

Exploring Forest Governance: Insights, Challenges, and Lessons Learned

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Prepared for the
“Workshop on the Workshop IV”
Bloomington, Indiana
June 3-5, 2009

Abstract

Research on forest governance has intensified in the past decades with evidence that efforts to mitigate deforestation and encourage sustainable management have had mixed results. This paper considers the progress that has been made in understanding the range of variation in forest governance and management experiences. It synthesizes findings of recent interdisciplinary research efforts, with particular emphasis on work carried out by the Center for the Study of Institutions, Population, and Environmental Change at Indiana University. By identifying areas of progress, interesting results, and enduring conundrums, the discussion will point to policy implications and priorities for research.

INTRODUCTION

How can forests be governed productively and sustainably? In an age of environmental degradation, deforestation, and global climate change, forest governance has become a central topic for researchers from many disciplines. Despite several decades of intensive efforts by governments, non-governmental organizations, and environmental activists to improve forest conservation and sustainable management, results have been mixed. At the same time, research conducted in forest communities around the world has found a range of variability; some groups of people have governed their forests sustainably over long time periods, while other groups have not. We still have much to learn about why some forests endure and others suffer degradation and deforestation. The purpose of this paper is to offer a brief overview of what has been learned, the persistent challenges and the enduring puzzles of forest governance, and the implications for policy. While drawing broadly on published research, I focus on the collaborative work and results of the researchers associated with the Center for the Study of Institutions, Population, and Environmental Change (known as CIPEC) at Indiana University, and the associated International Forest Resources and Institutions Research Program (hereafter, IFRI). Similar to many research efforts that have contributed to current knowledge, CIPEC researchers work across disciplinary boundaries, integrate multiple methodologies, and conduct studies that involve natural and social scientists working together on shared questions, and benefitting from each others' theoretical, technical, and practical skills.

A large body of research on forest change and management has focused on the causes and consequences of deforestation. If we understand the causes of deforestation—the reasoning goes—then we should be able to mitigate them, and move toward better forest governance. We now know that the proximate causes of deforestation vary across locales and regions (Geist and Lambin 2001; 2002; Moran and Ostrom 2005), and few of these causes prove easy to address, particularly when they are associated with underlying causes, such as

poverty, inadequate access to land or natural resources, and social inequities. Studies of causes of forest destruction have increased our knowledge of the complexity of the problem, but have helped little to improve forest governance. Another approach to move toward better forest governance involves studying locales where forests have been governed successfully for extended time periods. Here, successful forest governance encompasses conservation or expansion of forest cover along with its associated diversity of flora and fauna, and it may include a variety of extractive uses. With this approach, the rationale is that we may learn how to govern effectively by studying successful cases. A third approach involves studying a range of governance approaches and comparing forest outcomes in order to identify patterns. All of these approaches make a contribution. But after nearly two decades of studying forest governance in communities in Latin America, and learning about cases in other parts of the world, I realize that most cases of forest governance entail a combination of shortcomings and successes; they present reasons for hope as well as concern. Even the most outstanding examples of forest governance can come to teeter on the edge of catastrophe due to internal strife, external interventions, or rapid transformational processes. Thus, one of the main lessons is that there is no such thing as a guaranteed, calamity-proof means of governing forests well.

The discussion begins with outlining the major questions that have driven recent research on forest governance and considering basic definitions and concepts. It moves on to the central insights and lessons that have emerged in recent years, especially results emerging from CIPEC research. The paper closes by considering the implications for policy and the challenges that lie ahead.

DEFINITIONS

Exploring forest governance requires definitions of central concepts, especially governance, its allied term, institutions, and forest conservation as I use them here.

Governance is the exercise of authority including the processes, acts, and decisions of a group or entity within a given context, in this case a forest. Institutional arrangements are integral to governance. Many of the world's forests fall under multiple levels of governance, including local, regional, and national levels. For the purposes of this paper, successful governance involves maintaining forests in good condition with respect to the biome, ecosystem functions, appropriate species composition, and biodiversity. Successful governance prevents interventions or transformations that lead to permanent degradation of the forest ecosystem or loss of constituent flora and fauna. Thus successful forest governance aims for conservation or sustainable management.

