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INVISIBLE FORESTS
The political ecology of forest resurgence in El Salvador

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In El Salvador, Nature has been extinguished.
(Terborgh, *Requiem for Nature*)

INTRODUCTION

Extensive deforestation was dramatic throughout the New World Tropics during much of the last century. Whether one emphasized Malthusian processes, social inequality, confused property regimes or misguided land use policy, Latin American forests relentlessly fell. Today, however, the "doomed forest" narrative, at least about Mesoamerica needs to be rethought. While deforestation continues in some areas, especially near expanding cities and in sites apt for mechanized agriculture, many rural areas are showing robust resurgence of anthropogenic and successional forests. Recent field research using an array of techniques including remote sensing and detailed land use surveys reveals a rising proportion of diverse, forested or semi forested anthropogenic ecosystems in the region (Hecht *et al.* 2002b; Hecht and Saatchi 2003), including, surprisingly, the "environmental basket case" of El Salvador. This process of regeneration has been reported elsewhere in Latin America (Aide *et al.* 2001; Klooster 2003; Moran *et al.* 2000; Rudel *et al.* 2002; Zimmerman 2001) and is also described for Asia (cf. Chokkalingam *et al.* 2001; de Jong 2001). This woodland recovery and the types of forests that comprise it, often ignored because of the overarching interest by many conservation scientists in "primary" ecosystems, has enormous implications for the longer socio-ecological future of the region, and for resource policy. This paper explores the explanations of forest trend, the political ecology of woodlands in El Salvador, and examines how well these models account for these changes. The final section focuses on the policy implications of these dynamics.

Today, farmers balance a broad array of economic and social elements in the construction livelihoods that shape the use of natural resources. Global processes (including international migration, remittances, commodity prices, international environmental ideologies) regional dynamics (such as the Central American Common Market, the Meso American Biological Corridor) national structural adjustment and development policies (like decentralization, credit, agrarian reform policies, restructured labor markets) and local socio-environmental circumstances (household strategies, tenurial structures, access rights, gender of farmers, ethnicity, traditional beliefs, natural resources endowment) all affect land use decisions in very concrete ways.

Globalization—by which we mean the effects of trade liberalization, international labor markets, migration, capital flows and the "internationalization" of certain ideas—is among the most powerful of the forces affecting farmers. In some literatures it is assumed

to unfold through a uniform set of social and institutional structures, rather like kinds of deterritorialized economic waves that wash over regions. We take the position, in line with a large literature in economic geography, political science and anthropology (cf. Bebbington 1999; Storper 1997, among many others), that globalization is mediated by local institutional arrangements, local assets, and a wide array of ethnographic and household factors that modify larger processes. Observed natural resource use reflects not just globalization "from above" but also its modification and manipulation "from below." Manifestation of these social processes include the physical forms of the landscape, especially in the resurgent forests of densely occupied rural areas and new institutional arrangements. Regenerating forests are a profound outcome of socio-economic as well as bio-geographic features. They are truly a socially "constructed" nature.

EXPLAINING FOREST TREND

The deforestation question

The dynamics of deforestation continue to be an active area of research, although most explanations of clearing processes have not integrated the impacts of current macroeconomics, and paid little attention to the impact of consolidation of both globalization and structural adjustment policies on resource management (but see Angelsen and Kaimowitz 2001; Barbier 1997; Hecht 2003). There are decades of summaries and discussions of the causes of deforestation but these will be rapidly summarized in the next few paragraphs.

Malthus and markets

These two approaches—Malthus and markets—population and prices—remain the dominant frameworks for explaining forest loss. While empirical and modeling data show ample reason to reject Malthusian premises (Fairhead and Leach 1998; Gibson *et al.* 2000; Kaimowitz and Angelsen 1999; Steininger *et al.* 2001; Templeton and Scheer 1999, among many others) population pressure is still seen as the key process in most of the biological literature (e.g. Myers *et al.* 2000; Terborgh 1999, most articles in the journal *Conservation Biology*). The simplicity of the correlation and the habit of two centuries have helped reinforce this approach.

Markets are seen to play a significant role in deforestation, either as enhancing demand for commodities that destroy forests or replace them (like timber, pasture or soybeans), or as stimulating markets for green products, correctly pricing tropical resources, and providing economic alternatives that promote more sustainable forest use, such as in non-timber forest products, certification of timber, and biodiversity friendly coffee (Hecht and Cockburn 1989; Perfecto *et al.* 1996; Shanley *et al.* 2003). Globalization of markets is conventionally viewed as an important driver in forest transformation as international demand for tropical commodities expands and produces forest depletion, and stimulates local farmers and other economic actors to respond to far flung market pressures (cf. Barbier 2000; Hecht 2003; Sunderlin *et al.* 2001). Another dynamic often mentioned of globalization of capital markets is the impact of debt on

natural resources. In this approach tropical resources are plundered to pay off government obligations to international borrowers. The impact on natural resources of international migration and remittances remains largely unstudied (Hecht *et al.* 2002a) though it is central to the arguments advanced later in this paper.

Institutions: property and political structures

Institutional features associated with tenurial structures, property regimes and access rights are also viewed as key elements in deforestation (cf. Gibson *et al.* 2000). Insecurity over tenure, and the importance of clearing as a means of claiming lands has been widely analyzed as a stimulus for deforestation (cf. Downing *et al.* 1992; Hecht 1984, 1994; Schmink and Woods 1992). Weakness in the political institutions of environmental governance contributes to forest clearing (Didia 1997; Hecht *et al.* 2002b; Repetto and Gillis 1988).

Policy deficiencies, corruption and state cronyism—institutional rent seeking—are also recognized as stimulants to deforestation. Institutional rents associated with regional development policies and state initiatives that subsidized land clearance, particular commodities, timber cartels, and/or colonist programs that triggered clearing or speculative dynamics have also been blamed for fueling clearing (Hecht 1985, 1993; Lopez and Mitra 2000; Repetto and Gillis 1988). Corruption, especially in the timber and construction industries is implicated in the development of the policy and political climate that supported deforestation. Deeper macro-political processes involving geopolitical concerns, internal ethnic control, structural alternatives to agrarian reform, and larger effects of the political economy provided the overt ideological apparatus and the deeper justifications for massive clearing.

Intensification and technology

Technology arguments have also been widely advanced to explain patterns of clearing. This view suggests that increasing intensive production on its own will reduce clearing by keeping each hectare in cultivation and by increasing returns per area. This view, championed by advocates for alternative agricultures as well as the larger scale research organizations like the CGIAR[1] and agribusiness essentially views deforestation as a technical problem of extensive land uses. Allied with technology arguments have been those associated with infrastructure development, suggesting that better roads would assist in consolidating frontiers and reducing deforestation, even though historically infrastructure expansion has been the most straightforward correlate with clearing (cf. Dale *et al.* 1993; Kaimowitz *et al.* 2002). Discussions of Technology /intensification is usually unmoored from social contexts, and has been viewed as having a braking effect on forest clearance. Recent research suggests that this dynamic is far more complex. Intensive technologies, such as those associated with soybeans, sugarcane, industrial maize and cotton have, however, been decisive in massive deforestation processes (See Angleson and Kaimowitz 2001; Hecht 2003; Steininger *et al.* 2001; Utting 1993) and have been problematic elsewhere (See Angleson and Kaimowitz 2001).

Both endogenous and exogenous forces have been invoked to explain patterns of clearing, and there are case studies that support each of these larger models. Most of

these models of deforestation derive however from the macroeconomic milieu that preceded deepening globalization and structural adjustment reforms. These larger scale macroeconomic impacts have been poorly theorized in the deforestation literature. But regardless of the nature of the drivers of forest destruction, the overwhelming policy choice for maintaining forests has centered on conservation set asides—national parks and reserves.

The last policy stand: parks and forest persistence

The literature on forest clearing gives a depressing and unidirectional sense of forest trend, and provides a sense that most deforested landscapes are forever barren and degraded. This version of a post-clearing world of holocaust has justifiably fueled the eagerness for conservation set aside throughout the tropics, and given the National Park or national reserve model pride of place as the best possible response to the seemingly inevitable, irreversible ravages of tropical deforestation. The lion's share of conservation funding has been applied to this model, in part due to its conceptual simplicity as policy, as well as the large theoretical and applied intellectual apparatus has emerged with the study of Island Biogeography (cf. MacArthur and Wilson 1967; Terborgh 1999), and early institutional analysis (Hardin 1967). This framework supports the idea of reserves as the last feeble hope in a landscape of despair. Its related field, fragment ecology, has proved to be far more contradictory, since the quality and type of the matrix in which forest fragments occur are seen as having a decisive impact on the diversity parameters of both the forest fragments *and* the matrix. Nonetheless, informed by theoretical models of species/area curves and tested in various contexts (islands in reservoirs, cf. Terborgh 1999) the Central Amazonian minimal critical size project (Laurence *et al.* 2001) among others, seemed to argue that large set asides in areas of significant diversity (hot spots) would provide the best protection for maintaining ecological processes and biodiversity (cf. van Shaik *et al.* 1997; Myers *et al.* 2000).

