Scales of Governance in Carbon Sinks
Global Priorities and Local Realities

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Global environmental problems are often complex and interconnected, with effects at different scales, local to global. An increasing number of environmental issues exhibit such linkages, both in effect and in driving force, including loss of biodiversity, land degradation, and climate change. It is typically recognized that management of all commons, including the global atmosphere and forests, requires robust institutions to coordinate and cooperate at different scales (Ostrom and Ahn 2003). This involves interactions among institutions both horizontally (spatially) and vertically (across levels of organization), from the global to the local.

In recent years, global environmental agreements have proliferated. There have been some two hundred global environmental agreements and protocols, including the United Nations Framework Convention on Climate Change (UNFCC) and its Kyoto Protocol. The Kyoto Protocol is the first legally binding commitment by nations to curb greenhouse gas emissions to 5 percent below 1990 levels. Under the Protocol, the so-called flexible mechanisms have been established to combat greenhouse gas emissions cost-effectively. One of these mechanisms, the Clean Development Mechanism (CDM), allows developed countries to offset emissions through energy or forest projects that mitigate carbon dioxide from the atmosphere and allows developing countries to voluntarily participate in efforts to reduce greenhouse gases in return for payments from developed countries. The CDM is considered by many developing countries an important and attractive opportunity

to receive compensation for taking paths of lower emissions (for example, Costa Rica has been a critical advocate of land management projects).

Forests gained an important platform in the climate debate, brought into focus in Kyoto in 1997, with the realization that the world's forests, including tropical forests, were a net absorber of carbon dioxide (Adger and Brown 1995). In its Third Assessment Report (TAR), the Intergovernmental Panel on Climate Change (IPCC) estimated that deforestation (primarily in the tropics) accounts for about one-quarter of annual global emissions of carbon dioxide (Intergovernmental Panel on Climate Change 2001). While unmanaged forest stands absorb carbon dioxide, it is their destruction and resultant massive carbon dioxide emissions that are of most concern.

Climate policy discussion on land use change and forestry has revolved around the uncertainties of accurate monitoring of carbon emissions, given already limited information on deforestation rates and amounts of standing biomass. While proven scientific methods exist and have been used to quantify biomass and deforestation rates, such methods were ignored by many policy makers and other real challenges were not recognized—for example, leakage and methods of setting baselines were the primary technical challenges while local social issues were also paramount. The political process has rapidly adopted the challenge of incorporating land use change and forestry into its agenda without a sound understanding of their scientific, technical, and social challenges. Four main approaches exist to sequester and sink carbon or prevent the emissions of carbon through forest systems. These include (1) to maintain existing carbon pools (slowing deforestation and degradation), (2) to expand existing carbon sinks and pools through forest management, (3) to create new carbon sinks and pools by expanding tree and forest cover, and (4) to substitute renewable wood–based fuels for fossil fuels (Intergovernmental Panel on Climate Change 2000).

The development and push for land management in the CDM has come from both developing and developed countries. In particular, some countries in Central and South America (for example, Bolivia, Belize, Costa Rica, Chile, Colombia, and Guatemala) were strong proponents, with the perspective that the critical service their forests provide to the planet is a service that deserves compensation. The push against land management in the CDM was spearheaded by northern environmental nongovernmental organizations (NGOs) with support from the European Union, some developing countries, and some small island states. Ultimately, implementing such schemes under the Protocol calls for unprecedented levels of international

cooperation, maybe even signaling a paradigm shift in the way that sovereign states interrelate, particularly regarding land (Fogel 2002, 2004).

The main aim of this chapter is to explore land management in the context of the CDM negotiations and how this policy plays out on the ground. The first section of the chapter draws on twenty elite interviews, extensive participant observation, and informal discussions with policy makers, NGOs, scientists, and other actors at the UNFCCC negotiations. The chapter then reviews a number of IPCC reports, specifically the IPCC (1990) Summary for Policy Makers of the IPCC Response Strategies Working Group, the IPCC (2000) Special Report on Land Use Change and Forestry (SRLUCF), the IPCC (1995) Second Assessment Report, and the IPCC (2001) TAR. The chapter then analyzes the local story lines, conflicts, and institutional dynamics in two pilot projects in Bolivia and Brazil. The final section of the chapter discusses the theoretical and policy implications of these findings relating to scale.