Institutions are rules in use. They establish what people may do, must do, or must not do in a specific situation (Ostrom, et al. 2002). Governance includes the development and enforcement of institutions, which may be formal or informal. What matters is that most people recognize them as legitimate and use them as a guide for their behavior. When people disregard an institution, they know that they are violating a respected rule. If rules are written but not recognized or enforced, they are not institutions, they are merely abstractions put down on paper.

Forest conservation refers to the maintenance of a forest, including ecosystem functions and its native biotic and abiotic components. Forests experience successional processes and impacts from extreme weather events and human interventions, but conservation exists if perturbations of natural or human origin permit recuperation. Thus forest conservation, as defined here, may allow for harvesting forest products and other transformations, as long as they do not cause permanent degradation or destruction of the ecosystem, its functions, and its components. However, most forests have already experienced irreversible transformations due human activity over the past 10,000 years (Williams 2003). Therefore we must accept that forest conservation is a relative concept. We cannot be sure what a forest was originally; we only know with confidence what it is now or was in recorded history. Our vision of what a forest is, or

should be, is subject to our experience, current knowledge, and convictions. As a result, forest conservation means different things to different people, and multiple understandings and expressions of conservation exist. This definition endeavors to embrace this range of variation.

MAJOR QUESTIONS AND ISSUES

Research on forest governance encompasses a broad range of questions. Here I address the central question: “How do different forms of governance influence forest outcomes?” This question concerns the kinds of tenure, institutional arrangements, and management regimes associated with sustainable forest management. A related question is “What conditions are conducive to effective governance?” I cannot cover all of the current understanding, so I aim to hit the main points.

LESSONS REGARDING FOREST GOVERNANCE

What have we learned in answer to the question, “How do different forms of governance influence forest outcomes?” The underlying goal of this question is to discover if there is any kind of governance that works better than others.

A key finding is that no form of tenure or governance regime is necessarily more successful than any other. In other words, any form of tenure may be successful, any form of tenure may fail. Tenure regimes have received particular attention in discussion of sustainable forest governance. Does private, public, or communal tenure work better than others? The short answer is that any form of tenure, including composite tenure and various co-management arrangements, can result in well-managed or poorly managed forests (Moran 2005). The local context influences the type of tenure that is appropriate, and that includes the specific histories, political economic processes, social relationships, biophysical characteristics and forest conditions, and people’s experiences in managing natural resources. If there is no experience

with collective action or joint resource management, common property is unlikely to be successful, and private or public arrangements may be more suitable. At the same time, private and public property regimes have led to serious problems in forests when national governments have imposed them from the top down, without comprehension of or respect for pre-existing local arrangements.

Factors that do need to be present for any forest governance regime to work are (1) the owner or owners must have secure tenure, (2) institutions must support sustainable management (3) institutions must fit the local context, and (4) monitoring must exist and rules must be enforced.

These are a subset of design principles identified by Ostrom (1990) as key elements in long-enduring common property regimes. The principles I list here appear to be integral to forest governance for all forms of tenure. I will elaborate on each one.

Tenure must be secure

A key aspect of governance success is that the owner or owners have secure tenure. Whether tenure involves private, public, or communal ownership, rights to the forest must be recognized as legitimate and enduring by formal government entities and the general population, especially the neighbors. Secure tenure has long been known to be a necessary component of good governance. It includes title (or similarly strong recognition) with rights to make decisions and use the resources, definite boundaries, and clear identification of the owner or owners (Banana and Gombya-Ssembajjwe 2000). Land-titling programs have attempted to provide such secure tenure under private ownership, and governments have nationalized forests in order to provide secure tenure under public ownership. Privatization and nationalization of forests grew in part out of assumptions that common-property arrangements were bound to fail, and that local groups lacked the capacity to govern themselves and their resources. Evidence has accumulated that nationalization tends to undermine or abolish local institutions, which are often invisible to national governments (Scott 1998). The effect of nationalization often has been to

