14	1.81 ^d	4.14 ^f	0.19	2.58 ^f	-0.01	(-2.23) ^e	
	User group owns agricultural land	0.07	2.45 ^e	0.11	1.27	1.15	0.01	0.12	0.02	2.84 ^f	
	Distance individuals in group live from forest	0.01	0.61	0.04	0.59	0.50	0.05	0.93	0.00	0.79	
Forest characteristics	Forest size (log form)	0.01	1.47	0.01	0.25	0.24	0.02	0.65	0.00	2.08 ^e	
	Forest topography (1=flat ... 5=steep)	0.00	0.37	0.03	0.96	(-2.96) ^f	0.02	1.03	0.00	2.21 ^e	
	Government owns forestland (ref.=privately owned)	0.21	7.37 ^f	0.02	0.11	0.79	-0.06	-0.42	0.00	-0.84	
	Community owns forestland (ref.=privately owned)	0.84	1.28	-0.24	-1.31	0.73	-0.04	-0.26	-0.20	-1.49	
	Forest owner has right to harvest (1=yes)	-0.03	-1.14	-0.17	(-1.83) ^d	(-2.19) ^e	0.06	0.84	0.02	1.75 ^e	
Forest external enforcement	Forest has open access (1=yes, 0=no)	0.04	1.36	0.03	0.25	1.75 ^d	0.08	0.99	0.01	1.51	
	External enforcement, govt. organisations	-0.01	-0.60	0.06	1.13	(-2.20) ^e	0.00	-0.03	0.01	2.35 ^e	
	External enforcement, community-based org.	-0.04	(-2.69) ^f	0.00	0.02	3.95 ^f	0.05	1.84 ^d	0.00	0.01	
	External enforcement, forest-specific org.	-0.06	(-2.27) ^e	0.01	0.19	(-2.83) ^f	-0.16	(-2.45) ^e	0.02	3.07 ^f	
	External enforcement, private org. external	0.06	3.15 ^f	-0.06	-1.06	(-2.68) ^f	-0.02	-0.49	0.01	2.27 ^e	
Other dummies	Decentralisation (dummy, 1=in or after year of decentralisation, 0=otherwise)	-0.02	-0.57	0.12	0.78	2.55 ^e	0.43	2.26 ^e	-0.01	-0.45	
	Year of the visit	0.01	1.14	0.02	1.32	-1.12	-0.01	-0.63	0.00	0.53	
	Regional dummy, Latin America (base is Africa)	0.85	5.26 ^f	0.55	2.79 ^f	3.85 ^f	0.14	1.03	-0.04	-1.33	
Number of observations		170	170	170	161	167	168				
Pseudo R2 for probit (or R-square for OLS)		0.5345	0.1989	0.6609	0.2947	0.4071					

a. All regressions are corrected for heteroscedasticity; b. M.E. is mean error; c. t Stat is Student t-test; d. significance at 10%; e. significance at 5%; f. significance at 1%.

Table 4. User group investments by region (proportion of user groups that have undertaken certain investment or behaviour)

Investment	Average		Male-dominated group		Mixed group		Female-dominated group	
	Total obs.	(prop.)	Obs.	(prop.)	Obs.	(prop.)	Obs.	(prop.)
Regeneration activity								
Average	290	24%	117	20%	106	37%*	67	13%
Africa	208	9%	98	6%	47	13%	63	10%
Latin America	82	65%	19	89%	59	56%	4	75%
Improvement activity								
Average	290	27%	117	23%	106	35%*	67	21%*
Africa	208	21%	98	18%	47	28%	63	19%
Latin America	82	43%	19	47%	59	41%	4	50%

Note: Figures in bold are significantly higher than the average.

community-based organisations. Wealth disparities within user groups also promote exclusionary practices. This may support the line of thinking about collective action that suggests that privileged individuals within groups can underwrite the costs of collective action by disproportionately contributing their resources towards collective activities in anticipation of greater benefits. Alternatively, it may imply elite capture where wealthier, more influential individuals are more likely to participate in critical group functions in order to influence outcomes in their favour.

Note that community-based organisations promote user group participation in forest management, especially with regard to rule making.

Conclusions

At the forest level, the lack of association between gender composition of user groups and forest condition (or between stricter harvesting rules or conservation measures and forest condition) points to a need to include and account for other influencing factors (such as biophysical, socio-economic and institutional) in an analytically comprehensive manner, which this analysis did not attempt.

