



Globalization, Forest Resurgence, and Environmental Politics in El Salvador

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Summary. — Globalization is often viewed as a driver of deforestation, but there are contexts where it promotes forest recovery. This is the case in El Salvador. In spite of population densities in excess of 200 people per km², the country, which has been seen as a Malthusian parable of population and ecological catastrophe, is now increasingly wooded. This reflects the impacts of globalization (new flows of labor, capital, commodities, and ideas) which profoundly affected the rural economy, as well as local processes such as civil war (which constrained the agricultural frontier), structural adjustment policies, and agrarian reform.

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1. INTRODUCTION

In the popular consciousness, El Salvador is notorious for its extensive deforestation and land degradation. Numerous articles assert that only 2–5% of its forests remain, giving the impression of a blasted landscape with barely a tree in sight (FAO, 2001; MARN, 1999; Terborgh, 1999). This view is faulty, and is an outcome of (1) extrapolating deforestation trends from earlier periods whose dynamics no longer hold given the enormous social and economic changes of the last decades; (2) ignoring the widespread anthropogenic and regenerating woodlands that are significant in their total area, and in their ecological and social impacts; (3) a lack of awareness of processes that now encourage forest recuperation. Deforestation continues throughout Latin America, but there is also a strong countertrend of forest resurgence, now identified in several countries (Aide, Zimmerman, Pascarella, Riveira, & Marciano-Vega, 2001; Klooster, 2003; Moran, Brondizio, Tucker, MacCracken, & Falesi, 2000; Rudel, Bates, & Machinguiashi, 2002). While the

dynamics of these cases differ, the pervasive occurrence of forest regeneration is intriguing and suggests outliers of more general socio-economic changes at many scales that may pre-empt broader environmental shifts. This article outlines the dynamics of forest recovery in El Salvador as a result of the processes of globalization, new national policies, local politics,

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and changes in the ideologies of environment and environmental practices.

2. FOREST SYSTEMS OF EL SALVADOR: DISTURBANCE HISTORY, DIVERSITY, AND ANTHROPOGENIC WOODLANDS

El Salvador falls entirely within the “Hot-spot” of Mesoamerica, where some 7% of the globe’s biodiversity resides. Highly endemic biota are found throughout the region, outcomes of El Salvador’s highly dissected relief, its location in the contact zones between the great biogeographic domains of North and South America as well as Holocene climatic change (Daugherty, 1969, 1972; Dull, 2001).

(a) *Biodiversity in El Salvador*

Lacking international attention, with little emphasis on local natural resources training due to years of civil war, and the preference of many foreign natural scientists for “wild landscapes,” there is a ubiquitous impression that El Salvador is depauperate in biodiversity. While often derogated for a lack of biological richness (FAO, 2001; Terborgh, 1999) and portrayed as a Malthusian nightmare, recent ecological research in several fields contradicts this inaccurate, and unfortunately, oft repeated impression (Berendsohn, 1995; Komar, 1998; Ramirez, 2001).

Current studies, partial though they are, give a different sense. Komar (1998, 2003), documented more than 508 species of birds, in addition to 121 mammals, 130 reptiles and amphibians, and over 2000 plant species. Recent studies of trees (Berendsohn, 1995; Ramirez, 2001) have reported many unrecorded species, and others are being discovered regularly. The diversity of habitat types, and the array and resource rich structure of anthropogenic forests have undoubtedly contributed to the maintenance of overall biodiversity. Rustic shade coffee farms suit many generalist species, including international migrants because of the permanent nature and complex structure of the crop (Perfecto, Rice, Greenberg, & van der Voort, 1996; Perfecto & Vandermeer, 2001). The widespread planting of hedgerows, fruit trees, and extensive domestic agroforests provide resource islands throughout the landscape. In addition, secondary vegetation and arboreal diversity in abandoned pastures suggests a role in the maintenance of El Salvador’s biotic complexity.