terminate previously secure tenure and resource rights held by individuals or local groups. When secure tenure and rights are lost, local people have no confidence that they could benefit by limiting their forest exploitation. Besides, people usually feel angry and want compensation when they lose rights to land and resources. Few governments are prepared to dedicate adequate resources to protect nationalized forests or to confront conflicts with local people that may ensue. Without protection, forests can become open-access zones subject to uncontrolled exploitation and degradation (Jodha 1992; Ostrom 2005). For example, the creation of the Monarch Butterfly Reserve in Mexico sought to protect the endangered forests that shelter monarch butterflies during their winter hibernation. Declaration of the reserve stripped local communities of their rights to use those forests, even though they maintained legal land titles (Tucker 2004b). The government lacked the resources to conduct consistent monitoring and enforcement, and deforestation rates continued unabated or accelerated following the reserve's establishment (Brower, et al. 2002). Private property may also fail to protect forests. Privatization often involves dividing a forest into parcels for individual management. From an ecological standpoint, subdivision of forests can undermine ecosystem functions and lead to deterioration (Mwangi 2007). Moreover, not all owners have the management skills or desire to manage forests sustainably; some owners would just as soon transform forests to other uses.

Secure tenure through private and public forest ownership has not been sufficient to lead to good governance, and this has contributed to greater interest in common property. Scholars have discovered that with secure tenure and other favorable conditions, groups can govern communal forests successfully (Becker and León 2000; Ghate 2004; Gibson 2001; McKean 1992; McKean and Ostrom 1995; Netting 1976; Tucker 2004a). Moreover, common-property regimes can offer benefits in terms of equity and reduced bureaucracy (Runge 1986). When local groups have experience cooperating, share common goals, trust each other, and make the investments of time and labor to govern a forest jointly, common-property ownership can be as effective, or sometimes more so, than private or public ownership. But like other forms of

governance, common property regimes can fail if they lack basic elements for success, or circumstances mitigate against them.

Institutions should support sustainable management and conservation

Secure tenure represents one piece in the set of contributing factors for successful forest governance. If a forest is to survive, institutions must support sustainable management and conservation. Interestingly, this caveat is usually taken for granted; most studies assume that institutions will be designed to sustain forests in perpetuity. But institutions can be designed to transform forests efficiently to other land uses, or to support rapid exploitation of forest resources. Nations have granted timber concessions to companies following institutions based on the profit motive, and they clear forests. Colonization programs have been designed with institutions that require transforming forest to other land uses. It is also possible that institutions designed to protect forests actually encourage deforestation. In Honduras between 1974 and 1992, the nation owned all trees and the right to make management decisions even when the land titles belonged to private or communal owners. Local communities lost rights to manage or use forests, and the nation suffered high losses of forest cover to fires as angry forest owners laid claim to their land by eliminating trees (Ascher 1999).

Institutions need to fit the local context

As the previous example indicates, well-intentioned institutions can backfire when imposed on locales and people with different perspectives from those who created the institutions. Imposition of property rights from the top-down tends to discourage rather than promote sustainable management practices (Ostrom and Nagendra 2006). Rules that are imposed rather than developed within local circumstances may lack legitimacy and appear unreasonable to local people. Extensive research of common-property regimes around the world has found an immense variety of institutional arrangements that meet local needs and protect natural resources successfully (Ostrom 2005). Fitting the local context requires that forest users be involved in designing and changing the rules in ways that work for their needs. This is true

wherever multiple stakeholders use forests, whether it is under a private, public, communal or composite tenure regime. In a comparative analysis of 163 forests, including public parks, private and common property, Hayes (2006) found that the ability of users to make rules was strongly associated with vegetation density, as an indicator of forest condition. Where users had rights to design rules to manage a forest, vegetation density was greater, but forests were sparser where users were not involved in rule making (Hayes 2006). Moreover, local people are more likely to have intimate knowledge of a resource base than external entities (Cabarle, et al. 1997) and, therefore have an advantage in figuring out ways to manage a resource sustainably.

Monitoring and enforcement are key for forest conservation

One of the most significant findings for forest governance is that monitoring and enforcement are strongly associated with maintenance of good forest conditions. These results have emerged with large-N comparative studies of forest governance, including analyses of IFRI data. In a comparative study of 178 user groups in 220 forests, statistical analysis showed that forests with regular monitoring were more likely to be in good condition than forests with sporadic monitoring, This was true regardless of whether the group was formally organized, its level of dependence on the resource base, or the degree of social capital (Gibson, et al. 2005). In a related study, local enforcement was significantly associated with the likelihood of forest regeneration (Chhatre and Agrawal 2008).