While increasingly advocated and adored by conservationists, a large body of research is emerging that places reserves in a social context that explains why, to the bafflement of many ecologists, local populations often detest parks. The Reserve model has proved controversial everywhere for a number of reasons outlined by Neumann (1999, among others). These issues often revolve around the creation of mythology of a European image of "wild" uninhabited nature in areas already occupied by people, and the criminalization of traditional subsistence and livelihood activities like gathering firewood, grazing, extraction of building materials, hunting and fishing (Hecht and Cockburn 1989; Neumann 1999, and this volume Spense 1999). Local peoples often had their reserve in—holdings expropriated and were "resettled" in ways not always especially beneficial for them.[2] In Latin America these set asides also carried with them other reasons for resistance. More than 70 percent of Latin American parks were established in the 1970s, and 1980s, (van Shaik *et al.* 1997), a period associated with military and authoritarian regimes, intense violence against rural populations, and a period especially associated with enclosure and rural dispossession. Even when the transition to democratic governance was underway, rural policies, including many environmental ones, still reflected this authoritarian legacy. In places like Brazil, and Bolivia, large scale conservation set asides were seen as part of the ideology and practice

of authoritarian planning models of regional integration, and enclosure in the tropics that marginalized vast numbers of traditional peoples (Hecht and Cockburn 1989; Schmink and Woods 1992). Today, conservation initiatives have become important drivers of centralized land use planning, and often underpinned large Amazonian planning exercises such as "Planofloro" in Rondonia Brazil, and "Plus" in Bolivia and the Meso American biological corridor. Indeed, many community-based conservation initiatives have been rooted in a critique of these large scale modernization and land rationalization (Scott 1997) programs (Hecht and Cockburn 1989; Lima 1999).

Predicated on the idea of empty landscapes, the architects of forest reserves, simply viewed non-conservation, social landscapes with disdain—a fragmented forest, or successional form, home to the living dead in their shrinking little habitat. Thus as ecologists whizzed from the capital to their favorite conservation areas, the matrix in which the conservation landscapes occurred was largely overlooked. In many areas of the world, this landscape was increasingly wooded, as anthropogenic forests and successions replaced and supplemented earlier pastures and grain crops. As Fairhead and Leach (1998) have pointed out, the dominance of the scientific discourse of degradation/deforestation made it difficult to imagine that humans might have positive impacts on the environment. Meanwhile, many rural social movements began to articulate position that saw a "convivencia" and closed adaptation between forests, and people—a position increasingly supported by the archeological and ethnographic record (cf. Denevan 2001). In the midst of these heated debates over people and parks and whether even the idea of people and reserves was legitimate (cf. Sanderson and Redford 1997; Schwartzman *et al.* 2001) another dimension of forest processes remained mostly unobserved. Forest resurgence was occurring throughout the region.

Model of forest persistence

While complex sets of theories and explanations have emerged on why forests fall, few explanations are on offer for why forests stand. Six frameworks: geographic isolation, livelihood, institutional contexts, the environmental Kusnets curve, forest transition, and equity models explain the dynamics of forest persistence outside of parks.

The first model, *isolation,* simply argues that the forests are so distant or access is so difficult that the forests exist by default away from the realm of human transformation. Here, forests exist in geographical areas "outside" of history.[3] The standard set aside approach is a socially created "isolation" from human impacts.

In the *livelihood* analysis, traditional populations are often understood as highly forest dependent and require forest products as subsidies to subsistence and as essentials for market. Well known examples such as Brazilian Rubber tappers, Xateiros in Guatemala (among others) inform this "livelihood" logic of why forests stand. But for most forest dwellers, successional forests or earlier successional elements are especially important even within "primary" forest models. The manipulation of palms, fruit trees of many types, and successional formations by forest people has been extensively documented (cf. de Jong 2001; Padoch *et al.* 1999; Posey and Balee 1989, among many others). The high utility of secondary forests for "non forest" people has also been widely described (see Chazden and Coe 1999; de Jong 2001; Hecht *et al.* 1988; Padoch *et al.* 1999, among many others). In short, this utility argument emphasizes forest products in livelihood as

the over-arching explanation for forest protection, and by extension, construction or reconstruction by local people. The livelihood model has obvious economic and policy dimensions to it, and is very sensitive to economic and institutional dynamics. This livelihood approach is often linked to ideas of territoriality, identity, and indigenous knowledge systems as well.

Social movements

While social movements are often organized around economic/livelihood concerns, they can be mobilized, and regularly are in the developed world around non-economic goals. The national parks movements, and various wildlife preserve advocates usually make their cases on the basis of a moral or scientific discourse rather than one that emphasizes utility. But there are also spiritual arguments that may cause local movements to agitate for protection of sacred spaces or sacred forests, or places of special significant for local identities.

Property and political institutions

The *institutional* approaches *vis-à-vis* forest persistence takes two main forms: those pertaining to property regimes and those associated with political institutions. The dynamics of property regimes are usefully summarized by Gibson *et al.* (2000) who review the controversies and outcomes for forest management through several case studies that explore the issues in local regulation of access and ownership regimes. Institutional dynamics are highly contingent and must be carefully specified at the historical, ethnographic as well as policy levels. The research on property regimes (whether private, state, or communal ownership) does show that institutions of property, whether collective or private have a significant effect on forests, and can contribute to their protection or their demise, depending on the context (cf. Gibson *et al.* 2000; Klooster and Masera 2000; Orstrom 1991). The data support both sides of the argument for and against collective and private regimes, although mixed systems (private household with collective holdings) give the impression of somewhat better performance when institutions of social regulation are in place. While this is perhaps not a satisfactory conclusion, it reflects the deeply conjunctural and social nature of resource control.

The impact of property regimes on diverse forest "creation" is far less studied. The conventional arguments usually weigh in on the side of private property because this forest "construction" literature focuses so heavily on plantation development which is heavily dependent on clear ownership to assure investment over long time frames. But there are some studies that focus on communal rights that emphasize non private tenurial forms and strategies of forest recuperation and expansion, mainly as an outcome of sustainable development, forest co-management and watershed recuperation activities as parts of Aid programs (cf. Klooster and Masera 2000; Primack *et al.* 1998, among many others). Property institutional issues are contentious due to their intense ideological content, the volatility of power relations and policies that affect them especially in the face of national and international effort to "rationalize" communal holdings and to reduce land conflict through privatization as part of recent neoliberal policy interventions.

Another institutional approach specifically emphasizes the idea that more democratic political institutions and local accountability produce more environmentally sound outcomes in resource management (cf. Didia 1997; Torras and Boyce 1998). This was the crux of the argument advanced by leftist movements and environmentalists just prior to the massive implementation of decentralization programs associated with structural adjustment policies. Local accountability, democratic access and decision-making could, it was argued, provide flora that would permit local communities to articulate their environmental needs more effectively and thus slow degradation and promote recuperation. The literature on *ejidos* in Mexico, extractive reserves, and some of the Bolivian decentralization efforts have shown a generally positive relation of more accessible political institutions with the maintenance of forests. Overall, however, the decentralization literature shows a far more ambiguous set of outcomes. Local management can be hijacked by native or outside elites, local communities can be unorganized and thus unable to articulate a coherent program, localities may have groups or ethnicities with highly different goals in terms of resource uses (See Ribot 2001). In addition, programs that emphasize an "environmental" nature—like potable water projects, often eclipse the more "ecological" terrain of natural resource management.

Decentralization in general has not usually been associated with budgets necessary for management or regulation of natural resources and thus depends a great deal on local social capital for successful implementation (cf. Hecht *et al.* 2002b; Ribot 2002). In short, political institutional dimensions of resource management is clearly important, but like the literature on property regimes, must be highly specified. The questions of social capital, as well as institutional structure and access lie at the heart of this debate.

History-ing the making (of forests)

The next approaches—the environmental Kuznets curve and the forest transition models are historical in nature, and view forest degradation as a phase in the development process. The central question that the Environmental Kuznets Curve (EKC) addresses is whether environmental degradation increases monotonically with rising GDP, or whether there is some point where it decreases. Inspired by Kuznets (1956) work on inequality, the EKC suggests that environmental damage increases up to a certain income point after which the degradation parameters decline as economies become more efficient, less resource based, and tastes change. Graphically this is represented as an "inverted U." In its simplest formulations it is meant to correlate with GDP, but modeling exercises increasingly incorporate a broader range of variables. Approaches to the EKC include "brown" studies that emphasize the dynamic of pollutants (Torras and Boyce among others) and "green" studies that specifically focus on deforestation (Bhattarai and Hammig 2001; Koop and Tole 2001, among others). One issue that needs to be underscored is that there is an analytic difference between EKC for externalities like atmospheric emissions and those for deforestation. The conflation in the EKC models for control of "brown" pollutants with "green" EKCs is problematic for a number of reasons. "Brown" externalities like sulfur emissions, urban waste, etc. are classic cases of externalities where traditional approaches for reduction, like taxes, regulation, pollution markets and technical change can emerge, and are not as institutionally complex or as ecologically unpredictable. Deforestation or forest maintenance and/or recovery, as we

have seen, expresses a much more complex set of biotic, ecological and social processes. The socio-ecological terrain, really that of political ecology, focuses on the complex intersections of biology, land use, history, social context, institutional, economic, cultural, symbolic and power relations. Thus, the data for deforestation EKCs is much "noisier" at all analytic levels when forest trend and the EKC are analyzed.

The deforestation EKC

The deforestation EKC studies are based on panels of FAO forest statistics (often highly questioned by local field researchers), and then the trends of forest change are evaluated using a range of variables including population, population density, GDP, debt, institutional factors (such as enhancement of democracy) and policy factors to test whether the curves exist, and at what income level the inflection point occurs (Bhattarai and Hammig 2001; Ezzati *et al.* 2001; Koop and Tole 2001; Stern *et al.* 1996; Usivuori *et al.* 2002). Forest EKC modeling efforts, which involve all tropical countries where the basic data sources are highly questionable, do not easily assess "informal," successional and anthropogenic forests. For example, the data sets used for the Mesoamerican biological corridor recognize some 133 native vegetation types, but conflate all anthropic landscapes from cotton fields to agroforestry into one category, making the array of regenerating woodlands largely "invisible."