Definitions: Scale, Institutions, and Discourse

One way to advance thinking on global assessments is to deconstruct and reconstruct problems to reach a synthesis. This chapter focuses on the concern that solving problems through centralized controls and global blueprints tends to create its own vulnerabilities in the long term (Adger 2003). The theoretical framework adopted assumes three basic premises. First, the effectiveness of global treaties at the community level requires addressing multiple-scale assessment and multiple levels of decision making (Berkes 2002; Young 2002). Second, institutions represent the numerous ways in which society is held together that give it a sense of purpose and enable it to adapt. Third, institutions adopt and promote their own beliefs and values, which are manifest as discourse or narratives. Unraveling the global scientific and political discourses surrounding land management and the CDM is a useful way to understand the construction of policy choices that make up global institutions (Hajer 1995; Dryzek 1997; Adger et al. 2001).

Scale

Scale matters because actors and stakeholders in the global commons coexist at different spatial and temporal locations. Cash and Moser (2000), citing Holling (1978), suggest that meaningful understanding of systems can be fully reached only if the driving and constraining forces are addressed at different

levels simultaneously. Scale is also important in terms of assessments. Complex systems require forging links between fine details and large outcomes in a manner that allows predictability. This requires addressing multiple levels of analysis simultaneously (Ahl and Allen 1996, 11). Multiple-level analyses may include the individual, household, community or village, district or municipality, state or province, and national and international levels.

Institutions

Institutions and institutional analysis incorporate a range of concepts and tools explored in the discipline of political science (Crawford and Ostrom 1995) and more recently applied to new institutional economics (Paavola 2005). Institutions are the entities from which collective action is taken for a variety of resource management activities—for example, water level control, tree harvesting, and health hazard mitigation—to achieve social or economic goals (Gunderson, Holling, and Light 1995). Ostrom, Schroeder, and Wynne (1993) explain that the structure of an institutional arrangement also includes analyzing which participants are involved, what their stakes and resources are, and how they are linked to one another and to outcomes in the world. This analysis, I argue, could be widened to include examining the *meanings* attached to and the constructs of environmental problems. These constructs are embedded in the narratives or story lines adopted by organizations and actors and subsequently manifest in institutions. Critics of global institutions argue that policy makers employ a *discourse* that focuses only on the global nature of problems.

Environmental Discourse

The understanding of discourse may be shared by a small or large group of people across different levels (Adger et al. 2001). Hajer (1995) argues that "environmental problems are ostensibly constructed through fragmented and contradictory discourses within and outside the environmental domain" (Hajer 1995, 15) and simplified into simple metaphors or symbols to ensure the successful transmission of a story line through the political realm. Adger et al. (2001), for example, explain global environmental discourses in terms of a dominant managerial story line and localist counternarrative. The former represents a blueprint, technocratic worldview, while the latter consists of a cultural or traditionalist view of peoples as victims of external intervention. Bringing together these strands of theory allows us to examine the way environmental

debates are framed by global scientific assessments that concentrate on reducing greenhouse gas emissions over more localized intervention to reduce vulnerability or to build adaptive capacity on more locally defined terms. This clearly has implications for global-scale assessments.

Global Discourse

We examine two global discourses relevant to the study of carbon sequestration: global deforestation discourse and the global simplification of nature.

Global Deforestation Discourse

Land management surfaced late in the negotiating process in the run-up to Kyoto and was typified by poor scientific understanding and definitions and inconsistencies in national positions on land management (Fry 2002). Some suggest that the issue of tropical deforestation was brought into the debate because of the lack of money generated by the United Nations Convention on Biological Diversity, which is reportedly constrained by limited financial backing and an overloaded work program, while others point to the failure of the United Nations Forum on Forests process to bring about a convention on forests (Fogel 2002).

The politics of land management and the CDM are underpinned by two important story lines, namely the "alarmist" deforestation discourse of the 1980s and Hardin's "tragedy of the commons" (1968). Regarding the first story line, Fogel (2002) argues that the discourse inaccurately labels the South as culprits of deforestation and the North as victims of environmental externalities. She points out that despite alarmist suggestions by scientists such as Norman Myers (1989), scientific claims of deforestation rates are based on incomplete data and information. Forsyth (2003) also argues to allow some degree of local determination of what is considered environmental—for example, increasing forest cover may indeed be a facet of local environmental management, but it does not always follow that this is exclusively positive, as some forms of deforestation may also be considered acceptable if the resulting land cover is still sustainable for various uses.

Looking back to the early work of the IPCC and the Response Strategies Working Group in 1990, a number of forest-related recommendations are provided. One that stands out is that to address the pervasive forest crises, agriculture as well as people's need for employment and income needs to be

addressed. In the words of the IPCC (1990, xlii): "Deforestation will be stopped only when the natural forest is economically more valuable for the people who live in and around the forests than alternative uses for the same land." Property rights strongly influence the adoption of the dominant development paradigm in Latin America and reportedly contribute to the existing pattern of deforestation into the frontier zones of the region (United Nations Development Programme 2001). Offsetting carbon dioxide emissions from one developed country in another developing country creates an implicit change in property rights between the investor and the land owner, or at least the rights to those forests are made acceptable (Brown and Adger 1994).