LESSONS LEARNED FROM COMPLEXITY, CONTEXT, AND CONTINGENCY

These elements—secure tenure, locally appropriate institutions that protect forests, and monitoring and enforcement—interact with a series of contingent factors. The effect of one variable can change the state or impact of other variables (Chhatre and Agrawal 2008), thus context matters (Dietz and Henry 2008). The result is complexity, and I will discuss several outstanding lessons that have come from recognizing the contingent, complex, and sometimes

unpredictable interplay among variables that influence forests and prospects for successful governance.

There are no panaceas

There is no single formula for successful forest governance. Blueprint thinking, where a single model or set of institutions is imposed unilaterally, has failed consistently to build successful forest governance (Ostrom 2007; Ostrom, et al. 2007; Ostrom and Nagendra 2006).

Governance is a process

Institutions have to be flexible enough to change in pace with political, economic, and social processes; they also need to adapt to and make choices about forest change. One of the hallmarks of enduring systems is the capacity to adapt to change over extended time periods. Many traditional systems have been lost, however, due to their elimination by privatization or nationalization processes, pressures from outside incentives, and socioeconomic or political transformations. Those systems that remain may face changes that occur too quickly to experiment with institutional revisions, as when an external government creates a protected area in a forested region that previously was managed by local users. Effective governance can be undermined or compromised when rules are not allowed to change, when rules are changed or imposed without respect for the local contexts, or when processes of change occur too quickly for managers to make measured assessments and adjustments in institutions for managing the resources. Governance is never finished, the people who participate in governing forests must adapt approaches and have sufficient autonomy that they can adjust institutions and strategies to meet changing circumstances.

Governance must adapt to forest change processes

To speak the obvious, forests are not static. Everyone who works in forests knows this, as do local forest owners and managers. But many top-down governance efforts have fallen short in designing institutions that deal effectively with natural successional processes. In addition to natural succession, forests may experience damage from severe weather events, fire, invasive species, and human interventions. Current management regimes, particularly top-down regimes designed by higher-level governments or firms, may have inadequate comprehension of natural processes specific to a given forest. Policies may be designed for a certain kind of forest or specific species composition, or rest on assumptions about what the forest should be, rather than acknowledging natural succession or human needs.

An example of governance shortcomings in managing natural forest transitions comes from the western United States. Forest fires have increased in severity after decades of a policy designed to prevent fires. Historically, forest fires occurred frequently and burned off dry underbrush before it accumulated. The policy of stopping fires allowed underbrush and debris to build up in the understory, which serve as kindling for lightning strikes or humanmade fires to ignite into unprecedented conflagrations. Today there is broad recognition that the policy of fire prevention has created conditions favorable to wildfires. Ironically, the forest composition that these policies aim to protect were in fact created by the indigenous people who started using fire to clear underbrush thousands of years ago (Pyne 2001).

An example of the difficulty that can arise when forests undergo natural succession comes from Yellowwood State Forest in Indiana. A group of concerned citizens and government authorities have come to odds as succession has changed forest composition from sun-tolerant to shade-tolerant species. The result has been a decline in some of the commercially valuable trees and fodder for deer and other wild animals. The state owns the forest, it wants to increase logging, as do hunters and other groups who want to maintain the sun-tolerant species. A number of other residents and environmental groups oppose logging and argue that the forest should be allowed to mature naturally. They believe that logging will cause soil erosion and

runoff into a freshwater lake that is one of the few places in the region where freshwater shrimp survive. The shrimp die in murky or polluted water, and thus anti-logging activists argue that logging poses a threat to a locally endangered species (Arnold, et al. 2008).

In these cases, governance needs to find a way to manage forests, and make decisions about natural succession, forest change, and potential ramifications for the different species and interest groups that will be impacted by whatever choice is made.

Partnerships and deliberative processes support successful governance

In a complex world undergoing constant change, individuals, communities, and higher-level entities often come into conflict over how to govern forests. Given contrasting goals and differences in perceived knowledge, there are multiple perspectives and objectives. Recent studies of successful governance point to the importance of linkages among groups and entities operating at different levels, or in parallel, with local forest users and owners. Studies of integrated conservation and development projects (ICDPs) sponsored by the United Nations Development Program (UNDP) show that successful cases had formed partnerships with groups that represented a wide range of expertise, such as fundraising, empowerment building, marketing, business networking, knowledge transfer, and research and training (Berkes 2007). Through partnerships, local groups can access resources, information, technology, and training that support their governance efforts. When dealing across levels of governance, where local, regional, and national government entities may compete for influence and contrast in their goals or understanding, deliberative processes can increase the possibility of balanced and nuanced decision making, and institutional design, that take multiple perspectives into consideration.