The final results of the models are contradictory: Bhattarai and Hammig (2001) focusing on institutional dimensions of clearing and EKC find that a deforestation EKC exists for Latin America, but its inflection point occurs with a mean income of $6,600, well above the mean income for Latin America of $3,500. Bhattarai and Hammig emphasize that political institutions (based on criteria provided by Freedom House data)[4] were the key elements of the model that explained the emergence of an environmental Kuznets curve. The impact of population (density and rates of growth) in their model was not significant when the political institutions and macroeconomic structures (in this case presence or absence of a black market in natural resources and the percent of debt) were specified.

Usivuori *et al.* (2002) also assert the existence of an EKC but links this to population density and income per capita and places the inflection point at around $2,500, although with many caveats. Koop and Tole (2001) on the other hand, find no EKC for Latin America—arguing that policy contexts and other factors affecting land use differ so much as to defy useful comparisons.

Critiques of the EKC point to problems with the data base on which assertions are made, comparability between countries and between types of ecosystems, and the statistical methods used to address the questions (Ezzati *et al.* 2001; Koop and Tole 2001, among others). Others cite the sanguine epistemology that devalues current environmental degradation as part of "growing pains" in the transition to a more ecologically sound future (Stern *et al.* 1996), in spite of the fact that serious, and perhaps irrevocable degradation might occur, as with extinctions associated with deforestation. Another problem with the EKC is that structural change is implicit, but not specified, presumably reflected in the rise in income. That is, the processes that lead to inflection, whether growth, redistribution, institutional change etc., remain a "black box."

The next historical model, that of forest transition, is really the flip side to the more widely known phenomenon of the urban transition. Its analysts, (cf. Mather and Needle 1998) argue that as countries become more urbanized, small holders abandon their agriculture and move to cities. Largely based on the history of the US and Europe, the forest transition model is intimately tied to ideas of long term structural change in the economy with permanent out migration. It remains informed by the Harrod-Domar two sector economy equations that informed a great deal of rural development policy throughout the twentieth century, and depends on a definitive differential labor market and more or less permanent out migration. In his study of Puerto Rico, Rudel *et al.* (2000) argues strongly in favor of a forest transition as an outcome of the aggressive industrial development via Operation Bootstrap, and as a result of the special relation with the United States which provided both labor markets and US "safety net transfer payments" which drew off labor from farm activities and raised its costs. The lack of migration barriers to the United States also was a key dynamic, as was the lack of competitiveness of PR agriculture. The ensemble undermined most agricultural production by devaluing rural production and by creating a competing and relatively highly paid labor market. In this approach, the rural exodus reduces rural population and agricultural enterprises and results in land abandonment. Yet he argues against the forest transition model in his study of Ecuador, suggesting both the dynamics of cattle and intensive small holder agriculture do not imply deserting the land, which is implicit in most forest transition models.

The EKC and transition models are useful because of their historical sweep, and because they stimulate questions about specification of the actual processes that produce the "inflection" and forest resurgence. They suffer from problems of over aggregation and data quality.

The final model is the "Equity" model. Torras and Boyce (1998) empirically analyzed the relationship between air and water qualities indicators that improve with income. Their study argued that it was not so much the dynamics of economic growth, but rather changes in the distribution of income—especially transfers to the "average citizen" that was most significant, because these empowered citizenry to demand better environmental management. Greater income inequality was associated with more pollution and less safe water at lower income levels, and the patterns continued at higher income countries. Expanding on this approach, Koop and Tole (2001) modeled the relationship between income inequality, growth and environment (deforestation in this case) by essentially linking the Kuznets curve with the environmental Kuznets curve to test "to what degree social welfare policy mediates the environmental effects of economic growth" that is, are the effects of economic expansion on the environment influenced by a country's distributive policies. It is, after all quite possible to raise the average GDP/capita without improving living standards of most of the population. In their model they used indicators of inequality such as the Gini coefficients for income and the Gini coefficients for land. Their findings showed that in countries with a high degree of income inequality, increasing GDP and deforestation was positively related, while in those countries with greater equality in their land distribution, GDP had only a marginal effect on deforestation. More equitable resource distribution resulted in lower rates of forest clearing. These results complement some of the findings of the political institutional impacts, and help explain why the deforestation EKC results are variable. These results

are important because there are several situations in Latin America that appear to support this finding—the *ejidos* of Mexico, inhabited reserves of various kinds, and some situations of colonization. Indeed, studies of deforestation in Bolivia show that the smaller holdings have slower rates of deforestation than large ones (Hecht 2003; Steininger *et al.* 2001). But while the Koop and Tole model help us understand forest persistence, can it illuminate forest resurgence? Overall, how well do these models of forest persistence and resurgence explain the new patterns of forests in El Salvador, Central America's poster child for environmental degradation?

EL SALVADOR

In the popular consciousness, El Salvador is notorious for its degree of deforestation, as summarized in Terborgh's cheerless sentence. Numerous articles assert that only 2 percent to 5 percent of its forests remain, giving the impression of a blasted landscape with barely a tree in sight (FAO 2000; MARN 1999; Terborgh 1999)[5]. This view is faulty, and informed by the extension of older deforestation trends whose logic and dynamics no longer hold given the enormous structural changes in El Salvador's and the global economy (Hecht *et al.* 2002a). This view also misses several processes that have encouraged forest recuperation and overlooks the widespread anthropogenic and regenerating woodlands that are significant in their total area, and in their ecological and social impacts. While some might revile these types of forests, it is worth pointing out that the major "wild" national park—El Impossible—with its impressive biodiversity was a former coffee plantation, and has at least eight major archeological sites within it.

This section outlines the dynamics of forest recovery in El Salvador and reviews the global processes, national policies, local politics and varying ideologies of environment and environmental practices that now shape rural landscapes. The last section of the paper discusses how well the models on offer help explain these changes, and what they imply for conservation policy in the new global context.

Biodiversity in El Salvador

While often derogated for a lack of biological richness (FAO 2000)[6] recent ecological research in several fields (cf. Berendsohn 1995; Dull 2001; Komer 1998; Ramirez 2001) contradicts this inaccurate, and unfortunately, oft repeated impression. The view of "forest Free" El Salvador misreads forest trend, and devalues the importance of anthropogenic and disturbed forests which are significant for the maintenance of biodiversity and other ecosystem services. While conservation science often fetishizes "virgin" forests, there is some question in a region as geologically and biologically dynamic as El Salvador, whether the idea of "primary" versus "disturbed" ecosystems even makes sense as "categories" especially, given the antiquity of intensive occupation and the ubiquity of human impact over at least eight millennia. (See for example Bush *et al.* 1992; Daugherty 1969; Dull 2001; Flannery 1982; Pohl *et al.* 1996; Sharer 1978; Sheets 1979, 1982, 1984). Recent research on the Holocene vegetation history of El Salvador suggests that secondary vegetation types are the more "characteristic"

formations of the region, and that the region has never been completely forested (Dull 2001).

Biological collectors and tropical ecologists generally prefer areas with extensive wild areas (good laboratories) and so have largely avoided El Salvador, with its dense population and dearth of facilities. With little international attention, and not much emphasis in local natural resources training due to twelve years of civil war (and decades of rural unrest), there is a ubiquitous impression that ES is depauperate in biodiversity which is reinforced by comments like those of Terborgh, and a general sneery attitude to the biotic gifts of the country (Myers *et al.* 2000). But recent studies of trees (Berendsohn 1995; Ramirez 2001) and birds (Komar 1998) have discovered so many unrecorded species that the old perception must be rethought. Amazingly, 580 bird species have been reliably recorded here, and another 75 are expected to occur. Northern Central America is a center for avian endemism and this suggests that other taxa will also be highly endemic (Komer 1998). The patchiness of the habitats themselves, and the types and the resource rich structure of anthropogenic forests have undoubtedly contributed to the maintenance of overall biodiversity. Coffee farms suit many generalist species including a large array of international migrants because of the permanent nature of the crop and its shade trees (Perfecto and Vandemeer 2001). The widespread planting of hedgerows, fruit trees, and extensive domestic agro-forests provide resource islands throughout the landscape. In addition secondary vegetation and arboreal diversity in abandoned pastures plays an increasingly important role in the maintenance of El Salvador's biotic complexity While it is true that the charismatic fauna of Central America—jaguars, tapirs and some primates—are rare, the region does embrace significant diversity.

Table 3.1 compares the diversity of El Salvador with other countries in Central America. It is worth pointing out that "diversity" is a feature of ecosystems as well as an artifact of biological collection. Panama with its long association with the Smithsonian Institution, and Costa Rica's venerable tropical ecology study site, La Selva, have meant that both places have undergone extensive taxonomic analysis and had thousands of students collecting specimens for more that 40 years The diversity of El Salvador is especially impressive given the "small" (indeed, underestimated) forest area of the country, and the prevalent view that it has almost no worthwhile forests. How then, does one explain such diversity in a country that is seen as having no significant forests?

Table 3.1 Biotic diversity in Central America (number of species per 10,000 km^2).

Country	*Forest Area*	*Mammals*	*Birds*	*Reptiles*	*Amphibians*	*Higher Plants*
El Salvador	167,000	106	365	57	18	1,956
Guatemala	4,253,000	114	304	105	45	3,638
Honduras	4,608,000	78	308	68	25	2,252
Nicaragua	6,027,000	86	322	69	25	3,003
Panama	2,123,000	112	477	116	84	4,618
Costa Rica	1,569,000	120	496	125	95	6,421

Source: World Resources Institute (1996).