Fogel (2002) suggests that the IPCC has embraced an approach to halting deforestation that gives precedence to the establishment of property rights over other approaches, such as reducing population growth or reducing human overconsumption. In contrast, the "localist" discourses encountered in side events of the climate negotiations have focused on the developmental and rights-based aspects of forest management. For instance, a number of indigenous organizations highlight that the market approach to managing the commons could result in exacerbating existing inequalities between north and south and would do little to address the root of the climate change problem, namely industrial development.

This discourse is transposed into the story lines on land management in the CDM made evident in the rhetoric of a national delegate at UNFCCC COP-6 promoting a carbon sequestration project, and in a subsequent interview with the company investing in the project. First, the delegate wrote: "Deforestation resulting from indigenous people's settlement practices *creates a need* for alternative ways of improving the quality of life for such communities" (G77/delegate, personal communication, 2000; emphasis added). And later: "We are helping poor people in the tropics to change *centuries old practices* towards more sustainable lifestyles, such as alternatives to slash and burn" (personal communication, 2002).

These two statements overlook the role of international and national institutions in contributing to deforestation and the impact that it has on forests in the context of weak institutions and law enforcement. It also risks painting a misleading picture of the culprits of deforestation in a context in which the political economy has contributed to current rates of deforestation and where poor people have governed territories forested for over a hundred years, despite economic alternatives. Increasingly, evidence suggests that the poor are not

necessarily perpetrators of environmental change but are actually important contributors to the management of the commons (Ostrom et al. 2002; Dolšak and Ostrom 2003). Skeptics of environmental orthodoxies also point to the benefits that local people have brought to some local environments—for instance, increasing forest cover and, in some cases, managing complex human-ecological systems (Forsyth 2003; Fairhead and Leach 1996).

Having said this, there is a shift in thinking among policy makers and scientists regarding the value of local and indigenous knowledge systems. Evidence of this shift prevails in the global Millennium Ecosystem Assessment (MA) (Millennium Ecosystem Assessment 2003). In contrast to the MA, the IPCC has been criticized for depicting the "real world" as sectoral, single-scale, with a single epistemology, and with no validation of knowledge outside of the peer-reviewed science, while in fact there are multiple actors as well as winners and losers across scales.

Global Simplification of Nature

Meanwhile, global managers, including policy makers, scientists, and conservation NGOs, have tended to frame carbon sequestration in terms of simple constructs of cause and effect. In reviewing the scientific discourse of the IPCC, the body that governs the science on land management and CDM, nature has been simplified into units and models. In 1990, the IPCC Response Strategies Working Group report recommended investing in plantations in developing countries, estimating two hundred million hectares of land to this option (Intergovernmental Panel on Climate Change 1990). Subsequently, in the 1995 Second Assessment Report, the IPCC took this thinking further in saying that protection, sequestration, and substitution of carbon dioxide globally (but predominantly in the tropics) could reduce atmospheric carbon by approximately 83 to 131 gigatons of carbon by the year 2050 (60 to 87 GtC in forests and 23 to 44 gigatons of carbon in agricultural soils) (IPCC 1995).

When the IPCC's SRLUCF came out in 2000, it was criticized by indigenous groups, NGOs, and scholars for its simplified portrayal of terrestrial systems and lack of information on the socioeconomic, political, and institutional consideration of carbon sequestration (World Rainforest Movement 2000). Land tenure was an issue of particular contention at the time, and it was only taken up much later in the negotiations on small-scale afforestation and reforestation in the CDM. The IPCC TAR in 2001 continued this line of simplifying

complex systems in estimating that the global potential of biological mitigation options could reach an order of magnitude of 100 gigatons of carbon (cumulatively) equal to about 10 to 20 percent of potential fossil fuel emissions by 2050 (IPCC 2001) on proviso that the *appropriate organizations are available.* Achieving such a level is dependent on land and water availability as well as the rates of adoption of different land management practices. Furthermore, what "appropriate organizations" entails is not entirely clear.

Fogel (2002) suggests that the governments had to simplify complex forest ecosystems into objects in order to define, standardize, and universally agree on their carbon content. It has also been suggested that the simplification of classification systems, by government administrators and scientists, is done in order to know and to govern systems from a distance (Scott 1998; Latour 1997). Yet, at the same time, the IPCC acknowledges the overwhelming challenges that remain to this option. Methods of financial analysis and carbon accounting are still incomparable, in many instances the cost calculations do not cover costs for infrastructure, and appropriate discounting is absent. Further implementation challenges include monitoring, data collection and implementation costs, opportunity costs of land and maintenance, and other recurring costs, which are often excluded or overlooked. The IPCC also acknowledges that if projects are implemented inappropriately they may result in negative impacts: loss of biodiversity, community disruption, and groundwater pollution (IPCC 2001).

