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# Land Reform and Biodiversity Conservation in Brazil in the 1990s: Conflict and the Articulation of Mutual Interests

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**Abstract:** *Land-reform and environmental movements, revitalized by the democratization of civil society in Brazil in the 1990s, found their objectives in conflict over forested parcels that settlers want for conversion to agriculture but that are important for wildlife conservation. In the Atlantic Forest, where 95% of the forest is gone, we reviewed three cases of Brazilian nongovernmental organization (NGOs) engagement with the land-reform movement with respect to forest remnants neighboring protected areas that have insufficient habitat for the long-term survival of unique endangered species. In the Pontal do Paranapanema (São Paulo), Poço das Antas (Rio de Janeiro), and southern Bahia, environmental NGOs have supported agricultural alternatives that improve livelihood options and provide incentives for habitat conservation planning. Where land-reform groups were better organized, technical cooperation on settlement agriculture permitted the exploration of mutual interests in conciliating the productive landscape with conservation objectives. Processes of regular consultation among NGOs, environmental agencies, and the private sector revealed that there was less zero-sum conflict over the same lands than commonly perceived. In both groups, technicians found forested lands less suitable for small-scale agriculture, and leaders took risks to justify and support claims to alternative existing agricultural lands. Based on the cases we examined, the construction of landscapes with both forest stewardship and poverty-reducing agrarian reform faces continued obstacles from contradictory agrarian and environmental sector policies and inadequate economic incentives for forest stewardship on private lands.*

Reforma Agraria y Conservación de Biodiversidad en Brasil en los 1990s: Conflictos y la Articulación de Intereses Mutuos

**Resumen:** *La reforma agraria y los movimientos ambientales, revitalizados por la democratización de la sociedad civil brasileña en los 1990s, basan sus objetivos en conflictos sobre parcelas de bosque que los colonos solicitan para conversión a la agricultura pero que son importantes para la conservación de vida silvestre. En el Bosque Atlántico, donde ha desaparecido 95% del bosque, revisamos tres casos de participación de organizaciones no gubernamentales (ONG) en el movimiento de reforma agraria con respecto a remanentes de bosque aledaños a áreas protegidas que tienen insuficiente hábitat para la supervivencia a largo plazo de especies únicas en peligro. En el Pontal de Paranapanema (São Paulo), Poço das Antas (Río de Janeiro) y el sur de Bahía, las ONG ambientales han apoyado alternativas agrícolas que han mejorado las opciones de vida y proporcionado incentivos para la planificación de conservación del hábitat. En los lugares con mejor organización de los grupos de reforma agraria, la cooperación técnica en la agricultura permitió la exploración de intereses mutuos en la conciliación del paisaje productivo con los objetivos de conservación. Los procesos regulares de consulta entre las ONG, las agencias ambientales y el sector privado revelaron que había menor*

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*conflicto suma cero sobre las mismas tierras que el percibido comúnmente. En ambos grupos, los técnicos encontraron que las tierras boscosas son poco adecuadas para la agricultura de pequeña escala, y los líderes corrieron riesgos para justificar y apoyar la demanda de tierras agrícolas alternativas. Con base en los casos que examinamos, la construcción de paisajes tanto con bosques administrados como con reformas agrarias para reducir la pobreza enfrenta numerosos obstáculos desde políticas agrarias y ambientales contradictorias hasta incentivos económicos inadecuados para la conservación de bosques en terrenos privados.*

## Introduction

Many independent agrarian reform organizations and conservation nongovernmental organizations (NGOs) were born, revived, and greatly strengthened when the Brazilian military government ended in 1984. These groups found a common cause in their opposition to two decades of environmentally destructive megaprojects, such as government-sponsored colonization of the Amazon and industrial expansion fired by charcoal from the dwindling Atlantic Forest. In both the Amazon and the Atlantic Forest, the principal cause of rapid deforestation was government policies, and the principal beneficiaries were owners of large rural estates (Evans 1979; Fearnside 1993; Dean 1997). In the 1990s, large cattle farms in São Paulo, which had been carved out of state forest reserves in the 1950s, began to be occupied by landless rural workers, led primarily by the Movement of Rural Landless Workers (Movimento dos Trabalhadores Rurais Sem Terra [MST]). This resonated across Brazilian society as social justice, since it was also cattle ranchers who were responsible for the death of Chico Mendes, labor leader of Amazonian rubber tappers, and defender of the forest.