Secret forests of El Salvador

Table 3.2 outlines land uses in El Salvador and provides classification and area of woody vegetation from three different sources.

Secondary forests of various ages and forms (which is often classified as "pasture"), and with different degrees of density cover more than a third of El Salvador. Pastures are either largely diverse silvo pastoral systems[7] since during the war cattle were largely sold off or eaten, beef imports from Honduras have sharply reduced local market prices, and the current level of banditry results in such high rates of cattle rustling that grazing without close supervision produces spectacular losses.[8] As such, secondary growth and advanced pasture successions represent the largest forest types in the country, and given the millennial anthropogenic and disturbance dynamics in El Salvador, secondary formations are probably its characteristic vegetation.

In spite of its reputation for "extinguished" nature ES has substantial forest cover. All the sources indicate that the country has at least 600,000–700,000 ha of tree cover of all types—at least a third of the country is forested, and in its montane zones—Chalatenago, Morazon, La Union, Cabanas the proportion may increase to close to 60 percent.

Deforestation drivers in El Salvador are now substantially different from those of the past and mainly include urbanization especially in the urban fringes of San Salvador, vacation and tourism in the mangrove forests and sugar cane with its protected markets on the coastal plain and Lempa valley. The factors that drove clearing before have shifted, and numerous processes now support the return of woodlands. These are outlined in the next section.

Table 3.2 Post-1995 estimates of land use according to various sources (in Ha).

	MARN	*Hecht*	*Komer*
Forest	320,761	320,000***	
Secondary forests	—	300,000	
Mangroves	24,382	25,000	38,000
Coffee	230,000	170,000*	195,000
Plantations	—	7,000	7,000
Coco	5,000	5,000	1,314
Commercial orchards	46,863	35,450	
Domestic	—	50,000–100,000**	
Protected areas	—	28,000	
		(+48,000 ha to still be added)	
Urban forests	—	8,000	
Hortalizas	9,014	—	
Basic grains	499,000	300,000*	
Pasture	1,160,738	—	
Urban area	44,261		
Total forest	627,761		

Source: Hecht 1999; Komer 1998; MARN 1999.
Notes:
* MAG (1998).
** Estimates of forests in household orchards and agroforests, land demarcations and hedgerows.
*** Includes Pasture.

FACTORS OF FOREST RECUPERATION

Forest recuperation in El Salvador reflects several processes that are the outcomes of political and economic globalization, structural adjustment politics, and processes of democratization and decentralization. These include:

- the impacts of El Salvador's civil conflicts as they reflected hemispheric cold war politics. These had effects on the agricultural frontier, migration and agrarian reform;
- the outcomes of regional and international economic integration and trade liberalization on grain prices and the volatility of international coffee prices;
- the effects of structural adjustment policies on rural credit and subsidies, and the implementation of decentralization programs;
- the emergence of local and regional environmental politics as an outcome of political opening after 50 years of authoritarian regimes and decentralization.

Conflict and clearing

El Salvador was a "hotspot" in the cold war. A long history of civil uprising marked the history of the twentieth century in this country, but among the most severe episodes was the civil war that lasted from 1980–1992. The main impacts of the war on natural resource management involved its chilling effects on the expansion of the commercial and peasant agricultural frontiers, its role in stimulating international and urban migration (and later, the economy of remittances), its ensuing agrarian reform and its impact on holding size and the rural economic structure. While war should not be advocated as a resource policy, from the environmental perspective, these outcomes all tended to reduce pressures on forests and permitted large areas of cultivated landscapes to revert to successional formations.

Deforestation in El Salvador

In the period from 1960 to 1980, El Salvador began to diversify its export base and transform the structure of agriculture. In an effort to modernize the agro-export sector, extensive land uses like cattle, and intensive industrial, high input agriculture like cotton and sugar cane exploded (Conroy *et al.* 1996; Faber 1993; Paige 1999). This dynamic was stimulated by an ensemble of fiscal incentives that were reproduced in many Central American countries, including subsidized credit for land, animal and machinery acquisition, duty free equipment importation, tax holidays, land grants and infrastructure development. Protected and preferential markets further buffered these activities from external competition, and until the economic downturns of the 1980s, agricultural modernization created;

1 a powerful, corrupt agro-commercial elite;
2 concentrated land ownership among this coterie; and
3 marginalized an increasingly landless population who sought to produce their livelihoods on ever more precarious holdings at the mountainous agricultural frontier.

The combination of the export agricultural and marginal subsistence production generated an extremely aggressive deforestation frontier (Faber 1993; Paige 1997; Williams 1986). The array of institutional subsidies also produced immense distortions in the agro-export economies as owners sought institutional rents of various kinds and engaged in land speculation (Hecht 1994). The effect of the war can be usefully disaggregated to clarify why, now, forests return.

The end of the agricultural frontier

Impact on large producers

While Malthusian drivers are often invoked to explain El Salavador's deforestation in the 1960s and 1970s, other analysts have pointed to the mechanization of the traditional crops of sugar cane and cotton on the coastal plain and the central Lempa Valley. This reduced the demand for labor, and also marginalized share croppers and other types of informal access, leading to a structural dispossession. As these populations moved into the mountains, they were increasingly displaced by an expanding livestock frontier, stimulated by cheap credits and a variety of subsidies to the sector that characterized much of Latin American at the time (cf. Kaimowitz 1995; Leonard 1987; Paige 1997; Utting 1993). Because of the geographic dynamics of displacement, mangrove coastal zones and the mountain areas became strongholds of the FMLN. As war theatres, commercial activities were curtailed, and subsistence producers also were forced to abandon cultivation (cf Pearce 1986).[9] These skirmish zones were often left alone for more than 20 years, and the continued existence of ordnance in these sites can make them still very hazardous to clear. In the coastal areas, also controlled by the FMLN, the production of cotton, the land use that was most responsible for chemical pollution of the landscape and waters was also decisively curtailed. With its extremely high use of biocides of all types, cotton was central in contaminating local water bodies and in the pollution of mangroves. (Murray 1994; Williams, 1987).

The civil war had important effects on coffee cultivation, the historic source of wealth in El Salvador. As Perfecto *et al.* (1996) show, during the 1980s, throughout Central America, coffee producers began to switch from the ecologically sound and "biodiversity friendly" shade coffee to the more sun tolerant varieties being promoted through various development agencies because they were somewhat more productive and as a control measure for coffee rust. The war precluded this changeover, and as a consequence 85 percent of El Salvadorian coffee is grown under traditional highly diverse shade canopies, and is organic, since chemical cultivation and harvesting were also inhibited by the conflict in this period (Procafé 1998).

Campesino production

The small farmer agricultural frontier, based on the cultivation of maize and beans that had been progressively pushed into montane areas by land scarcity during the 1970s (Faber 1993; Paige 1999; Utting 1993) was also reduced in the guerrilla zones by the periodic military skirmishes, the threats and realities of civilian massacres, forced resettlement, migration and widespread instability and marauding. While some areas limped along, the expansion of small-scale cultivation was increasingly difficult.

The War thus had the effect of curtailing the changeover to sun coffee, the expanding agro-industrial, livestock and peasant agricultural frontiers at exactly the moment that both these exploded in other parts of Latin America and were significant drivers of deforestation (cf. Downing *et al.* 1992; Hecht and Cockburn 1989; Perfecto *et al.* 1996; Schuuman and Partridge 1989).

Migration, remittances and environment

Another significant effect of the war was the out-migration of roughly one sixth of El Salvador's population as the war and its human rights abuses accelerated. Internal and international migration increased sharply during the 1980s when war ravaged the countryside, and has continued due to the economic declines in agriculture in the 1990s (Lungo and Kandel 1999).

The problem with Malthus

Although only 3 percent of the national territory, 32 percent of the population resides in the Metro Area San Salvador, which experienced a 13 percent gain in population since 1971. The northern third of the country, absolute numbers of the population remained constant. In Southeastern El Salvador, the proportion of national population dropped from 28 percent to 20 percent, but its absolute numbers increasing its absolute numbers by 200,000. In the southwest, once the Metro area of San Salvador is excluded, the percentage of the population has remained constant since 1971, although in absolute numbers the population more than doubled, largely due to peri-urban development around San Salvador, and the Maquila industrial economy near the airport (PRISMA 2002). Thus, rural population remains at roughly the same densities as the high deforestation phase in the 1971. (See Figure 3.1.)

Roughly 2.5 million Salvadorans live outside the country, some 94 percent in the US (Kandel 2002). The expatriates are the main source—66 percent—of El Salvador's foreign exchange. Table 3.3 shows magnitude of the dollars sent by households to their relatives and also illustrates the profound structural changes that have occurred in the agrarian economy. What is most noticeable is the collapse in tradition agro-exports, and the preponderance of remittances.

The "economy of affection" thus eclipses all other hard currency sources and accounts for 13 percent of the National GDP. The average amount of these remittances sent to rural households is roughly US $121/mo, about the equivalent of one minimum salary. Roughly one fifth of all rural households receive them. The average income per capita in El Salvador is US $1,990, (although rural incomes are roughly half that) so the average remittance contribution of US $l,452/year is a significant, and direct welfare subsidy.