To its credit, the IPCC (1995) and its SRLUCF (2000) do point out that providing greater public participation in decision making may contribute to new approaches to sustainability and equity. The issue of participation and equity should, however, not be used lightly in the context of carbon offsets in the tropics. It seems unmerited of the IPCC to highlight equity to those countries where the major mitigation option is slowing or halting deforestation without paying mention to the issues of carbon price differentials (cost estimates reported to date of biological mitigation vary greatly from $.01 to $3 per ton of carbon in several tropical countries and from $20 to $100 per ton of carbon in nontropical countries), the role of the bigger emitters such as the United States, or the responsibility of governments in managing deforestation.

To conclude, this section has summarized the two key story lines surrounding carbon sequestration. At the global scale, land management and the CDM are underpinned by two important story lines: "alarmist" deforestation

discourse and the tragedy of the commons, which tends to perpetuate the perception of poor people as culprits of environmental change. We have also brushed on another important element of carbon politics—the way that science has been used to simplify nature as an object. Policy on land management and the CDM appears to be underpinned by a simplified portrayal of complex natural ecosystems and the human dimensions of global environmental change.

We now examine two pilot projects in Bolivia and Brazil. We present an overview of the projects, a chronology, and a description of the stakeholders, followed by analysis of findings and comparisons of the institutional context.

Observations from the Field: Bolivia and Brazil

This section examines local story lines, conflicts, and institutional dynamics in two projects: the Noel Kempff Mercado Climate Action Project in Bolivia and the ONF/Peugeot Land Rehabilitation Project in Brazil. This section helps to contrast the global story lines discussed earlier with the local narratives to help identify conflicting institutional priorities. The analysis has also found that horizontal institutional dynamics (between organizations) is important to the way that carbon sequestration projects are played out at the local level. If this type of cross-scale approach were applied to global-scale assessments, it could help to inform policies better suited to the local context.

These pilot projects seek to provide local sustainable development benefits as well as to reduce greenhouse gas emissions of global impact (May et al. 2004). They also are entitled to claim under the non-Kyoto market, such as the Chicago Climate Exchange, and provide examples of what could develop under the Kyoto Protocol. Research included more than sixty semistructured stakeholder interviews, participation observation, and a workshop in 2001.

The Context of Latin America

In the context of climate change, Latin American forests are crucial, primarily as a contributor to upholding the global climate system. Land conversion to pastures and agriculture in the tropics contributes an estimated 20 percent of global greenhouse gas emissions (IPCC 2000). Brazil alone derives approximately one-fifth of its carbon dioxide emissions from land conversion of the Amazon region across Latin America. The potential for regulatory measures to succeed in abating deforestation and protecting the environmental services that

forests provide, such as carbon sequestration, have been limited. In response, some argue for the use of the CDM in the forest sector (Fearnside 1999). Innovative approaches to conservation and carbon sequestration are, however, emerging among civil society and producer organizations in many parts of Latin America. For example, Brazil has begun to make use of fiscal instruments for encouraging conservation and providing environmental services, such as the ecological value-added tax (May et al. 2002) adopted initially by the states of Paraná and Minas Gerais and implemented more recently in the Amazon.

Case Study: Noel Kempff Mercado Climate Action Project
Project Description

The Noel Kempff Mercado Climate Action Project (NKMCAP) is one of the largest pilot projects of its kind undertaken globally. The NKMCAP is situated in the Noel Kempff Mercado National Park in northeastern Bolivia, bounded by the Paragua/Tarvo and Itenez rivers to the west and north and by Bolivia's international frontier with Brazil to the east. The park is biologically diverse lowland forest with a bird list of more than 630 species and with about 130 mammals, including abundant populations of giant otter and freshwater river dolphin (U.S. Initiative on Joint Implementation 1996).

Driven by a partnership among the Nature Conservancy, a consortium of companies (American Electric Power, BP Amoco, PacifiCorp), and the Bolivian government, the NKMCAP is an emission-avoidance project that is predominantly conservation focused in character complemented by diminished agriculture encroachment on purchased land. In 1996, logging concessions were indemnified for $2 million by the consortium, and the park doubled in size to about 1.5 million hectares. Carbon generation was originally estimated at 14 metric tons of carbon over thirty years, while recent monitoring and verification of the stands indicate the figure is 4.4 metric tons of carbon. The park is located in the municipality of San Ignacio de Velasco, within the department of Santa Cruz (800 kilometers from the provincial capital). Dispersed Chiquitano communities of the Bajo Paragua region have long used the forest that is now part of the expanded national park. The population is approximately 2,400.