Cross-level linkages and partnering also can serve to reinforce the commitment to conservation and protective institutions when alternatives to forest conservation become attractive. Not all forest owners want to preserve forests indefinitely, and even if they do wish to conserve forests, circumstances may compel them to change their minds. Private forest owners

may decide to harvest timber if prices rise or if they face an urgent need for cash. New market opportunities may convince owners to transform forests to other land uses. In the Midwest USA, the recent demand for ethanol, as a biofuel, drove up corn prices. A number of farmers responded by clearing forests on their land to plant more corn. Similarly, indigenous communities with communal forests have been known to accept timber contracts in order to finance public works, such as roads or schools; this happened in the 1970s in a Honduran community where I work. Neither are national governments immune to changing market pressures. The discovery of petroleum in forest reserves in Ecuador and Guatemala has led to the opening of these supposedly protected areas to oil drilling and concomitant environmental degradation. Thus commitment to forest conservation in any governance regime can be undermined by evolving personal, community, or market pressures. The opposite is also true; experience with forest degradation or perceived risks to valued forest resources can motivate owners to deeper commitment to conservation (Tucker 2008). Because forest owners at any level can face changed incentives that affect decision making, the chances of successful governance increase when individual owners or user groups are linked into networks with multiple levels of oversight and reinforcing relationships. Moreover, partnerships have the potential to restrain a powerful actor, such as the state, which could abrogate the governance of less powerful stakeholders. For example, the Kayapó people of Brazil discouraged the state from building a dam on their territory through connections with international environmental organizations and famous personalities. Together, they carried out a media campaign to gain international support to stop the dam. Under international pressure, Brazil's government shelved the plan.

POLICY IMPLICATIONS AND CONCLUDING THOUGHTS

Where do we go from here? We know a little bit, but we are far from a thorough and nuanced comprehension of the long-term impacts of our policy and governance choices, particularly in an

era of climate change and unprecedented demands upon forest resources. Our world now supports 6 billion people, and nearly one-sixth do not have enough food to meet physiological needs. Even more people lack one or more basic needs: adequate shelter, health care, education, employment, and opportunities to develop individual capacity to the fullest extent.

Forests will continue to change, as will the social, political, and economic contexts that impinge upon forest management. People are more likely to protect and cherish forests that they see as benefitting them through economic value, recreational worth, spiritual meaning, or emotional solace, and in which they have some influence over decisions. Therefore, collaborative efforts that bring stakeholders together, work out management plans, and resolve conflicts appear to be promising as means for people to become invested in the survival of the forests, whether that involves commercial harvesting, ecotourism, swidden fields with long fallows, aesthetic or religious values, or other desired uses.

We have made progress in identifying patterns and principles associated with successful forest governance even as we recognize the complex, contingent, and multiple interrelationships that shape the specific challenges of governance for each forest. If all forests were to be governed by the principles identified here: secure tenure, institutions that protect forests and fit local contexts, monitoring and enforcement, avoidance of blueprint thinking, governance that adapts to social, economic, political and forest change processes, and partnerships within and across levels, governance would still fail in some instances. We do not know and cannot predict how current and future events will impact forests and their governance. From the outset, we must accept the possibility of failure, and see such cases as an opportunity to learn. Our risks of failure at a global level will be greatly diminished if the world's forests are governed by a multiplicity of approaches. That is, while recognizing general principles for successful governance, each forest should be governed with respect to its specific contexts. The best defense and preparation for the unexpected is for governance systems to encompass diverse forms of knowledge and perspectives, and engage a variety of appropriate institutions,

recognizing that some will not work well and many will need to evolve continually. Diversity gives systems more options for adapting to unpredictable or extreme events. More forests are likely to survive, and humanity will be more likely to thrive, if policies and programs allow governance arrangements to embrace the richness of opportunities to manage forests with respect to specific contexts. This implies that a balance must be attained among different powers and stakeholders in political processes that shape governance on the ground.