The spatial distribution of remittances is also variable as Figure 3.2 suggests, ranging from a low in the areas of Ahuachapan—coffee production areas largely buffered from the war, versus areas like Morazan where the war, massacres,

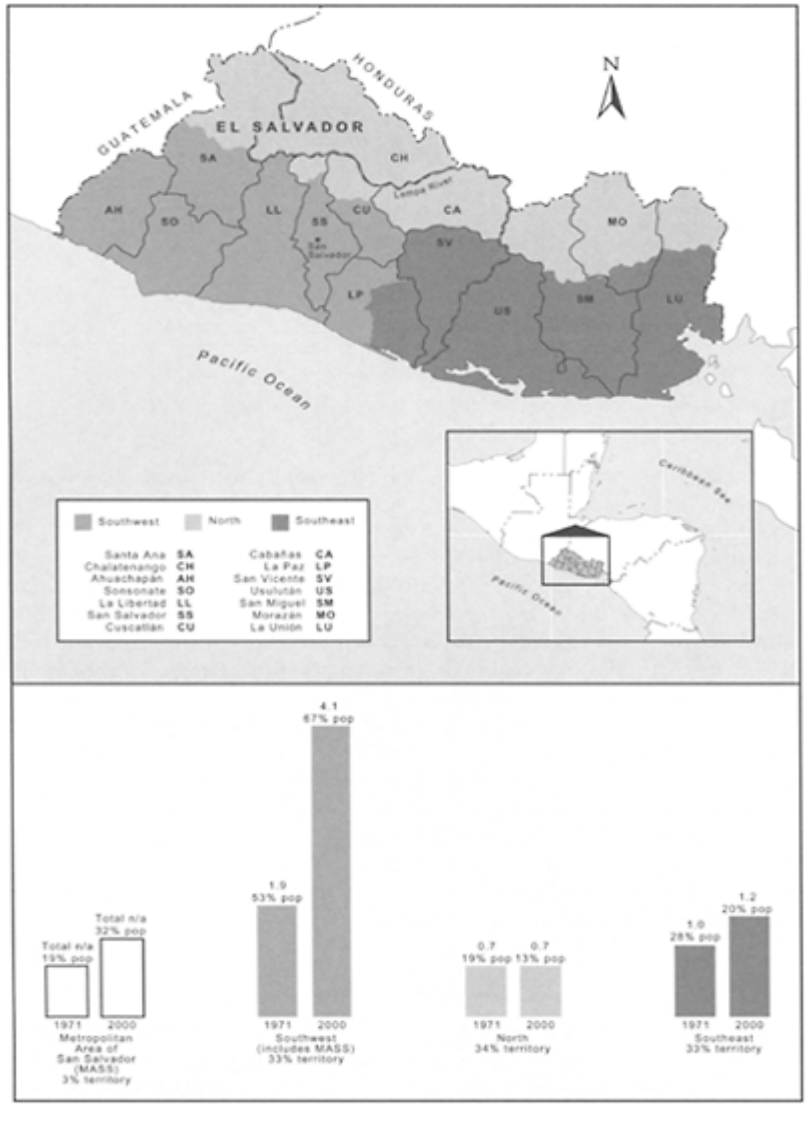

Figure 3.1 El Salvador: population distribution by zones, 1971 and 2000 (millions of habitants).

Source: PRISMA, based on population census.

Table 3.3 El Salvador: changes in the primary sources of foreign exchange, 1978 and 2000.

	Millions of dollars		*% of traditional agro-exports*		*Structure (%)*	
	1978	*2000*	*1978*	*2000*	*1978*	*2000*
Traditional agro-exports*	514	292	100	100	81	11
Non-trade exports outside Central America	54	145	11	50	8	5
Maquila (net income)	21	456	4	156	3	17
Remittances	51	1,750	10	599	8	66
Total	640	2,643			100	100
Total excluding remittances	589	893				

Source: PRISMA (2002) based on data from the Central Reserve Bank of El Salvador.
Note: *Coffee, cotton, sugar, shrimp. The table does not include exports to Central America.

resettlement and economic collapse fed large migration flows. Remittances correlate with the zones of forest recuperation: the mountain zones of Chalatenango (25 percent households get about US $125/mo), Cabanas (28 percent about US $100/mo), Morazan (30 percent about US $135/mo), La Union (41 percent US $145/mo), and northern San Miguel (28 percent, US $125/mo). The effect of remittances has been to buffer the incomes of the poor so that relentless environmental exploitation is less necessary, and to permit the purchases of food, (so that it does not need to be grown) medicine and improved shelter and education (Lungo and Kandel 2000).

The collapse of agricultural prices meant that the costs of production often exceed their return. In a series of group interviews on the impact of remittances in rural households carried out in Chalatenango and Ahuachapan, respondents were unanimous in their assessment that many such households had stopped cultivating, and would rather wait for remittances (Hecht *et al.* 2002a). The effect of declining grain prices worked against peasants as producers, but benefited them, through low prices, as consumers with cash from remittances wages. This has, however undermined food security.

Agrarian reform

Agrarian reform has been one of the central political questions in Central and Latin America throughout the last century. Indeed, the roots of the civil war were inflamed by demands for equitable land distribution. Redistributive agrarian reforms in El Salvador have undergone several distinct phases, each with a specific set of legal characteristics. Two main reform periods are especially relevant to our concerns: the Agrarian reform of 1980 that was put into place as an effort to stave off the war, and the PTT (Land Transfer Program) of 1992 inaugurated with the

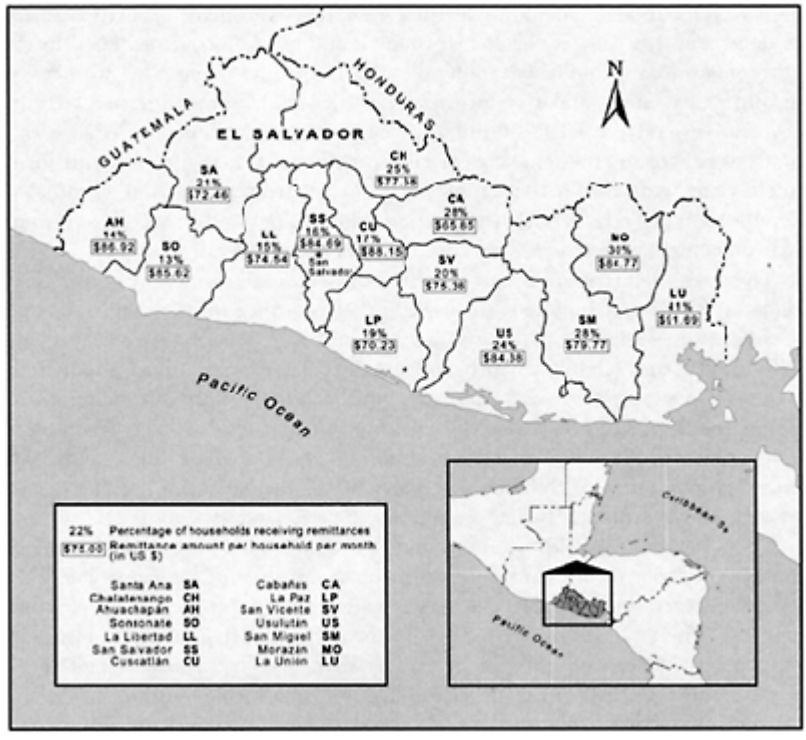

Figure 3.2 El Salvador: percentage of households that receive remittances by department.

Source: PRISMA.

Peace Accords. While the Agrarian reform enabled collective property through cooperatives, the PTT beneficiaries took advantage of the "proindiviso" phase to define and legalize common areas. In both these transfers, land could be held in single plots, but provision were also made for collective holdings and communal management.

The agrarian reforms of the 1980s distributed 295,000 ha among 84,000 beneficiaries. In the early nineties 106,232 ha were distributed amongst 36,597 beneficiaries—mostly ex-combatants—under the Land Transfer Program (PTT) that was part of the 1992 Peace Accords. Thus, in total 401,232 ha were distributed—a fifth of the national territory—to 120,597 beneficiaries and 25 percent of rural households received land under the programs.

The agrarian reform has had four main effects on natural resources. First, at the social level, the land transfer processes opened up the possibility of new forms of tenurial and territorial organization, which in some cases have lead to collective decisions about land, including natural resources management such as forest management, fire control, watershed councils and hunting controls. Local forms of regulation and political lobbying thus emerged from the history of revolutionary and solidarity organizations. Second,

some agrarian reform cooperatives and the PTT communities have received technical assistance and funds as part of international cooperation programs. As a result of institutional interactions with NGOs that emphasized environmental ideas and sustainable development projects, such as reforestation, agro-ecology and resource protection, environmental awareness in rural communities has increased.

Third, the redistributive structure itself has created a different agricultural landscape that is much more multi-use and multi-purpose in its focus. In the case of coffee, for example, small farms of less than 7 ha represent 80 percent of the individual farms (about 18,500) and are integrated into mixed production systems that supply coffee as well as other ancillaries, like fruits, artisanal inputs, forage, medicines and fuel-wood for cooking (Méndez *et al.* 2001). These plots have an important role in self provisioning and buffering households and extended families from the economic volatility of the Salvadoran economy and create a highly structurally and ecologically diverse landscape mosaic.

These fragmented holdings mean higher diversification at the plot level, and much more "inertia" for land transformation at the scale of the landscape. This tenurial "patchiness" blocks the large scale clearing more typical of large holdings. This is illustrated by Table 3.4, where the most fragmented holdings in the producer association embrace the greatest diversity since a range of cultivated forest products such as citrus, other fruits, posts, small scale building materials, firewood and artisanal materials are also produced.

Another significant effect of the agrarian reform and the war was to wean El Salvador's economic elites away from the rural economy. The Peace Accords mandated expropriation of many large agro-industrial rural holdings for agrarian

Table 3.4 Diversity characteristics of coffee shade: three small farmer tenurial systems.