Local Story Lines

Local villages resisted park expansion in the early days of the NKMCAP (Kaimowitz et al. 1998), and development assistance took off to a slow start:

"When the theme of protected areas and conservation appeared it was a big change for the communities because they were not ready to take on the norms and rules that the state was imposing and above all without consulting the communities or at least having workshops about how the new system was going to work" (headman Piso Firme, personal communication, 2003).

One key challenge was the issue of access and control of forest lands. The "alarmist" deforestation discourse adopted by the governing institutions initially excluded "people" from the mandate to protect forests and to prevent leakage from the destructive practices of local people. A former director of the national NGO noted that the project aimed primarily to "protect the Park to avoid leakage of carbon, deforestation, invasions, or timber extraction, and to restrict communities from entering to extract anything from the Park" (Adolfo Moreno, personal communication, 2001).

In contrast, the local story line emphasized the coexistence of humans with their natural environment for survival. For instance, in one community, people referred to the forest as their *supermarket,* from which they obtained animals, fruits, medicinal plants, and wood for construction and furniture. Locally, people took pride in their local knowledge, noted for example in their use of medicinal plants (Boyd, field notes 5, 2001). They also expressed concern about future opportunities that the forests would provide their children and envisioned forests as a means to generate income under controlled conditions (headman Piso Firme, personal communication, 2003).

In contrast to the state and the NGOs, community authorities were concerned about the impacts of new institutions on the existing way of life in the region and felt excluded from initial decision-making processes. The president of the Central Indígena de Bajo Paragua (CIBAPA), the community-based organization (CBO), wrote:

> [Because] everyone was not in agreement with the expansion of the
> park; they (the communities) didn't view the people responsible for the
> program with appreciation, they rejected them. [I] have learned from
> the process that above all the project should have consensus. There
> should be a participatory process in the communities, no? So, for a proj-
> ect to have success it should be done in a participatory way so that when
> it comes to project implementation everyone is in agreement, everybody
> knows and in this way work with responsibility and dedication. I see it

as a lesson learned from now on forward we have to take into consideration these things. (Ivar Vaca, personal communication, 2001)

The issue of land tenure was a central aspect of the NKMCAP. The park expansion zone was state-owned fiscal land, aside from a few small, private holdings. It was within this expansion zone that the state gave concessionary rights to forest harvesting companies. These rights, in turn, were indemnified by the project investors in order to clear the way for the state to officially declare the park's expansion area. Once the expansion zone was officially defined and the annual operating plan was in place, several "private property owners" within the expansion zone appeared out of the woodwork and demanded indemnification. These contested properties—which have a low chance of standing up in court—are currently holding up the process of fully clarifying the park's legal landholding rights.

The communal lands were also state-owned fiscal lands. After the park was expanded, the process of legally consolidating the indigenous lands adjacent to the park began in earnest with project funding. The convoluted Bolivian property rights system has allowed for two superimposed concessions within the community territory. Once this issue is resolved, the CBO will have legal ownership of its land holdings. This process continues to this day; once complete, it will mark the first time ever that the local communities of the Bajo Paragua hold legal titles to the land they have lived on for generations. Although the project has significantly contributed to strengthening local institutions, the process has emphasized the conflicts that may occur among international, national, and local institutions over entitlements to land or resources.

Institutional Power Dynamics

The institutional dynamics played out in the NKMCAP are important to understanding the barriers to implementation. In the design phase of the NKMCAP, institutional power dynamics figured predominantly between global and national institutions. The investor underscored bureaucratic government procedures as one of the weaker aspects of the collaboration, while the international NGO highlighted the different levels of knowledge required. Meanwhile, the state assumed credit for the existence of the scheme, stressing that without its capacity and knowledge the project would never have taken place. At

the local level, the "Comite de Gestion," or management committee—an entity made up entirely of local actors, including the CIBAPA and the Municipality of San Ignacio—suggested changes that were taken seriously and generally incorporated into the planning and implementation cycle. Once the management committee approved the annual management plans, the project directors, government of Bolivia, and investors provided final approval for both the technical and financial aspects of the plan.

The management committee is an incipient body; while in theory it has say over the project, its members do not have the capacity or know-how to contribute much. Needless to say, with each passing year, the committee becomes increasingly savvy, attuned to the park's needs, and committed to offering their very best for the successful management of the project. Many of the issues that arose early on in the project had to do with the lack of capacity in the management committee. In the beginning, the CBO was not an equal partner in this sense—its members' lack of capacity meant that they were marginal to decision making.