The diversity of El Salvador is especially impressive given the prevalent view that it has almost no “worthwhile” forests. While most discussions of forest diversity in Central America emphasize the structure of old growth stands, an emerging body of research focuses on the biodiversity and conservation value of “countryside” landscapes (Daily, Ceballos, Pacheco, Suzan, & Sanchez-Azofeifa, 2003; Daily, Ehrlich, & Sanchez-Azofeifa, 2001; Harvey & Haber, 1999; Vandermeer & Perfecto, 1997). These studies, largely from Costa Rica, show significant use and colonization of anthropogenic formations by rainforest species of birds, butterflies, animals, and plants. About 57% of tree species in pastures were primary ecosystem species, and roughly 50% of avian and butterfly species regularly used anthropogenic systems. Indeed, the recent research on coffee ecosystems reveals that they are often more diverse than local old growth fragments (Perfecto *et al.*, 1996). Successional landscapes are also widespread and rapid absorbers of CO₂ (Castro, Sanchez, & Rivard, 2003), and socially and economically important as they provide a range of subsistence and market goods to households (Bray *et al.*, 2003; Chazden & Coe, 1999).

(b) *Disturbance landscapes*

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 “undisturbed” ecosystems applies. El Salvador is regularly buffeted by earthquakes, mass movements, volcanic eruptions, fires, hurricanes, floods, and tsunamis (Rose, Bonner, Lopez, Carr, & Major, 2004). In much of Central America, it is not clear whether it makes any sense at all to speak of “natural” *versus* “cultural” forests given the antiquity of intensive occupation and the ubiquity of human impact over at least eight millennia (Bush *et al.*, 1992; Daugherty, 1969; Dull, 2001; Pohl *et al.*, 1996; Sharer, 1978; Sheets, 1979, 1984, 2002). Its vegetation is adapted to geophysical and human perturbation.

There are more than 800 significant archeological sites in El Salvador, or a documented average of one for every 2500 ha in this country of a mere two million hectares. The region was well integrated to Olmec and Mayan empires through its production of the Amazonian domesticate, cacao, as well as obsidian and

hematite (Demarest, 1988). The excavation of Central America's "Pompeii," the Hoya de Ceren, formed with the eruption of the Laguna Caldera volcano in the early seventh century, revealed large and complex land transformations including ridged field cultivation, irrigation works, and the production of a diverse variety of trees, seeds, and root crops (Amaroli & Dull, 1999; Dull, 2001; Dull, Southon, & Sheets, 2001; Lentz, Beaudry-Corbett, Reyna de Aguilar, & Kaplan, 1996; Sheets, 1984). Pollen studies show substantial quantities of agricultural and cultivated forest pollens in pre-Columbian profiles (Dull, 2001). Ceren's population recuperated, but during the ninth century, it fell as part of the more general "Mayan collapse." Afterward, population increased and land use intensified, but this phase ended abruptly as El Salvador's population plummeted to 93% of pre-Hispanic densities after the arrival of Europeans (Lovell, 1992). Pedro de Alvarado, an early conquistador, was staggered at the wealth and number of inhabitants of Cuscatlan (today's San Salvador), describing it to Hernando Cortes as the richest and the most populous place he had seen. This passed with the epidemics, and so, the commentators of the 17th and 18th centuries noted mainly the verdant forests of the region (Fowler, 1988).

During its colonial period, various commodities were extracted from El Salvador, such as indigo, mahogany, and resins, but its most significant economic transformation occurred with the introduction of coffee, in 1830s. This classic agroforestry crop became the country's defining commodity, and by the 1930s, El Salvador was the world's third largest coffee producer. Manipulation of regional landscapes and the creation of anthropogenic forests and integration into international markets thus has a long history in El Salvador. Given its small area, geophysical activity, high human population densities, and prevalence of disturbed ecosystems, the country's biodiversity can be understood as an outcome of its geographic complexity and natural and human induced seral mosaics.

(c) *Secret forests of El Salvador*

Forests in El Salvador are mosaics of successional, anthropogenic, and "natural" forest fragments. The forests are of several types, and many data sources have been used to assess and classify areas of woodland cover. Remnant