The user-group level analysis offers two important findings. First, gender composition is important. Female-dominated groups tend to have more property rights to trees and bushes, and collect more fuelwood and less timber than do male-dominated or mixed groups. Mixed-gender groups participate more in forestry decision making and are more likely to exclude other groups from harvesting from the forest. Female-dominated groups invest less, sanction less and exclude less. The finding that female-dominated groups specialise in certain forest products agrees with findings by other researchers, who have demonstrated that women tend to collect certain forest products in line with their gendered roles and responsibilities. The finding that female-dominated groups are less likely than other groups to participate in decision making or invest in forest improvements is not controversial. Time constraints, male bias in the delivery of extension services

and a lack of information can depress women's investments and participation. Moreover, a huge literature has shown that, due to social and cultural norms that limit their roles to the private sphere, women often lack the experience, confidence and skills to engage in the public sphere. Mixed-gender groups, by contrast, perform consistently better in all forestry functions, including in exclusion. An earlier study has suggested that mixed groups exploit the complementary advantages of men and women and have better access to information and services from external agents. Although policy makers and practitioners are advised to seek interventions that strengthen women's groups by delivering information, technologies and capacity-building programmes in formats that take into account their constraints, they should also recognise, support and strengthen other types of groups, such as mixed-gender ones. However, before designing interventions for mixed-gender groups, it is important to gain better understanding of their structure and functioning, including the nature and extent of cooperation, leadership and the flows of information, knowledge and benefits between male and female members.

Second, the implementation of decentralisation reforms has strengthened user group rights to forest products yet has reduced user groups' actual harvest levels. Furthermore, decentralisation has encouraged user groups to participate in forest management activities, including decision making and sanctioning. These gains agree with the normative expectations of decentralisation reforms. By expanding and strengthening property rights and management responsibilities, the reforms were intended to create incentives for sustainable use and management. However, such incentives are even more effective when users also have full rights to resource benefits, including incomes.


Third, regional differences exist. User groups in Latin America tend to invest more than those in Africa. Whilst the exact reasons for this are not immediately evident, we hypothesise that Latin America's longer history of and experience in community involvement (the outcome of longstanding struggles in broad policy reforms) in forest management may have influenced the distribution of benefits to community actors.

A final note on the role of external organisations is in order. Community-based organisations appear to strengthen use rights to products other than timber, just as forestry agencies restrict rights to trees and timber harvesting. However, few of these organisations appear to have any positive influence on user group investments in improvements and regeneration. It is unclear why various organisations with forest-related mandates impede (rather than enhance) the propensity of user groups to invest in activities that can potentially enhance forest sustainability. Further research is needed to establish the factors behind this incongruence.

References

- Agarwal, B. 2010 Does women's proportional strength affect their participation? Governing local forests in South Asia. *World Development* 38(1): 98–112.
- Agarwal, B. 2001 Participatory exclusions, community forestry and gender: an analysis and conceptual framework. *World Development* 29(10):1623–1648.
- Agrawal, A., Yadama, G., Andrade, R. and Bhattacharya, A. 2004 Decentralization, community, and environmental conservation: joint forest management and effects of gender equity in participation. CAPRI Working Paper No. 63. International Food Policy Research Institute, Washington, DC.
- Andersson, K.P., Fleischman, F., Jagger, P., Luckert, M., Meinzen-Dick, R., Mwangi, E. and Ostrom, E. In press. Unpacking decentralization: a case study of Uganda's forestry reforms. CAPRI Working Paper. International Food Policy Research Institute, Washington, DC.
- Andersson, K.P., Gordillo, G. and van Laerhoven, F. 2009 local governments and rural development: comparing lessons from Brazil, Chile, Mexico, and Peru. University of Arizona Press, Tucson, AZ, USA.
- Andersson, K.P. and Pacheco, D. 2004 The historical origins of modern forestry in Bolivia: the challenge to govern a vast land. *Policy Matters* 13(November): 40–49.
- Gibson, C., Williams, J.T. and Ostrom, E. 2005 Local enforcement and better forests. *World Development* 33(2): 273–284.
- Mwangi, E., Meinzen-Dick, R.R. and Sun, Y. 2009 Does gender influence forestry management? exploring cases from East Africa and Latin America. CID Graduate Student and Research Fellow Working Paper No. 40. Center for International Development, Harvard University, Cambridge, MA, USA.
- Westermann, O., Ashby, J. and Pretty, J. 2005 Gender and social capital: the importance of gender differences for the maturity and effectiveness of natural resource management groups. *World Development* 33(11): 1783–1799.

The authors acknowledge the support of the United States Agency for International Development's Sustainable Agriculture and Natural Resources Management Collaborative Research Support Program under terms of Cooperative Agreement Award No. EPP-A-00-04-00013-00. The authors also appreciate support from the Ford Foundation. We are grateful to our colleagues based at the International Forestry Resources and Institutions research program's collaborative research centres in Bolivia, Kenya, Mexico and Uganda. Useful comments from Elena Petkova and Maria Brockhaus are greatly appreciated as is Imogen Badgery-Parker's careful editing.

 Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra
Swiss Confederation
Federal Office for the Environment FOEN

 FORDFOUNDATION

www.cifor.cgiar.org

www.ForestsClimateChange.org



Center for International Forestry Research

CIFOR advances human wellbeing, environmental conservation and equity by conducting research to inform policies and practices that affect forests in developing countries. CIFOR is one of 15 centres within the Consultative Group on International Agricultural Research (CGIAR). CIFOR's headquarters are in Bogor, Indonesia. It also has offices in Asia, Africa and South America.