Type of cooperative	*Tree abundance/ha*	*Total species diversity/ha*	*Diversity/ parcel*	*Management/tenure*
Reform Sector*	390	74	12	196 Ha Collectively managed
Traditional Cooperative**	350	51	12	Collective (31Ha) and private parcels
Producer Association	900	110	22	Private parcels

Source: Méndez et al. 2001.
Notes:
* Cooperatives following the 1980 law that ceded holdings to cooperatives formed of their old workers, and are profit sharers in the collective returns.
** Formed from the 1983 FINATA law. Includes collective management and returns to coffee plus private holdings.

reform, while maintaining the security of urban and financial assets of national elites. This, along with the triumph of the conservative Arena party in national politics, helped create an economic and political class with virtually no interest in (and perhaps a political resentment of) rural development questions except as they might effect hydropower and

drinking water. As rural areas became less important for economic accumulation, they also were less important in policy and as sites of investment. El Salvador's national economic focus in the 1990s emphasized its financial and industrial policies—in line with structural adjustment strategies that embraced free trade and slashed rural subsidies and credits. After a long agricultural history, El Salvador embarked on an urban based and urban biased development model even though more than half its population remained in the countryside. Within that set of approaches, cheap food policies remained a central strategy to reduce urban unrest, and was largely achieved through trade liberalization with the Central American Common market and not through increasing national production, a situation that sharply undermined small farmers.

Economic integration: global prices and rural commodities

El Salvador is a relatively small country which has always emphasized export led development. It is integrated into the Central American Common Market and the Initiative for the Americas, and partakes of the trade treaties that minimize tariff barriers. The impact of global prices for two key commodities—grains and coffee—have had important effects on rural production and natural resources use. As Figure 3.3 reveals, agriculture's relative prices have been in sharp decline since the 1970s. The dynamics in the grain and coffee economies are different: one has simply been affected by the downward trend in grain prices through the elimination of tariff barriers and cheap food policies, while the other is buffeted by the high volatility and expanded competition in the international coffee market. This global integration significantly undermined the importance of the rural economy in the national GDP.

Grains

During the 1980s agricultural production of all kinds stagnated due to a general downturn in global markets, El Salvador's problems of debt burdens and of course, the war (Conroy *et al.* 1996). Food imports were the norm due to production constraints in the countryside and as a consequence, food import infrastructure and distribution systems became quite well developed. The 1990s witnessed relatively slow annual rates of growth (1.2 percent) overall, because the grain sector was hampered by cheap food imports which were necessary to calm urban political pressures in the post Accord period. The price for grains today is a mere 27 percent of the real value of production in 1978. The impact of these low prices can be seen in the structure of rural incomes which are shown in the next

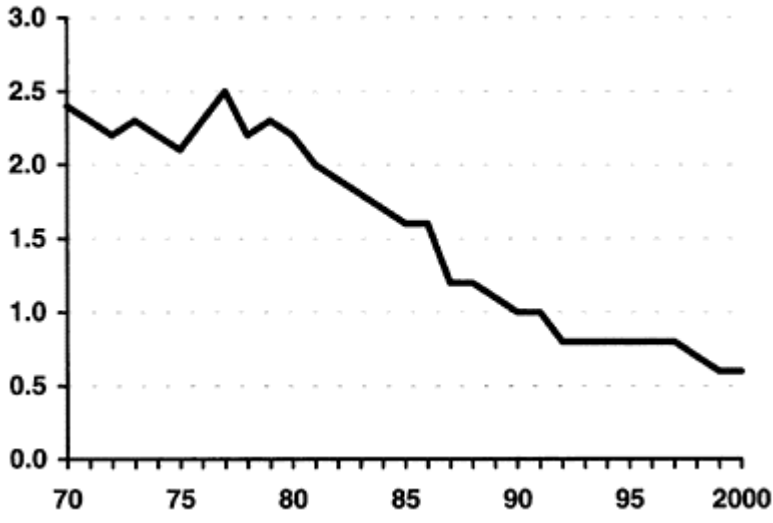

Figure 3.3 Decline in relative prices of the agricultural sector, 1970–2000 (GDP agricultural price index/GDP price index, 1990=1) (National accounts base 1990).

Source: PRISMA based on data from the Central Reserve Bank of El Salvador.

table. Sales of grains comprise only 5 percent of rural income even though almost 90 percent of all households produced them (see Table 3.5).

The total *area* in grain decreased. Table 3.6 indicates the magnitude of these crop declines except for sugar which has a protected market and subsidized credit reflecting the political power of the refining owners. Since about 90 percent of rural households grow maize, the contraction of the area by 18 percent indicates a sharp withdrawal from market production in this sector. Overall, the area devoted to producing food crops declined by 15 percent. If grains alone are calculated, the area in production has declined by 28.6 percent. More dramatic has been the contraction of pasture which has reverted to levels of the late 1960s.

Agricultural wages

The key impact of cheap food policies has been to drive down the value of agricultural production and wages. That a decline of this magnitude did not explode in social unrest speaks to the buffering of this sector by the deep semiproletarianization, access to land for self provisioning as an outcome of agrarian reform, and the impact of remittances. This ensemble however, coupled with its stagnant wages has made the sector undynamic,

a factor that works against investment in it, and thus has further constrained its expansion with the exception of sugarcane which receives subsidized credit and a protected market.

This agricultural contraction can be partially explained by price signals and the relentless capital scarcity in this sector, but several other social factors also

Table 3.5 Rural household income sources (%).

Type of activity	*%*
Agricultural sales	38.6
Grains	5.3
Other agricultural products	3.4
Animals	11.5
Other agricultural income	0.4
Sale of labor in agriculture	18
Non agricultural income	52.3
Work away from farm	44
Other income	9.2

Source: FUSADES (1998).

Table 3.6 Areas planted in agricultural products, 1980–1997 (1000s of hectares).

Crop	*1980*	*1990*	*% Change 1980–1990*	*1997*	*% Change 1990–1997*	*% Change 1980–1997*
Coffee	180	165	−9.1	165	—	−9.1
Sugar cane	57	44	−23	80	+81	+40
Maize	291	261	−11	239	−9	−18
Beans	52	62	+19.2	63	+1.6	+21
Rice	16	14	−13	8.4	−40	−52
Sorghum	119	128	+7.5	101	−22	−16

Source: Central Reserve Bank (1982, 1992, 1998).

played a role. These included the effects of male migration on the gender division of labor, and the declines in availability of family labor. Finally, the changing aspirations and exposure to mass media have made farming less attractive and detracted from its precarious prestige. If one is going to proletarianize oneself, it makes more sense to do so away from the low wage rural zones, and by preference in the US where pay rates are higher. Table 3.7 illustrates the profound rural wage stagnation compared to other employment sectors in the economy. Thus, while grain farming is still important for food security and as a buffer against the vaguaries of the economy (and thus grown by most households), the grain frontier as an *economic* frontier is no longer as significant in deforestation. Grain production might more usefully be seen as domestic horticulture and provisioning rather than a commercial enterprise.

Table 3.7 Real wages by sector (1992 national average=100).

Sector	*1992*	*1995*	*1998*	*2000*
Agriculture	53	50	51	50
Industry	98	104	126	108
Construction	101	108	120	123
Commerce	107	112	127	130
Services	108	124	124	129
Transportation/Communication	165	191	169	185
Finance	174	242	206	186
Utilities	182	164	192	226
National average	100	110	124	125

Coffee

Global coffee production has expanded enormously since the late 1970s because virtually every tropical development project in the world now includes coffee in its suite of rural commodities. El Salvador's coffee sector has declined throughout much of the 1990s reflecting structural change in agriculture (as agrarian reform shifted the sector into many small holdings and cooperatives) global price volatility, a shift from plantations into housing lots for urban development, contraction of credit, and the continuing problems of banditry, extortion and theft of product in rural zones. While Salvadoran coffee can participate in "fair trade" markets, the caliber of most of the product limits its price in elite markets.

One of the historic sources of wealth in Central America, coffee remains critical to the rural economy and environment of El Salvador. Coffee forests, cover about 9 percent of the country, and of these roughly 80 percent are the high biomass, high diversity shaded coffee. Coffee is the largest generator of foreign exchange in agriculture and a significant source of seasonal direct employment (about 30 percent of the wages income in the agricultural sector generating some 120,000 full and seasonal employment, and roughly another 26 percent of the jobs in agroindustries (MAG 1998). About 88 percent of the coffee farms are on approximately 40,000 ha, (about 25 percent of the total area in coffee) and average 2.6 ha. The economic condition of these owners precludes shifts to sun grown coffee, and minimizes the use of biocides in small holdings

The decline in prewar deforestation pressures, the impact of remittances, semi proletarianization and agrarian reform coupled with a downward trend in agricultural returns substantively change the physical, tenurial and structural role of agriculture in the rural economy. These contributed to forest resurgence, a process enhanced by the national policy milieu.

Structural adjustment programs

Structural adjustment programs (SAPs) were put into place with the Peace Accords. The economic package included trade liberalization, reduction of subsidies and decentralization policies. SAPs, in this case had two essentially beneficial effects on

environment, although, as we have noted, it was not uniformly wonderful for rural producers. The first was trade liberalization which provided agricultural commodities, like grain and beef, at low costs. This undermined national grain production, reduced rural incomes and transformed the role of agriculture in the national economy. The second was the elimination of fiscal incentives, subsidized credit as part of the Peace Accord adjustment programs. These had the effect of: 1) virtually eliminating high input cotton which had been critical in contaminating mangrove ecosystems and other aquatic systems; and 2) unraveling the highly subsidized livestock sector (which also suffered from rustling during and after the war, and later from cheap beef imports from Honduras). The sharp contraction of these two land uses eliminated the two subsidized systems that had the most impact on pollution and especially on direct and indirect deforestation. While the state was not entirely against subsidized credits to other sectors, such as the Maquiladoras—the manufacture assembly plants—rural areas were under severe austerity programs and sharp import competition. Agrarian debates and fiscal transfers to agriculture were off the agenda whether through policy, indifference or revenge on the part of governing elites after the Peace Accords.