Of all the challenges that we face, perhaps the most severe, is changing a world in which discrepancies of power and access to resources are profound and appear to be worsening. Many of the factors and principles of successful governance mentioned here rest upon the assumption that power and access to resources are relatively equitable, but that is seldom the case. Any of these principles can be at risk of intervention from the more powerful stakeholders or higher level entities. Therefore, the success of these principles depends upon sharing power within and across groups, and that must include empowerment of the disenfranchised. These are often the people who live in and around forests, or have been dislocated to forest fringes by conservation efforts. They may have few other options than exploiting forests to survive. If they are not given power in decision-making processes and rights to resources, forest governance cannot be successful. As Scott (1985) convincingly argued, the weak have weapons that can undermine the best laid plans of the powerful. It is not the *modus operandi* of states to willingly share power or relinquish it to local levels, particularly if that means empowering marginalized groups (Ascher 1999; Scott 1998). But such power sharing needs to be a part of most, if not all, approaches for forest governance, if they are to succeed in the long term. At the same time, the kinds of power that need to be shared will vary, as will the ways it may be accomplished. Decentralization and community-based forestry have been attempts to empower local actors, as well as reduce state costs, but because they followed a primary model, the results have been mixed and illustrate the pitfalls of blueprint thinking. Ultimately, building genuine partnerships that share power within and across levels in

varied ways, and creating the mutual trust and respect that implies, may be the most elusive and increasingly important of the elements associated with successful, sustainable forest governance.

References

- Arnold, Gwen, Jacqueline Bauer, Burnell Fischer, Forrest Fleischman, Megan Midgley, Sarah Mincey, Monica Paulson Preibe, Francisco K. Souza, Catherine M Tucker, and Sergio Villamayor-Tomas
2008 An Initial Visit to the Yellowwood Lake Watershed Forest: Report to the Yellowwood Lake Watershed Planning Group. Bloomington, IN: Indiana University.
- Ascher, William
1999 Why Governments Waste Natural Resources: Policy Failures in Developing Countries. Baltimore: Johns Hopkins University Press.
- Banana, Abwoli Y., and William Gombya-Ssembajjwe
2000 Successful Forest Management: The Importance of Security of Tenure and Rule Enforcement in Ugandan Forests. *In* People and Forests: Communities, Institutions, and Governance. C.C. Gibson, M.A. McKean and E. Ostrom, eds. Pp. 87-98. Cambridge, MA: MIT Press.
- Becker, C. Dustin, and Rosario León
2000 Indigenous Forest Management in the Bolivian Amazon: Lessons from the Yuracaré People. *In* People and Forests: Communities, Institutions and Governance. C.C. Gibson, M.A. McKean and E. Ostrom, eds. Pp. 163-192. Cambridge, MA: MIT Press.
- Berkes, Fikret
2007 Community-Based Conservation in a Globalized World. *Proceedings of the National Academy of Sciences* 104(39):15188-15193.
- Brower, Lincoln P., Guillermo Castilleja, Armando Peralta, Jose Lopez-Garcia, Luis Bojorquez-Tapia, Salomon Diaz, Daniela Melgarejo, and Monica Missrie
2002 Quantitative Changes in Forest Quality in a Principal Overwintering Area of the Monarch Butterfly in Mexico, 1971-1999. *Conservation Biology* 16(2):346-359.
- Cabarle, Bruce, Francisco Chapela, and Sergio Madrid
1997 Introducción: El Manejo Forestal Comunitario Y La Certificación. *In* El Manejo Forestal Comunitario En México Y Sus Perspectivas De Sustentabilidad. L. Merino, ed. Pp. 17-34. Cuernavaca, México: Centro Regional de Investigaciones Multidisciplinarias, Universidad Nacional Autónoma de México.
- Chhatre, Ashwini, and Arun Agrawal
2008 Forest Commons and Local Enforcement. *Proceedings of the National Academy of Sciences* 105(36):13286-13291.
- Dietz, Thomas, and Adam Douglas Henry
2008 Context and the Commons. *Proceedings of the National Academy of Sciences* 105(36):13189-13190.
- Geist, Helmut J., and Eric F. Lambin
2001 What Drives Tropical Deforestation? Louvain la Neuve, Belgium: LUCS International Project Office.