Poor land stewardship on the part of farmers became a unifying theme for both the land-reform movement and Brazil's rapidly expanding environmental movement. Despite their common interests, rampant rural poverty and the lack of government determination to address agrarian reform rapidly drove a wedge between the groups. Rural workers increasingly occupied unused lands when the government failed to implement land reform as per the provisions of the 1988 Constitution (Teófilo & Garcia 2003). Judicial decisions after occupation often favored nominal titleholder rights, but police were frequently unable or unwilling to evict the occupants. Landowner-organized vigilante attacks on occupiers commonly followed, and the escalation of rural violence motivated judicial decisions revoking titleholder claims (Medeiros & Leite 1999; Heredia et al. 2003). Only then did governmental land-reform agencies, led by the National Institute for Colonization and Agrarian Reform (INCRA), begin intervening. Disputes were resolved outside the judicial system, with INCRA providing the justification for appropriation, indemnification, and official recognition of land-reform settlements as eligible for government assistance. Ninety-five percent of land-reform settlements in a sam-

ple of those originating between 1986 and 1997 began with contestation of land tenure rather than government initiatives (Heredia et al. 2003).

The landless movement, however, lacked the political "weapons" (social, political, or broadly defined technological; Scott 1985; Peluso 1992) to claim the more valuable agricultural land. Brazil's agrarian reform law, outlined in its 1964 Estatuto da Terra (Law 4504, Article 1, Paragraph 1), also called for "a better distribution of land . . . through appropriation and indemnification of *unproductive* properties and their distribution to rural workers" (italics ours). The INCRA interpreted this to mean that properties having more than their legally required 20% forest reserve were unproductive (Dean 1997). Extensive uncultivated land on a property was presented before courts as cause for the suspension of a titleholder claim. Marginal lands with natural vegetation were also less likely to be violently defended because they tended to have soils, topography, and market access poorly suited for agriculture. Of the land appropriated by INCRA between 1997 and 1999, only 21.1% was in agricultural use before occupation (Teófilo & Garcia 2003). The land-reform settlement clusters within the Atlantic Forest states tended to be in municipalities with more forest remnants than average (SOS Mata Atlântica & INPE 2002).

Contradictions between land use for agrarian reform and for conservation remained largely unnoticed (Viola 1991). Activists attributed deforestation in the Atlantic Forest to inadequate enforcement of forestry law, residential expansion, and commercial agriculture (Young 2003). Media coverage of rural-land struggles emphasized their social aspects, whereas urban environmentalists had more immediate concern for urban pollution, congestion, and nuclear power plants. Nonetheless, the environmental aspects of land-reform settlements began to be addressed through pilot projects under the National Environment Fund (FNMA 2001), promoting agricultural practices that diminished deforestation and fostered livelihoods. Some environmental groups, however, began questioning whether rural poverty could be solved within the confines of land-reform settlements on the remaining 5% of forested land in the Atlantic Forest, particularly because the previous conversion of 95% of the land to agriculture had not solved the problem. The progressive degradation of lands occupied for agrarian reform triggered a regulatory ruling by Brazil's National

Environment Council (Resolution 289, 25 October 2001; CONAMA [Conselho Nacional do Meio Ambiente] 2001) that required prior environmental licensing of areas under consideration for agrarian-reform settlements.