forests embrace about 30,000–40,000 ha although these often bear traces of disturbance (timber extraction, grazing) in recent historical times (Ramirez, 2001). Coastal forests of all kinds, but mostly mangrove comprise about 25,000 ha (MARN, 1999). The 24 protected areas encompass another 28,000 ha (MARN, 1999). Secondary forests of various ages and forms (which are often classified as "pasture," and with different degrees of woody vegetation) cover at least half of El Salvador, but most are in various stages of succession or are diverse silvo-pastoral systems (Hecht, 1999; Komar, 1998; MAG, 1998). During the war, cattle were largely sold off or eaten, beef imports from Honduras sharply reduced local beef market prices, and the current level of banditry results in such high rates of cattle rustling that grazing without close supervision produces spectacular losses. As such, secondary growth and advanced pasture successions represent the largest "forest" types in the country (Hecht, 1999; Komar, 1998). The living fences, tenure demarcations, large urban forests, dooryard agroforests, and orchards are widespread. These "domestic forests" comprise close to another 100,000 of forest (Hecht, Kandel, Cuellar, & Rosa, 2002). Forest plantations embrace some 5,000 ha (MAG, 1998). Commercial orchards and coco plantations are found on about 35,000 ha, and coffee forests cover some 170,000 ha. These ground assessments of woody cover have been complemented and refined by remote sensing data that support the ground conclusions of a forested El Salvador (Table 1).

Data from Modis and AVHRR show land cover change during the 1990s (Hecht & Saatchi, in review) in that paper the methods, statistical techniques and margins of error are more fully elaborated. These results show an increase in woody cover for the region. It is important to clarify that woody vegetation reflects an array of spatial configurations ranging

Table 1. *Percent tree cover change 1*

Percent woody cover	1992	2001
0–10	6.9	0.9
11–25	21.3	5.6
26–40	28.9	31.4
41–55	19.3	30.8
56–70	12.2	13.8
71–100	11.2	14.6

Source: Hecht and Saatchi (in review).

from boundaries, riparian woods, living fences, trees in pasture all the way to dense coffee forests. These remnants, plantings, replantings, regenerating areas do not operate like old growth forests but do carry out partial functions in terms of habitat, hydrology, CO₂ uptake. At the 56–70 and 71–100%, woody cover shows slight increases, staying largely within the margin of error, the area of 26–40 and 41–55 shows a significant increase from 48.2 to 62.2. The decline of areas with minimal woody cover (0–25%) probably reflects the decline in pasture and corn production as pastures became woodier, and agriculture less important. These reflect recuperation of conifer, dry forests, and anthropogenic forests of which roughly half are the dense (71–100%) forest cover types. The most dense category increased its area by 3.4%.

Many analysts derogate and underestimate the extent of disturbance and anthropogenic forests because these kinds of forests do not “count” in the categories often considered most meaningful by many biologists—they are successional rather than “virgin” forests, anthropogenic or inhabited rather than “wild.” Ecologically and socially significant types of vegetation become “invisible,” and thus fall outside of the calculus of woodland cover. For example, the influential map of vegetation of Central America published by the World Bank recognized more than 113 vegetation types, but most human modified landscapes (the largest category) were conflated into one category (Vreugdenhil, Meerman, Gomez, & Graham, 2001). The extensive occurrence of woodlands in densely populated rural landscapes and their correlation with high levels of biodiversity suggest important reassessments of these dynamic forest landscapes and the processes that produce them.

3. FACTORS AFFECTING FOREST RECUPERATION: CONFLICT AND CLEARING

Forest recuperation in El Salvador reflects: (1) the impact of more than a decade of civil war that profoundly affected rural zones; (2) the outcomes of economic globalization; (3) structural adjustment politics; (4) democratization and decentralization; and, (5) the rise of an array of new environmental ideologies and programs. This next section reviews the ways in which that each of these processes affected the

rural economy and how these built upon each other in ways that resulted in the expansion of woodlands.

El Salvador was a “hotspot” in the cold war. A long history of civil uprising marked the history of the 20th century in that country, but among the most severe episodes was the civil war that lasted from 1980 to 1992. The effects of the conflict were wide ranging. The war was characterized by guerilla tactics, where forests were used as cover, and thus rural areas became war theatres. The immediate impact of the violence was to halt the expansion of the commercial and peasant agricultural frontiers as crop and animal production became impossible due to raids, carpet bombing, and massacres. The war was instrumental in triggering massive international and urban migration which was central for developing the subsequent economy of remittances. Finally, through its peace negotiations, the war generated a far reaching agrarian reform.