- Geist, Helmut J., and Eric F. Lambin
2002 Proximate Causes and Underlying Driving Forces of Tropical Deforestation. *BioScience* 52:143-149.
- Ghate, Rucha
2004 *Uncommons in the Commons: Community Initiated Forest Resource Management*. New Delhi: Concept Publishing Company.
- Gibson, Clark
2001 Forest Resources: Institutions for Local Governance in Guatemala. *In Protecting the Commons: A Framework for Resource Management in the Americas*. J. Burger, E. Ostrom, R.B. Norgaard, D. Policansky and B. Goldstein, eds. Pp. 71-89. Washington, D. C. : Island Press.
- Gibson, Clark C., John T. Williams, and Elinor Ostrom
2005 Local Enforcement and Better Forests. *World Development* 33(2):273-284.
- Hayes, Tanya
2006 Parks, People and Forest Protection: An Institutional Assessment of Effectiveness of Protected Areas. *World Development* 34(12):2064-2075.
- Jodha, N. S.
1992 *Common Property Resources: A Missing Dimension of Development Strategies*. Washington, DC: The World Bank.
- McKean, Margaret A.
1992 Management of Traditional Common Lands (*Iriaichi*) in Japan. *In Making the Commons Work: Theory, Practice and Policy*. D.W. Bromley, ed. Pp. 63-98. San Francisco: Institute for Contemporary Studies.
- McKean, Margaret A., and Elinor Ostrom
1995 Common Property Regimes in the Forest: Just a Relic from the Past?. *Unasylva* 46(1):3-15.
- Moran, Emilio F.
2005 Human-Environment Interactions in Forest Ecosystems: An Introduction. *In Seeing the Forest and the Trees: Human-Environment Interactions in Forest Ecosystems*. E.F. Moran and E. Ostrom, eds. Pp. 3-22. Cambridge, MA: MIT Press.
- Moran, Emilio F., and Elinor Ostrom, eds.
2005 *Seeing the Forest and the Trees: Human-Environment Interactions in Forest Ecosystems*. Cambridge, MA: MIT Press.
- Mwangi, Esther
2007 The Puzzle of Group Ranch Subdivision in Kenya's Maasailand. *Development and Change* 38(5):889-910.
- Netting, Robert McC.
1976 What Alpine Peasants Have in Common: Observations on Communal Tenure in a Swiss Village. *Human Ecology* 4(2):135-146.
- Ostrom, Elinor
1990 *Governing the Commons*. Cambridge: Cambridge University Press.
- 2005 *Understanding Institutional Diversity*. Princeton: Princeton University Press.
- 2007 A Diagnostic Approach for Going Beyond Panaceas. *Proceedings of the National Academy of Sciences* 104(39):15181-15187.
- Ostrom, Elinor, Thomas Dietz, Nives Dolšak, Paul C. Stern, Susan Stonich, and Elke U. Weber, eds.
2002 *The Drama of the Commons*. Washington, DC: National Academy Press.
- Ostrom, Elinor, Marco A. Janssen, and John M. Anderies

- 2007 Going Beyond Panaceas. *Proceedings of the National Academy of Sciences* 104(39):15176-15178.
- Ostrom, Elinor, and Harini Nagendra
2006 Insights on Linking Forests, Trees, and People from the Air, on the Ground, and in the Laboratory. *Proceedings of the National Academy of Sciences* 103(51):19224-19231.
- Pyne, Stephen J.
2001 The Fires This Time, and Next. *Science* 294:1005-1006.
- Runge, Carlisle Ford
1986 Common Property and Collective Action in Economic Development. *World Development* 14(5):623-635.
- Scott, James C.
1985 *Weapons of the Weak: Everyday Forms of Peasant Resistance*. New Haven: Yale University Press.
- 1998 *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed*. New Haven: Yale University Press.
- Tucker, Catherine M.
2004a Aiming for Sustainable Community Forest Management: The Experiences of Two Communities in Mexico and Honduras. *In Working Forests in the Tropics: Conservation through Sustainable Management?* . D. Zarin, J. Alavalapati, F.E. Putz and M.C. Schmink, eds. Pp. 178-199. New York: Columbia University Press.
- 2004b Community Institutions and Forest Management in Mexico's Monarch Butterfly Reserve. *Society and Natural Resources* 17:569-587.
- 2008 *Changing Forests: Collective Action, Common Property and Coffee in Honduras*. Dordrecht: Springer Academic Press.
- Williams, Michael
2003 *Deforesting the Earth: From Prehistory to the Global Crisis*. Chicago: University of Chicago Press.