Although critiques of the environmental impacts of settlements mounted (Graziano 2003), there were also concrete examples of collaboration between environmental and land-reform groups. Some conservation NGOs broadened their focus from the front-line defense of existing protected areas to a regional, landscape-planning perspective that considered multiple land-use options, including the integration of private reserves and other conservation measures with agrarian-reform settlements. The organized land-reform groups have also increasingly taken on technical assistance to orient land use on settlements that respect environmental objectives and have sought to establish means to legally challenge land titles independent of the extent of uncultivated land (MST 1999). Here we highlight three cases in which local environmental groups have engaged with the land-reform movement on technical issues involving the conservation of threatened species in the Atlantic Forest.

## Landlessness and Conservation in the Pontal do Paranapanema

### Background

In 1942 there was a large forest reserve, the Grande Reserva do Pontal of 246,840 ha, that covered most of the western part of the state of São Paulo—the “Pontal do Paranapanema” (Ferrari Leite 1998). Dean (1997) recounted the extraordinary history of the occupation of the region. Despite its protected status, the forests were largely destroyed during the 1950s and 1960s. The existence of the forest reserve, however, has meant that the titles to the vast ranches that exist there today are contestable—a reason the MST has been particularly active in the region. Besides scattered fragments, only the 36,000-ha Morro do Diabo State Park remains—the stronghold of the black lion tamarin (*Leontopithecus chrysopygus*), now the flagship species for the region. A second reserve, the federally administered Mico-Leão-Preto Ecological Station, was created nearby in 2002 as a result of the research and actions of a local NGO, the Instituto de Pesquisas Ecológicas (IPÊ). It covers the four largest remaining forest fragments, with a combined area of 6,200 ha. Other scattered forest fragments add another 7,000 ha, mostly privately owned or in agrarian-reform settlements. The Pontal is also home to jaguars, ocelots, pumas, tapirs, white-lipped peccaries, king vultures, and the Blue-and-Yellow Macaw. Metapopulations of these species are still considered viable, mainly because of the Morro do Diabo State Park and because the larger fragments still contain most of the original biota. The for-

est remnants also serve as the last remaining seed sources for forest restoration programs.

### Agrarian Reform and Conservation of Biodiversity

Deforestation in the Pontal from 1987 to 2001 took place at a rate of about 1.5% a year. At that rate, 34% of the remaining forest would be lost over the next three decades, although this is probably an underestimate because it does not include the more recent influx of settlers. The forest patches within agrarian reform settlements would also be degraded through edge effects. As a result of this diagnosis, IPÊ began to work with settlers as well as the owners of the larger properties. Although posing enormous challenges to conservation, the settlements also present opportunities for innovative approaches, and community leaders in land-reform settlements have taken an interest in agroforestry and landscape planning, effectively combining small-scale agriculture and conservation.

For 12 years IPÊ has been engaging with the regional stakeholders to secure the conservation and the recovery of forests in the Pontal (Valladares-Padua et al. 2002). Landscape planning at a regional scale is possible when local communities are involved. The lack of farming expertise is a primary barrier to the adoption of alternative agroforestry practices, as is the capacity to navigate government policies and credit practices to ensure effective support, making training a vital component of the program. Gaining the confidence of the local communities in sharing in technical collaboration in agricultural practices and environmental education has allowed for collaborative planning of priority areas for wildlife corridors that allow demographic interchange between isolated habitats. Where corridor creation is impractical, stepping-stone and agroforestry buffer habitat is planned around biologically vital areas, such as the Morro do Diabo State Park.