(a) *Forests, guerilla war, and the agricultural frontier*

Most of the literature on war and the environment emphasizes the impacts of bombing and hunting (Dudley, Ginsburg, Plumptre, Hart, & Campos, 2002). The destructive dynamics of these activities, though not absent in El Salvador must be understood in light of the inhibiting effect of warfare on the expansion of the agricultural frontier—the main cause of forest destruction in most of Latin America—and the importance of forests as cover for camps, underground hospitals, and field command posts. In El Salvador, mountain and coastal forest areas became FMLN (Farabundo Marti National Liberation Front) strongholds, and cattle and other domestic stock, rather than wildlife were the main “hunting” targets. Guerilla activity in the cordillera—the area of greatest expansion of ranching during the 1970s in the departments of Morazan, Chalatenango, Cabanas, and La Libertad caused upland ranchers to retreat. These livestock zones were often left to regrow 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, mangroves, and water was also decisively curtailed (Murray, 1994). The elimination of cotton with

its very high use of biocides of all kinds was very positive ecologically, and as a production system heavily dependent on subsidized credits and fiscal incentives, structural adjustment policies have not permitted its resurgence.

The civil war also affected coffee cultivation by hampering technical change in the sector. During the 1980s, Central American coffee producers began to switch from the ecologically sound and “biodiversity friendly” traditional 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 (Perfecto *et al.*, 1996). The war, with its rural instability, precluded investment in this changeover, and as a consequence 85% of El Salvadorian coffee is grown under traditional highly diverse shade canopies, and is largely organic, since chemical use and harvesting were also inhibited by the conflict in this period. By curtailing speculative and incentive driven ranching, by reducing pesticide drenched cotton cultivation, and inhibiting the switchover to sun coffee, the war’s environmental impact—at least for forests, was quite positive.

The small farmer agricultural frontier that pressed into El Salvador’s mountains was an outcome of relentless dispossession by industrial agriculture and ranching (Durham, 1979; Faber, 1993; Paige, 1999; Utting, 1994). This farming was also reduced in the guerrilla zones by military skirmishes, civilian massacres, forced resettlement, migration, and widespread instability and marauding. While some areas limped along, the expansion of small scale cultivation was increasingly difficult, and generated large out-migration. Fully one-sixth of El Salvador’s population fled the countryside. The civil war restrained the expanding agro-industrial, livestock, and peasant agricultural frontiers at exactly the moment that these exploded in rampant deforestation elsewhere in Latin America (Downing, Hecht, & Pearson, 1992; Hecht & Cockburn, 1989; Perfecto *et al.*, 1996; Schumann & Partridge, 1989).

(b) *War, migration, remittances
and environment*

A 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 as war ravaged the countryside, (Kandel,

2002; Lungo, 1996), even though population densities in many rural areas remain at or exceed those of the 1970s when forest clearing was at its peak.

Although only 3% of the national territory, 32% of the population now resides in the Metro Area San Salvador which experienced a 13% gain in population since 1971. The northern third of the country by contrast, reduced its proportion of the population from 19% in 1971 to 13% although in absolute numbers the population has remained stagnant. In Southeastern El Salvador, the proportion of population dropped from 28% to 20%, but increased its absolute numbers by 200,000. In the southwest, excluding the Metro area of San Salvador, the percentage of the population has remained constant since 1971, although in absolute numbers the population has more than doubled, largely due to periurban development around San Salvador, and the *Maquila* industrial economy near the airport (PRISMA, 2002). These stagnant or increasing rural population densities have in fact been associated with increasing forest cover, a sharp refutation of Malthusian orthodoxy (Figure 1).

Roughly 2.5 million Salvadorans live outside the country, some 94% in the United States (Kandel, 2002). The expatriates are the main source—66%—of El Salvador’s foreign exchange. Table 2 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. The traditional agro-exports, that once comprised 81% of revenues in the 1970s, has contracted to a mere 11% of foreign exchange.

The “economy of affection” thus eclipses all other hard currency sources and accounts for 13% of the National GDP. Remittances averaged roughly US\$121/month, about the equivalent of one minimum salary, and about one-fifth of all rural households receive them. With the mean income in El Salvador at US 1,990, the remittance contribution of 1,452/year is a significant welfare subsidy and an important buffer against declining social services, rural wages, and agricultural prices.