Case Study: ONF/Peugeot Land Rehabilitation Project
Project Description

Brazil's official position in the run-up to the Marrakech Accords in 2002 was that projects that aimed to avoid deforestation should be excluded from the CDM (for more information on the politics of sinks in Brazil, see Fearnside 2001). Within this national context, the ONF/Peugeot project was established. It is a commercial project that sought an environmentally friendly image to counter the prevailing image of emission-intensive car manufacturers. Established in 1997, the project consists of a partnership among Peugeot, the Office Nacional de France (ONF, or French Forest Service), and Pronatura International, a Paris-based NGO with a Brazilian affiliate called Instituto Pronatura (IPN).

The project is located in the "arc of deforestation" of the Amazon basin between the municipalities of Juruena and Cotriguaçu, in northwestern Mato Grosso. In a 1991 census of Jurena (and Cotriguaçu), the total population was estimated to be just under six thousand. The area of the municipality is 33,688 square kilometers, with an extremely low population density of 1.38 persons per square kilometer. Both Juruena and Cotriguaçu are under increasing pressure from migration, cattle ranching, and gold mining. Peugeot reportedly invested approximately $10 million toward an initial aim to reforest degraded pasture with 10 million native trees on five thousand hectares, resulting in an

estimated 2 million tons of carbon dioxide over forty years. Since the start of the project, the original carbon estimate has been reduced to 500,000 tons of carbon over one hundred years on two thousand hectares.

Mismatched Interests and Objectives

Peugeot's motivation, though largely publicity driven, was also to gain new technical knowledge about carbon monitoring, verification, and accounting (Marc Bocqué, personal communication, 2002). The company's self-interest is reflected in its market strategy for a green image and coincides with the timing of the installation of an industrial facility in Rio de Janeiro. Above all, Peugeot's aim was to have impressive results: "Our main aim was to promote the scientific process of controlling green house gases through such projects. We expect to encounter new knowledge about carbon measurements. [The] second motivation was our image—we feel that the environmental concern is something that is shared by all human beings today" (Marc Bocqué, personal communication, 2002).

Because of the project's ambitious aims and the company's sense of urgency, planting activities began prior to approval of environmental licensing and even prior to application for such a license at FEMA, the State Environmental Foundation. One year after the Peugeot project started, FEMA began to institutionalize single environment licensing—Licenciamento Ambiental Único (LAU)—for rural properties throughout Mato Grosso requesting deforestation approvals. The license was applied first to holdings above one thousand hectares and then lowered gradually to smaller rural enterprises. The São Nicolau ranch became one of the test cases for the LAU.

The indeterminate policy of the Brazilian government on carbon sequestration meant that there were no rules to guide the project, and the absence of guidelines produced uncertainties surrounding the project (Peter May, personal communication, 2001). The project became the object of regional criticism. Accusations linking use of herbicide by the project to the unexplained deaths of wild turtles and cranes found along the Juruena River, as well as accusations of smuggling native tree seeds to France, reached national media attention in November 1999. As a result, the land and environment committee of the state assembly, with the participation of the public prosecutor's office, mounted an official investigation commission to verify the facts. The project was able to keep the judicial issues at the local circuit court level. For a short time, it was also a

diplomatic incidence but was resolved amicably. The government of Brazil is no longer concerned about the project being a sovereignty issue.

Meanwhile, the local NGO representatives in Brazil related a different intended vision. In their view, the aim of the project was to work with communities through promoting agroforestry systems—not just to focus on commercial reforestation. The original project feasibility study proposed a budget that included a considerable aspect of buffer zone work. Local municipalities anticipated that the project would create opportunities for local development through technical expertise and dissemination of potential know-how of carbon schemes and would generate an alternative vision of development in the area. In practice, a number of people were employed temporarily on the plantation, but the concept of carbon sequestration was not introduced to local farmers for fear of raising expectations. The development aspects were sidelined (IPN, personal communication, 2001), and locally the project came under scrutiny for lack of local integration.

Partnership and Power Dynamics

The designers of the Peugeot/ONF project chose a private property regime to ensure rapid implementation of project targets. IPN Brazil, a local NGO, was an important partner in acquiring the land but was sidelined after the land purchase was completed. Two specific issues are important to the institutional dynamic in this case. First, the type of land acquisition instigated a change in the dynamics of the institutional actors; second, the way authority (state or private company) exerted itself affected the relationship with local partners.

The dynamics among project stakeholders in the Peugeot/ONF pilot project as well as the interaction among partners involved in the design process are illustrated in figure 6.1.