The technical training that IPÊ administers is intended to create incentives and remove barriers to the adoption of agroforestry systems. Community members learn to manage tree nurseries, identify and demarcate seed-bearing trees, plan seed-collection programs, and conserve and restore seed viability. The nurseries contribute seedlings for home gardens and rural landscape restoration, and to establish forest corridors and buffer strips around the forest fragments. Support for producer groups, who collectively seek training and financial support for certification and value-added enterprise development is vital, as is the identification of credit sources. Training is also important to managers of protected areas, allowing them to manage the parks effectively within the context of the surrounding landscapes and communities. Wildlife management plans, for example, need to consider both protected areas and surrounding buffer areas, especially for large cats and ungulates. Research

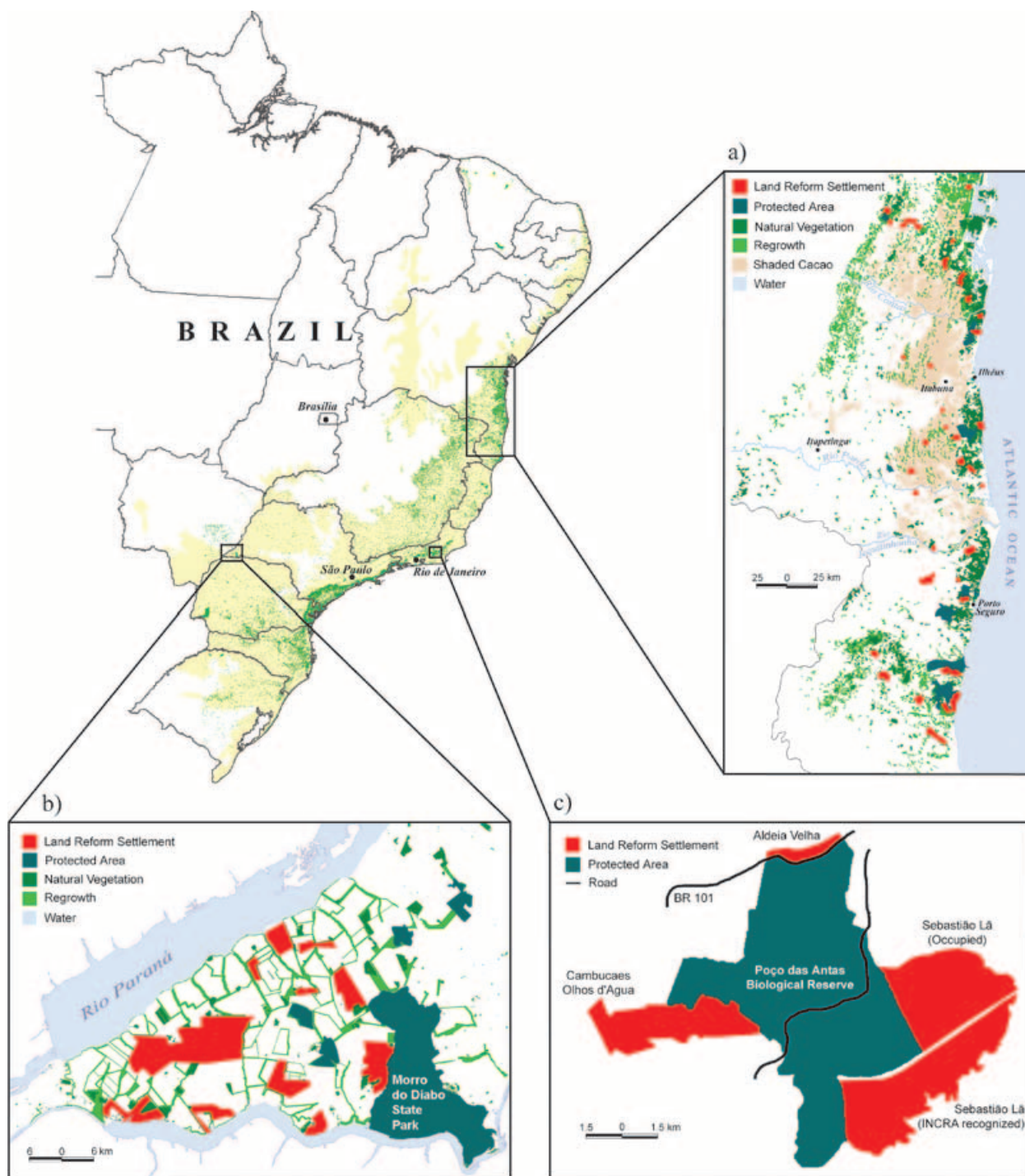


Figure 1. Atlantic Forest original extent (yellow) and current extent (green) with insets showing land reform settlements and protected areas in (a) Southern Bahia, (b) Pontal do Paranapanema, and (c) Poço das Antas.