Decentralization and the new environmentalism: formal and social conservation

Decentralization was also an important policy of Structural adjustment programs. The goals of administrative decentralization were to dismantle the power of central state, increase local accountability, and enhance administrative efficiency.[10] While some finances accrued to the municipalities—a mere 6 percent of the national budget—the reality is that decentralization, especially within poor rural areas, often produced an economically impoverished, isolated and thus quite powerless local government. This transfer of governance however, set the framework for the development of new local political arenas where an emerging environmental language and approaches to rural development could be evolved, largely through NGOs and civil organizations.

This greening of national politics was reflected at all levels: from the President Flores five year plan: *Plan de la Naccion* (GOES 1999) which emphasized that any development would have to take on environmental issues in a substantive way, to the emergence of the peasant "Socioambiental"—social/environmental—coalitions such as CACH (Comite Ambiental Chalatenango—the Chalatenango environmental Committee), an outcome of the end of 50 years of authoritarian regimes and decentralization. In this new context, approaches to environmental governance tended in two contradictory directions: one focused on community resource management, informed by the sustainable development approaches, the other on a highly privatized model of conservation.

The idea of sustainable development and increasingly ecosystem services tended to be linked to reconstruction after the civil war and focused on community initiatives. CACH, one of the earliest of such coalitions developed in the mountain areas of Chalatenango, a former rebel strong hold. Their approach is based on collective environmental protection (such as fire control) regional forest management, watershed councils, etc. and emphasizes broader territorial coordination and planning among the municipalities through the development of mancommunidads—associations of adjacent municipalities—that are more appropriate for resource management and strengthens the

political powers of the municipalities (CACH 1999). CACH is a model that has inspired other regional programs. Its significance lies in its coalitions that produce regional rather than isolated municipal strategies, and that mobilize the social capital produced by the war and by reconstruction after it. This community and collective approach contrasts with the privatization of conservation embraced by international conservation agencies and the Ministries involved with natural resources, MAG (Ministry of Agriculture) and MARN, (Ministry of Environment and Natural Resources).

The "formal" side of the new El Salvadoran environmentalism, produced a conservation strategy endorsed by the central state that focused regional (in the sense of Central American) conservation and international monies. Emphasizing National Park of El Impossible, (which is not run by the state but rather by a private NGO, Salva Natura, that is funded by subscription, grants and endowments), and on the private coffee forests, this park and its surrounding "corridor" is now the organizing principle for much national natural resource funding (GOES 1999). Financed by the (GEF) Global Environment Facility and CCAD (Central American Commission on Environment and Development) as well as other donors, funds will mainly go to developing technology packages, certification programs and international markets. This however has produced a disjuncture between "social" versus "formal" conservation in the country. By privileging privatized forms of conservation, innovations that could affect a great deal more territory than the 4 percent of El Salvador likely to benefit from the MBC face a funding and policy void. Indeed, the areas where forest resurgence is most marked, and where the social capital is most fully elaborated, the eastern mountain zone, is largely a "policy orphan."

IMPLICATIONS: THEORIES AND MODELS OF FOREST PERSISTENCE AND RESURGENCE

The case of El Salvador has several implications that extend well beyond the boundaries of this small country. The country, unexpectedly, presents phenomena of forest resurgence. In terms of understanding the theories of forest cover change, this study illuminates the strengths and weaknesses of the models on offer. We review these, and how well they explain forest return, and what these might in the end mean both for theory and policy. This next section reviews the cases model by model.

Malthus and markets

First, in spite of the fact that 50 percent of its inhabitants still reside in the countryside, and its rural population densities are over 150/km2, forests are making a comeback except in periurban areas near Metropolitan San Salvador, second housing development on the coast, and subsidized cane farming on the coastal plain. This situation throws into question some of the long held Malthusian ideas about population, population density and resource degradation. While many scholars have argued that a more complex analysis must be applied to resource questions, as we noted early in this paper, El Salvador has historically been the target of exceptionally simplistic discussions of population and

resources. What we see now are high rural population densities *and* forest resurgence. A similar process has been noted by Klooster (2003) and by Rudel *et al.* (2001).

Markets

Markets in El Salvador are deeply globalized, and the way they operated was at variance with the way markets have been thought to affect natural resources in most of the models of deforestation. Historically, the action of markets was reflected in the demand for products (that produced deforestation), or alternatively, "greening" as an outcome of substitution either less damaging production techniques or forest products (that stopped deforestation). In most agricultural contexts, as commodity prices drop producers either intensify, extensify or migrate. In this case there is migration (although mostly it was stimulated by the war), but the sectoral volatility and low returns coupled with a national emphasis on cheap food policies produced an agricultural *retraction*. This is possible only in a situation of profound semi proletarianization.

This case suggests that the impact of *labor markets—domestic and international*—may be especially significant in forest resurgence. Labor markets have been largely invisible in discussions of the impacts of markets on clearing. The impacts of globalized markets on land use thus need to be viewed through the lens of economic portfolios. The dynamics of this retraction were reinforced by neoliberal agricultural policies that starved the rural sector, and banished tariff barriers for agricultural products. On its own, however, the collapse in prices would not necessarily reduce agriculture, especially for small farmers, if other elements were not in place. Subsistence agriculture would have continued if farmers had no purchasing power, but, in this case, they did, through wages and remittances.

The dynamics of these markets should be understood as an outcome of globalization and trade liberalization that contributed to agricultural retraction, expanded labor markets and the transnational and national flow of remittances.

Livelihoods

Forest persistence models have emphasized the importance of livelihoods in forest conservation, and this approach was one of the major conservation policy innovations of the 1990s. What are the implications of the livelihood explanation for forest resurgence? Rural populations in El Salvador are highly dependent on anthropogenic forests for firewood, whether coffee plantation prunings, hedge rows, living fences, demarcations, etc., for fodder, fruits medicinals and so on. The high diversity of Salvadoran coffee plantations with their array of native trees provides a regular source of firewood and a wide variety of ancillaries. Studies of plot diversity and households show that anthropogenic forests are important, and that the "livelihood" model does help explain the continuous planting of hedgerows, demarcations and highly wooded patio forests, the "domestic forests" in Table 3.2 (cf. Chazden and Coe 1999; Hecht *et al.* 2002a; Méndez *et al.* 2001). The modest home gardens and hedgerows are an important shadow element of rural livelihoods, a subsidy from nature. And they actively managed elements of the rural landscape. So the livelihood aspect is certainly part of the explanation.

Institutions: property politics and social movements

Property regimes have both stimulated forest clearing and forest persistence. But how might they affect forest resurgence? As mentioned earlier, much of the plantation literature takes private property regimes as the *sine qua non* of forest recovery, and most conservation set asides are use exclusionary property regimes to shape the form of ownership. In El Salvador, the main park is in fact owned by a foundation. So it is certainly the case that private property regimes can produce forest persistence and forest recovery. Collective properties, such as indigenous reserves and *ejidos* have also maintained and managed forests on the basis of livelihood arguments and those of cultural identity.

The emergence of Mancommunidads in El Salvador that specifically emphasize forest recuperation in their management point to the broader impacts that social movements and agrarian reforms can have on landscape recovery. While much is made of the form of property regime, it probably matters less, at the end of the day than the socio-political institutions that surround it. In this case, agrarian reform, which enhanced the equity in rural resource distribution, political decentralization which provided an improved local accountability in political institutions, and the social capital and solidarity developed in the mountain zones during the years of civil war seem to support Torras and Boyce (1998) and the Equity model of Koop and Tole (2001) and which illuminate some of the dynamics of forest resurgence. In terms of conservation politics, a wide variety of property institutions are on offer, but only one—set asides—seems to infuse policy.

Transitions and Kuznets curves

There is no question that structural change in the economy had a significant impact on forests, but this change in the case of El Salvador was not the outcome of endogenous processes of development, but rather an abrupt outcome of being a cold war hotspot. The war simply collapsed the rural economy and forced urban migration. But the Accords also were significant for structuring the new industrial economy. Since they stipulated that urban and financial assets would not be expropriated, and these sources of considerable wealth became the focus of El Salvador's national development policies as economic elites embraced an industrial and financial development agenda, leaving the rural sector starved of capital and state interest, at the mercy, for good or for ill, of new civil institutions. What does this say about environmental Kuznets curves and the forest transition?

Under conditions of globalization and the ubiquitous implementation of structural adjustment policies—especially those pertaining to increased economic openness in a context of regional integration, resource dynamics must be contextualized by understanding how forest trend and land use are affected by household strategies and the politics of localities in the face of global pressures. The El Salvador case differs from most studies of the forest transition in that these rural areas are not forsaken but remain occupied, and often form part of complex transnational and circular migration networks, unlike the history of the US and European transitions. Rural areas have become in many ways a redout.

The environmental Kuznets curve for El Salvador, if one can speak of one, reflects globalized commodity and labor markets, enhanced rural equity, improved political

access and accountability at the local level, and adequate social capital. It also reflects another significant global process: the rise of environmental ideologies and projects.