The spatial distribution of remittances is quite variable as the map shows, and ranges from a low in the areas of Ahuachapan—coffee production areas largely buffered from the war with little out-migration—to a high in places like Morazan where the war, massacres (such as the infamous El Mozote), resettlement, and economic collapse fed a large exodus. Areas

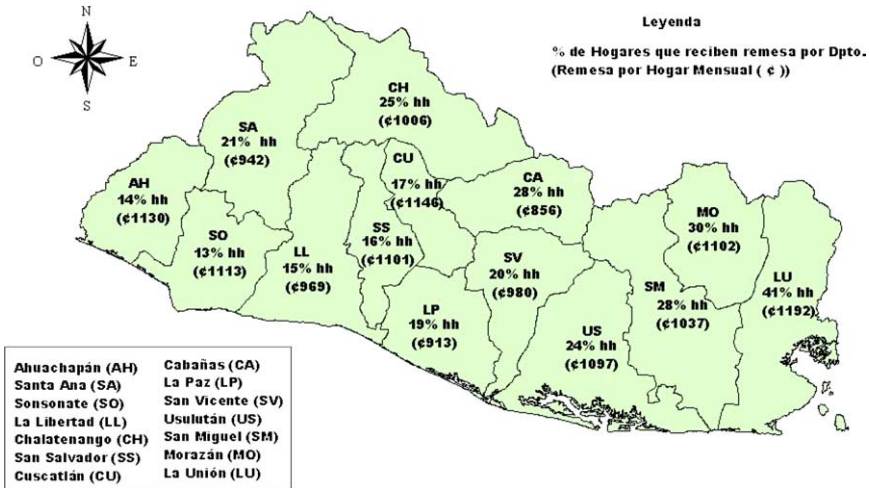


Figure 2. Number of households that receive remittances by department. Source: PRISMA (2002).

these households must take on more agricultural tasks while confronting: (1) very marginal grain prices; (2) labor scarcity due both to out-migration and to low rural wages; and (3) the declines in available family labor as an outcome of fertility declines and schooling. Overall population growth in rural areas in the period of 1972–98 was lower than urban rates (0.7 vs. 2.9)—less than replacement. In the 20 years during 1978–98, the average number of children per woman was reduced by half (PRISMA, 2002).

(d) Agrarian reform

Agrarian reform has been one of the central political questions in Central and Latin America throughout the last century and has underpinned a great deal of civil strife. Redistributive agrarian reforms in El Salvador have undergone several distinct phases, but two periods are especially relevant to our concerns because of their impact on tenurial regimes: the Agrarian Reform of 1980 that was instigated to stave off the war, and the PTT (Land Transfer Program) of 1992, negotiated as part of the Peace Accords. The 1980 Agrarian Reform enabled collective property through cooperatives, while PTT beneficiaries took advantage of the “pro indiviso” phase to define and legalize common areas. In both these transfers, land could be held in single plots, but provision was also made for collective holdings and communal management.

About 25% of rural households received land under the programs. In total, 401,232 ha were distributed—a fifth of the national territory—to 120,597 beneficiaries: 37,000 were organized in cooperatives and received 5.8 ha/beneficiary; 47,000 received individual plots averaging 1.7 ha; and 36,597 an average of 2.9 ha/beneficiary. These figures were generally below the size levels considered necessary for significant poverty alleviation (Diskin, 1996) but this is predicated on the idea that all income is derived from agricultural sales.

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 led to collective decisions about land, including natural resources management such as forest co-management, fire control, watershed councils, and hunting controls. Second, some agrarian reform cooperatives and the PTT communities received technical assistance and funds as part of international cooperation programs that emphasized environmental ideas and sustainable development projects, such as reforestation, agro-ecology, and resource protection. Reforestation with tree crops also became a significant element of disaster mitigation for hurricanes and earthquakes. Third, the redistributive structure itself has created a different agricultural landscape that is much more of multiuse and multipurpose with higher ecological and economic diversifications at the plot and

regional levels. In the case of coffee, for example, small farms of less than 7 ha represent 80% 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 fuelwood for cooking (Mendez, 2001). These plots have important roles in self-provisioning, local niche markets, and create highly structurally and ecologically diverse landscape mosaics. These create much more “inertia” for land transformation, and tenurial “patchiness” blocks the large scale clearing, typical of bigger holdings.