on wildlife ranging and dispersal requires collaboration among settlers, NGOs, and park managers.

The IPÊ's work has also demonstrated that viable landscapes can be rebuilt from small fragments through regional planning and with strong and broad support among the landholders. In 2003 the principal decision makers in the Pontal region responsible for land-use plan-

ning adopted priorities shown on a map that IPÊ produced (Fig. 1) as a regional development guide. It identifies areas for potential forest corridors on land-reform settlements that can be designated as their collective and obligatory forest reserve. Planning for connectivity on land-reform settlements is simpler than among private property owners because of the public character of

lands that are provisionally assigned to the land-reform settlements.

The program sponsors forums twice a year to facilitate dialogue among stakeholders and to discuss the regional plan and implementation progress. Settlers meet with representatives of the key public agencies responsible for land-use management to discuss emerging issues and organize joint activities to resolve or reduce socioenvironmental conflict. A parallel effort has undertaken the development of practical approaches and policing capacity to implement the regional land-use plan. Landowners, the public prosecutor, and environmental agencies have been brought together to coordinate efforts toward the demarcation of forest reserves and reforestation areas and to enforce the maintenance of “areas of permanent protection” (*áreas de proteção permanente*), such as gallery forests and forests on steep slopes, as required by law.

### Land Reform and Conservation around the Poço Das Antas Biological Reserve

The Poço das Antas Biological Reserve was created in 1974 in the state of Rio de Janeiro to protect another of the Atlantic Forest’s flagship and highly threatened primates, the golden lion tamarin (*Leontopithecus rosalia*). When created, it was the only protected area for the species, and remaining forest fragments elsewhere were so small and isolated that a captive breeding and reintroduction program was set up to avoid its extinction in the wild (Kleiman & Rylands 2002). After 21 years of intensive conservation efforts, the wild population is recovering but is still below the goal of a minimum viable population of 2000, an objective set for 2025 (Seal et al. 1990). Species viability studies have shown that at least 25,000 ha of lowland forests are required for its long-term survival. Only 2% of the forests in its original range are still standing (Kierulff & Oliveira 1996), and every remnant must be considered vital for reconstructing landscape connectivity and expanding forest cover.

Of the 9800 ha appropriated by INCRA in the municipality of Casimiro de Abreu in 1974, 5300 ha went to the biological reserve and the remainder was for agrarian reform. The first 900-ha settlement, Aldeia Velha, borders the reserve to the north, and originally involved 91 families. Of these, only a few dozen remain—many properties were subsequently sold to residents of neighboring cities for second homes, and others were combined and became cattle ranches. The legal requirement for 20% of each property to be retained as a forest reserve was ignored, and the vegetation on the steep hillsides and riverbanks was largely destroyed. The settlement’s social organization has always been precarious and unstable, and despite efforts in training and environmental education by the principal local NGO (the Golden Lion Tamarin Associ-

ation [Associação Mico-Leão-Dourado; AMLD]) it remains largely unengaged and disinterested.

A second settlement created by INCRA in 1994 for 104 families was triggered by the occupation of a 1200-ha property (Cambucães—Olhos d’Água). The existing legally required forest reserve was divided up for 19 families, whose only option was to log it and cut it down. The Brazilian Institute for the Environment (IBAMA) later fined these families—a fruitless effort that resulted only in making them ineligible for access to subsidized credit. Another 21 families demanded but did not receive land until 2001, when INCRA ruled for their indemnification and translocation to another, undetermined settlement project. The INCRA ignored a 1990 CONAMA resolution that required impact assessments to precede the expansion of any economic activity occurring within 10 km of a federal protected area boundary.