Ideologies of environment

The explosion of international environmental activities by multilateral and international conservations agencies has characterized much of the rural politics of the last decades. These were reflected at the institutional level through tied lending, national activism and greater attention to environmental institutions in national politics. The thrust of rural development as it now evolves is as much an environmental as an agrarian/social project. Landscape recuperation, conservation planning, enhanced agroforestry development, and Agroecological projects increasingly define the "Nature" of rural approaches. Environmental services are thus often seen as viable and valuable rural options than producing agricultural commodities. International investment in national environmental agencies, in conservation planning and in the hordes of NGOs engaged in projects has been one of the main means of transferring funds into rural areas. In Central America this trend increasingly dovetails with the rise of new social institutions as a result of the politics of reconstruction and decentralization.

This was a profound deflection in the rural development discourse away from an agrarian equity to ecological issues, and took on five main characteristics:

- The rise of the rhetoric of sustainable development throughout the 1990s as a product of international post war assistance and recuperation throughout war ravaged Central America. This approach was especially important in El Salvador due to its reputation of ecological ruin, and devastating social impacts of environmental hazards including earthquakes, floods, hurricanes and ENSO (El Niño) related drought whose effects were exacerbated by inappropriate land uses.[11]
- The increasing recognition by the nation of the importance of forest resources in regulating water flow and quality for electrical power and for urban industrial development, and thus the rise in the importance of the idea of environmental services.
- Local social movements began to organize for watershed councils to enhance forests for water flow and to minimize landslides.
- Regional integration in biological terms, through the Meso American Biological Corridor.
- The increased availability of funds for the development of environmental institutions and projects.

Within this post war framework, the agrarian question had been construed increasingly as an environmental one, and one of the few activities where funds would be transferred to rural zones. This "redefinition" of the rural, which also required local organizing for community development has infused virtually all of El Salvador's rural development projects and organizations. Agriculture programs have been displaced to some degree by environmental investment, a process that is occurring more widely (cf. Padoch *et al.*, 1999).

The dynamics of forest resurgence in El Salvador suggest that the directions of forest trend need to be understood in a more complex manner, one that integrates levels of analysis ranging from household strategy, regional to global processes. In this case, one

can argue that the impact of globalization—on commodity, labor markets, capital flow (remittances, aid monies) and environmental ideologies produced a general contraction in the agricultural frontier. But national institutional changes such as those associated with agrarian reform that enhanced equity,[12] decentralization, the rise of local environmental groups and the political development of Mancommunidads are also significant.

These kinds of changes—the emergence of substantial areas of anthropogenic forest—need to be incorporated into conservation approaches far more explicitly than they have been. Forest regrowth is occurring elsewhere in Latin America (cf. Klooster 2003; Rudel *et al.* 2002), and yet with the exception of a few case studies, the social ecology, diversity dynamics and political economy of these areas are not well known. These areas, with their substantive contributions to environmental services of all kinds—conservation of biodiversity, protection against natural hazards, carbon sequestration, water provisioning, soil protection and aesthetics are "policy orphans" in today s environmental focus.

Rural inhabitants and the forests they manage, unfortunately, are not viewed as priorities, because these resources are not considered "high value," in spite of relatively little research on the diversity dynamics of anthropogenic forests, in spite of the fact that most of the parks in Central America are in historically dense sites of human occupation and thus not "pristine" in the least (see Denevan 1992).[13] Conservation practice has not really addressed the importance of matrix ecology in anthropogenic environments. As Vandemeer and Perfecto (1997, 2001) among many others argue, this is a major lacuna in research. We argue that it is also a major policy void.

Matrix ecology Mancommunidads and the future of environments and environmental policy

One of the central points of the emerging discipline of fragment ecology is that the structure of the ecologies surrounding conservation ecosystems is central to the biodiversity dynamics of the remaining forests. Forest fragments in the world are found in complex matrices: coffee plantations, diverse tropical fruit orchards, manipulated and secondary successions, wood lots, multicropped milpas, agroforestry systems, abandoned or weedy pastures, door yard gardens, hedgerows. The dynamics and structure of matrices goes far to explain why many highly endangered ecosystems do not experience the kinds of extinction rates that are predicted by theory (Gillespie *et al.* 2000; Whitmore 1997). In these areas, human actions of soil improvement and selection for edible foliage, fruit bearing or seedy vegetation often enhances the value of these anthropogenic ecosystems for animals and can act as nurseries and havens for forest species (Andren 1994; Chokkalingham *et al.* 2001; Estrada *et al.* 1986; Harvey and Haber 1999; Komer 1998; Whitmore 1997). Data from Central America increasingly shows that the diversity in these sites is often significant (cf. Gillespie *et al.* 2000; Greenberg 1996; Harvey and Haber 1999; Perfecto *et al.* 1996; Perfecto and Vandermeer 2001). Thus it may be human impacts on age and heterogeneity of habitats, seral complexity and enrichment of matrices might be on par with "naturalness" in generating diversity at a landscape level. Yet these kinds of forests, from hedgerows and gardens to community successional forests are still largely invisible to conservationists and thus are largely ignored in policy and programs. More critically, this geographic fabric is also a matrix of social processes that have enormous potential to sustain environmental integrity over time.

The larger problem has to do with the conservation discourse and its relentless focus on large parks, devoid of people as the primary conservation emphasis, a discourse that in the end ignores the "secret" forests of El Salvador, by refusing to see them as forests at all. This is not a question of semantics, because in the context of extreme bias against rural economies and no agrarian policy other than neglect, this "invisibility" places peasants and their landscapes in a regressive and short sighted policy vacuum within a political economy of exclusionary environmentalism. As long as anthropogenic and regenerating forests are "invisible" as conservation entities, they are potential sacrifice zones without environmental support. Certainly, these ecologically and socially important landscapes deserve more policy attention that supports their positive impact on biodiversity and environmental services and recognizes the populations that increasingly manage and create these ecosystems.

THE CONTEXT AND CONTRADICTIONS OF CONSERVATION

Central American environmental approaches have historically been overwhelmingly dominated by conservation ideologies that emerged from ecologists associated with the US. Many influential researchers emphasize "set asides" as the key approach to conservation (See for example Sanderson and Redford 1997). The impact of these researchers on resource policy in Central America is significant because of their prestige, their capacity to shape the international discourse about environment, and to mobilize international economic resources for national ecological projects (such as national parks). El Salvador barely counts in their scheme of things.

Their position has several implications. First, rural Salvadorans remain very poor, and without economic transfers and market products that support peasant incomes, they have increasingly focused on activities to enhance their ability to mobilize environmental funds as parts of international cooperation, green trade and fair trade initiatives, and through payment for environmental services. These efforts in the context of the decentralized state of El Salvador have produced formidable organizations for regional resources management as well as more local efforts to manage water courses, forests and biodiveristy through a range of collective agreements. The mobilization of such social capital creates good perspectives for success in these kinds of environmental enterprises (Gibson *et al.* 2000). This very positive trend in approaches to resource management runs up against serious bias, not just from Salvadoran ruling elites who remain indifferent to the rural poor although concerned about the environmental services they generate, but also from the international environmental community unwilling to invest money, effort and policy development in anthropogenic forest ecosystems other than those associated with coffee or indigenous people. The dynamics of forest trend are much more complicated now than they were a decade ago, and the importance and complexity of different types of secondary, anthropogenic forests, and their role as key elements in conservation remains still largely unrecognized. The other issue is that while conservationists may have been emphasizing "hotspots" and conservation of selected forest fragments, they have missed, dare one say it, the forests for the trees.

NOTES

1 Consultive Group on International Agricultural Research.
2 Resettlement programs for natural resources development like Dams and for conservation set asides have fallen far short of the promises made to local peoples, and further aggravated the resistance to parks.
3 Again: research from virtually all forest types suggest substantial human impact in the past.
4 This is data that analyses political rights and civil liberties—and are based on 12 different freedom related criteria mainly focused on the electoral process, and 25 indicators of civil rights such as free presses, independent judiciary system, rule of law, freedom of assembly, etc. (See Scully 1992.)
5 Even in the early 1900s El Salvador was thought to only have 10 percent of its "intact" forests (USAID 1985, Daugherty 1969).
6 These studies tend to be overviews based on statistics and compendiums lacking in field work on location, and thus are likely to repeat "received ideas."
7 El Salvador's silvo pastoral systems have not been extensively analyzed, but a detailed survey in Costa Rica showed that 190 of the 360 species that occurred in the area were found in pastures (of which 60 percent were primary forest species). Ninety-four percent of the species in pastures were known to be used by birds, bats and other animals (Harvey and Haber 1999).
8 This dynamic has also been noted elsewhere in Central America by Kaimowitz (1995).
9 Pearse provides an exceptionally moving oral history of the history and war in Chalatenango.
10 The debates over the efficacy of decentralization and natural resource management remain extremely complex, since this form of local governance was implemented throughout the developing world and its results have been mixed. For further discussion see Hecht *et al.* (2002a), Ribot (2001).
11 Many of the most devastating land slides such as that of Sta Tecla on the outskirts of San Salvador were the outcome of faulty road and urban construction.
12 The Gini coefficients for El Salvador are more equitable than all other Meso American countries with the exception of Costa Rica.
13 El Impossible and its adjacent areas was a coffee farm until 1992. Neumann (1999) has noted that many conservation sites were often agricultural landscapes before they were designated "wilderness."

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ACKNOWLEDGMENTS

The field research for this project was developed over several years with wonderful colleagues from the research and policy NGO PRISMA (Program on Environmental Research in El Salvador) through a grant from the MacArthur Foundation to Hecht/UCLA and PRISMA. More detailed expositions of the field work can be found in the monographs of Hecht *et al.* 2002a and b. Hecht also received research assistance from the UCLA Academic Senate Grants and the Latin American Center. Special acknowledgements go to Herman Rosa and Susan Kandel from PRISMA. The theoretical issues raised by the paper reflect more recent research.