Once Peugeot and ONF had secured their property, IPN became redundant to their objectives. Land was purchased by private investors, a regime that proved problematic as the private investors chose to bypass local institutions. Initially excluded from the Peugeot project committee, local scientists expressed a sense of exclusion, as did the local NGO that backstopped the project from Brazil (as described earlier). Following accusations by the state environmental agency, the institutional dynamics substantially changed. The ONF increasingly interacted with local government, local farmers, and IPN. Also, a scientific committee was established that consisted of predominantly Brazilian scientists.

Figure 6.1

Institutional dynamics in the Peugeot/ONF pilot project in Brazil. P = Peugeot, ONF = Office Nacional de France, ONF Brazil, IPN = Instituto Pronatura, SC = scientific committee, LG = local government, and F = farmers.
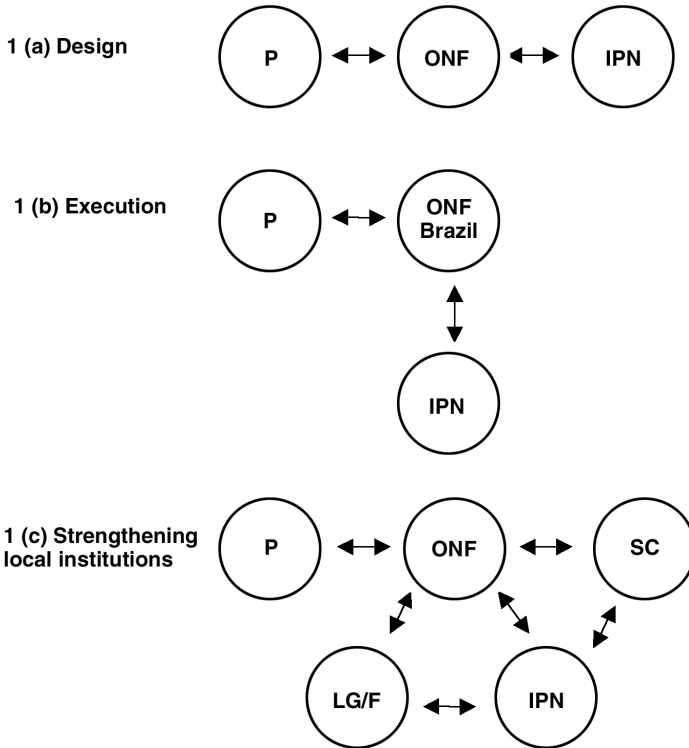
More recently, the project has gone into a process of "Brazilianization," as the ONF manager has departed and only Brazilians remain on site, with very remote "control" from France by the original site manger. Peugeot remains in the wings, using the project only for communication purposes and focusing instead on its primary aim in Brazil: promoting cars. The project mainly measures carbon and maintains a low-profile education and research program, although discussion revolves around longer-term forest management trials and conservation objectives to protect against encroachment from neighboring properties. The community tree planting activities have largely folded, as has IPN's "brittle" role in the region. Had ONF engaged more strongly with IPN or local producers, it may not have proved any more successful since the region is

hampered by fluid land uses and local institutional weaknesses. Unlike in the NKMCAP, there is no local commons under sustained management; instead, there are private property and unclaimed public land with predatory occupation. ONF needed to show results fast, so its only option was the private property approach.

Discussion and Conclusion

At the global level, the politics of land management and the CDM display a tendency to seek blueprint solutions, while in practice these are implemented under conditions of scientific uncertainty and limited knowledge of the impacts on local well-being. Essentially, the CDM is based on the premise that mitigation should be done in an economically efficient manner—that is, adopt a property rights approach rather than a commons approach (Ostrom 1990). The Kyoto Protocol recognizes that there are externalities that go beyond national borders and that there are joint but differentiated responsibilities. This implies a shared responsibility for environmental goods that can be obtained by joining forces to introduce cleaner technologies. However, in the land use sector, this implies an attack on national sovereignty, and the commitment of land to permanent (or temporary) forest is seen as an unwelcome restriction on development. A distinct property rights challenge exists in the projects that involve dedicating large tracts of land to conservation rather than to management.

Potentially, community-based approaches to land management and CDM would be more appropriate than the Kyoto framework. Yet, it is unclear how to build credibility for such projects in the marketplace at a scale large enough to make a difference. There are initiatives such as the ICMS Ecologico in Brazil, which—although it has no carbon-based criteria—represents an innovative way to reward municipalities that have allotted land to conservation and taken it out of production. Efforts also exist to provide sources of funding for socially and environmentally friendly carbon projects under the Brazilian Environmental Fund and Biodiversity Fund (Peter May, personal communication, 2005).