Since 1998, the AMLD has worked with the leaders and families of the Cambucães—Olhos d’Água settlement to promote sustainable agricultural practices and has facilitated relations and negotiations among the community, IBAMA, INCRA, and the local municipalities. The AMLD promoted the restoration of forested land on settler lots to compensate for the area deforested from the original forest reserve. The AMLD also trains schoolteachers in environmental education and in management of “green fertilizers,” agroforestry nurseries, and test plots; the use of hedges as an alternative to fences; and the reforestation of degraded areas with native tree species. Although the community’s social organization underwent many changes over this period, its greater internal coherence facilitated interaction with the environmental groups. Similar to IPÊ’s experience in the Pontal region, AMLD is working with the Cambucães—Olhos d’Água community, creating connectivity and reestablishing gallery forest corridors to allow for the dispersion of species.

Five hundred hectares acquired for land reform by INCRA in 1974, but subsequently controlled by a single landholder claiming title, were invaded by MST-organized settlers in 1997. Unfortunately, one of the settlers (later expelled) started a fire that swept through and significantly damaged the Poço das Antas Biological Reserve. Since then, conservation groups, IBAMA, and the leaders of the settlers have collaborated on land-use planning, environmental education, and agriculture, drawing on the experience gained with the Cambucães—Olhos d’Água community. After it was officially recognized for land reform by INCRA in 1999, 30 families were settled in the area. There was a delay in INCRA recognizing the legitimacy of a similar site with an encampment of 83 families organized by the MST, when IBAMA took out a civil action against INCRA, demanding that it conduct an environmental impact assessment required by CONAMA (Resolution 13, 1990). This revealed the inadequacy of the environmental assessment protocols, designed primarily for industrial projects, in evaluating land-reform initiatives and resulted

in a new CONAMA resolution (no. 289/2001) that established a new protocol specifically for land-reform settlements. The federal public prosecutor's office, recognizing the urgency of the situation for the encamped settlers and the threat to golden lion tamarins, ruled for the creation of a multidisciplinary evaluation team—coordinated by the Fluminense Federal University—with the participation of NGOs and other stakeholders. There are high hopes that this process will lead to a compromise that addresses the needs on both sides.

### Land Reform and Conservation in Southern Bahia

As in the Pontal de Paranapenama and the Poco das Antas areas, environmental NGOs in the Atlantic Forest of southern Bahia have increasingly sought common ground on technical issues with organizations that promote land-reform settlements. As with IPÊ and AMLD, small environmental groups such as Gambá, Jupará, and the Instituto de Estudos Sócio-Ambientais do Sul da Bahia (IESB) have sponsored projects to train land-reform communities in agroforestry, tree-crop nurseries, wildlife and water issues, and land-use planning. Southern Bahia is a cacao-producing region, and its forests have generally not (yet) been reduced to the hard-edged fragments typical of the regions discussed previously. Naturally shaded cacao plantations that connect the forest fragments remain an important component of the landscape. With more forested remnants on private lands than in the Pontal and with significant agroforestry still providing some landscape connectivity, environmental groups have focused on influencing public policy to avoid further fragmentation rather than on reconstructing connectivity.

Approximately 200,000 rural workers lost their jobs on cacao plantations in Bahia in the early 1990s, when declining world prices could not cover producer costs amid an outbreak of the fungal witches' broom disease (Demeter 1996). Although out-migration from the region was significant, unemployed rural workers constituted a reserve army of the poor for the organized land-reform movement. Organizations of the land-reform movement in Bahia were more heterogeneous than in the Pontal, where the MST was dominant. The human rights of rural

settlers were first defended in Bahia by representatives of the Catholic Pastoral Commission of the Land (CPT); other groups have included labor organizations (CUT-Rural), the Land Liberation Movement (MSLT), and the Movement for the Struggle of the Landless (MLT). Land-reform settlements in the 1990s tended to be established on properties with more forest remnants, induced by the technical and legal standards designating properties with above-minimum native vegetation as unproductive (Table 1). While land-reform settlements have been an increasing source of pressure on forest remnants in Bahia, they contributed less to deforestation in the 1990s than the deforestation occurring on lands controlled by large landowners (Alger 1998; S.D.P. Trevizan. 2004. Poor People, Poor Social Organization, and Poor Space: Case Studies among Rural Settlements in Southern Bahia, Brazil. Paper presented at meeting of the Latin American Studies Association, Las Vegas, Nevada, 7–9 October 2004.).

Environmental NGOs sought to influence the locations chosen for land reform in southern Bahia by building awareness of existing public policy, such as the CONAMA resolution 13/1990 that placed use limits on areas within 10 km of the boundary of federal conservation units to protect the habitats of threatened species. Despite these regulations, IBAMA approved numerous logging concessions on private lands within 10 km of the Una Biological Reserve, where researchers confirmed the presence of two threatened primate species. The federal public prosecutor's office was informed, and use restrictions were disseminated through maps showing the affected properties. The INCRA and land-reform community technicians were also apprised of these limitations, which effectively restrict the prospects for INCRA to appropriate land in favor of settlers, thereby undermining the incentive for organizers to occupy these lands in the first place.

Soil maps and independent studies revealing the poor agricultural suitability of coastal soils underlying most remaining forest fragments were shared in meetings with land-reform activists. In specific cases, environmentalists helped the landless find more appropriate and already deforested agricultural land, enhancing shared interests. In one case, a 500-ha, completely forested property (Fazenda Oregon) within an area to be designated by the state of Bahia for the Conduru State Park was

**Table 1.** Land-reform settlement location in southern Bahia in relation to land use, 1986–2000.\*

	Number	Natural vegetation (%)	% agriculture/urban
Municipalities in broadleaf evergreen tropical forest zone	109	22	74
Municipalities with land-reform settlements: 1986–2000	23	34	57
Land-reform settlements, including surrounding lands within 3 km: 1986–2000	38	42	52

\*Natural vegetation was measured from classified 1996 Landsat imagery (Landau et al. 2003) and includes forests, mangroves, restingas, and wetlands. Vegetation on both settlement lands and lands surrounding settlements is a measure of the predominant land use in the vicinity, independent of changes brought by the settlement itself.



building was necessary to reach a landscape scale of engagement. To avoid species extinction, all the NGOs realized that broader-scale work is the only technically viable approach, although they all also found that confidence-building efforts with land-reform activists on settlement agroforestry projects was a necessary starting point.

Continuing pressures on forest fragments exist, and efforts to build awareness of the irreplaceable importance of these fragments also increase pressures. Environmental awareness also highlights the fact that without progress on rural poverty, forest fragments are still a potential “weapon of the weak” (Scott 1985). Although the dwindling, isolated forest fragments in the Atlantic Forest constitute one of the world’s greatest and most immediate risks of biodiversity loss, fragments continue to be livelihood buffers for people without economic alternatives during cyclical and sectoral economic adjustment. As such, they can be held hostage by social movements to put political pressure on government to offer better economic alternatives. Despite these structural forces, a surprising degree of mutual interest was discovered in work around protected areas in these three Atlantic Forest regions. As the land-reform movement employed technicians and understood the ecological consequences of forest degradation, increasing political efforts and risks were taken to avoid zero-sum confrontations. Environmental NGOs also learned that their technical capacity to influence public policy in favor of better lands for small-scale agriculture did not contradict their aims of conserving habitat remnants and could potentially contribute to the reconstruction of habitat connectivity.

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