Global Blueprint Meets Local Complexity

Adger, Brown, and Hulme (2005, 1) argue that "human responses to global environmental change have been driven on the one hand by underlying discourses of environmental management and control and of economic integration, and, on the other hand, by resistance to globalization and new perspectives on

vulnerability and resilience." These observations fit with the way that land use and CDM have largely been conducted from the top down and driven by a set of global actors that largely subscribe to a managerial scientific and political discourse. From this chapter, we have seen that the impact of global policy includes cross-scale conflicts and entrenchment of global institutions against local worldviews perpetuated by myths (assumptions) and misinformation (media reporting and gossip), arguably resulting in adaptive learning processes but also in wasted opportunities for collective action and potentially compacting brittleness of local institutions in the long term (i.e., loss of resilience while increasing institutional efforts to control information and action) (Holling 1973).

It seems curious that the complexity of human-environmental interactions is poorly reflected in the global discourse on land management and CDM despite evidence of advancement in knowledge of these concepts (Millennium Ecosystem Assessment 2003). Concepts of land, spaces, dynamics, embedded identity, and complex social structures remain poorly understood in the best of circumstances and are deemed entirely irrelevant by some government administrators and scientists. Local values appear to be closely associated with development and land tenure, jobs, autonomy, and political leverage, while administrators and scientists lay claims to rights to carbon and conservation. However, the two scales are not irreconcilable: cooperation and increasing local involvement in the management of projects so as to incorporate local demands, rights, and privileges from the start are an important source of hope for improvement.

Participation versus Central Design

This chapter has helped to illustrate the risks of centrally designed projects. Clear, consistent messages will be required to reach people in the local context, as noted by the farmers' association in Brazil and by the local authorities in the NKMCAP. Increasingly, scholars suggest that concepts of equity require further notice in global environmental change research (Adger, Brown, and Hulme 2005). These concepts are highly relevant to implementation of global policies if they are to benefit those people they are aimed at helping (Adger et al. 2004). If future Kyoto compliant or noncompliant land management projects are to fulfill their sustainable development objectives, they will have to address issues of fairness—that is, who benefits—as well as processes and participation, which may initially require institutions to finance the development of local institutions. Boyd, Gutierrez, and Chang (2005) suggest that projects will have to adapt

to local organizations, although they also recognize that this might be a barrier to project development in many locations.

At present, signals from "the top" have been construed as inconsistent and misunderstood. Such messages are likely to contribute to the brittleness of adaptive institutions and could enhance existing social, political, and institutional weaknesses. The NKMCAP case emphasized differences in priorities, and some actors stood to benefit more from the project than others. The Peugeot/ONF case highlighted the institutional barriers that exist within networks of like-minded groups of scientists, NGOs, and local officials. Analysis of these dynamics has helped to highlight the importance of communication among different stakeholder groups or actors.

Role of State Institutions

In touching on the interactions between global and local institutions, this chapter has highlighted the pivotal role of the state in directing and implementing global policy. The pilot projects discussed here show that a pivotal role for government agencies and devolved administrations exists in these partnerships but also that roles require clarification of responsibilities. In the NKMCAP, the state acted as a partner in designing and developing the project yet held a distinct position of authority in comanaging the project and the park. It also laid claim to the national park as a public good (49 percent of the potential carbon credits) and to control over financial resources. By creating a carbon land management project in a national park, the government will be involved either in controlling the project or in managing the resources. Meanwhile, the municipality played a more marginal role.

In contrast, the Peugeot/ONF project took place outside of a formal regulatory framework and relied on a local NGO as a linking institution to reach low-income small holders. In bypassing national authority, the project suffered from the uncertainty of rules and the lack of basic standards. These findings concur with Vogler (2000), who argues that there is an important role for the state in implementing global environmental policy but that it requires cooperation between levels of governance.

The government has a key auditing role in avoiding negative project impacts on local communities or the environment. Nevertheless, without local representation and participation of the communities and user groups that inhabit the local commons, such projects remain beneficial only on paper. The

conflicts encountered may have been avoided with better guidance, greater transparency, and communication. This awareness, linked with accountability of discourse coalitions, networks, and organizations, might be a way to connect the global and the local.

Future Prospects

At the global level, government administrators and scientists have a responsibility to ensure that global standards are compatible with heterogeneous and diverse local institutions and to acknowledge that local institutions are not only diverse but also require capacity to develop or reestablish resilience. Policy on land use and carbon trading is at the early stages of development, but pilot projects have taught us that scale, institutions, and discourse play an important role in the outcomes of implementation.

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