Another 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 and agro-industrial rural holdings for agrarian reform, while assuring the security of urban and financial assets. This policy, as well as the conflict itself, shifted the interests of former agricultural oligarchs away from rural development, except as it might effect water resources for power and urban uses. As rural areas became less important for economic accumulation, they fell in policy importance. After a long agricultural history, El Salvador changed to urban based, low wage, development models. In this context, cheap food policies remained a central strategy to reduce industrial costs and urban unrest, and was largely achieved through imports. El Salvador’s structural adjustment strategies embraced free trade and slashed rural subsidies and credits, both of

which further hammered countryside economies.

4. FACTORS OF FOREST RECOVERY: GLOBALIZATION AND COMMODITY PRICES

El Salvador is a relatively small country which has always emphasized export-led development. It is integrated into the trade treaties of the Central American Common Market, CAFTA (Central American Free Trade Agreement) and the Initiative for the Americas, including those that minimize tariff barriers. The impact of global prices for two key commodities—grains (corn and beans) and coffee have had important effects on rural production and natural resources use. As Figure 3 illustrates so depressingly, 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 regional grain prices, while the other is buffeted by the high volatility in the international coffee market, an outcome of the enormous expansion in its production throughout the tropics.

(a) 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,



Figure 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.

Murray, & Rosset, 1996). Food imports were the norm due to production constraints in the countryside, and, as a consequence, food import infrastructure and distribution systems became well developed. The 1990s witnessed relatively slow annual rates of growth (1.2%) 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% of the real value in 1978. The impact of these low prices can be seen in the structure of rural incomes. Sales of grains comprise only 5% of rural income even though almost 90% of all households produced them (FUSADES, 1998).

Although the area devoted to annual crops fell in the war period, the rate of growth of this sector increased by 5% in the period from 1990 to 1995 as cultivation became possible and reflects a pent up demand by producers to farm again. But grain cultivation contracted in the 1995–2000 period as the poor returns to grains become obvious. In the 1995–2000 period, the value of agriculture production declined by 10% (Cuellar & de Larios, 2002).

The total *area* in annual food crops also decreased. Table 3 shows the magnitude of land use change of these crops. Virtually all field crops decline except for sugar, an industrialized crop which has a protected market and subsidized credit reflecting the political power of the refinery owners.

Since about 90% of rural households grow maize, the contraction of the area in cultivation by 18% indicates a sharp withdrawal from market production in this sector, and grain has basically become a horticultural, domestic enterprise. Overall, the area devoted to producing grains has declined by 27%, or some 78,000 ha, about 4% of the national land area. This retraction occurred largely in poorer fertility montane zones. Beans are the only bright

spot in this grim scenario. Local varieties of the delicious black bean are preferred, and their price has been maintained because they are relatively difficult to find, there is high local demand for them and they are quite expensive in international markets.

The key impact of cheap food policies has been to drive down the value of crops and wages. That the large declines did not explode in social unrest speaks of the buffering of this sector by the deep semi-proletarianization, access to agrarian reform land for self-provisioning, 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 further constrained its expansion.

Agricultural contraction after the war was a result of market factors like declining commodity prices, relentless capital scarcity in this sector, and stagnant agricultural wages. Social factors like male out-migration, declines in availability of family labor, and changing attitudes toward farming made rural life seem less attractive as an economic option and further undermined the sector. But while grains were undermined by low prices, coffee has been hampered by volatility.

(b) *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 declined throughout much of the 1990s reflecting: (1) structural change in agriculture as agrarian reform shifted the sector into many small holdings and cooperatives (about 88% of the coffee farms are on approximately 40,000 ha, and average 2.6 ha); (2) global price volatility; (3) a shift of plantations into housing lots for

Table 3. *Areas planted with agricultural products, 1980–97 (1,000s of hectares)*

Crop	1980	1990	%Change, 1980–90	1997	%Change	
					1990–97	1980–97
Coffee	180	165	–9.1	165	–	–9.1
Sugarcane	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).

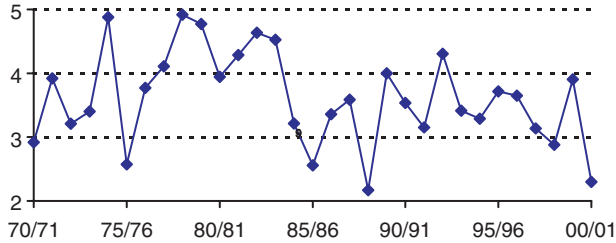


Figure 4. Changes in harvest employment in the coffee sector, 1970–71 to 2000–01 (millions of workdays per year). Source: PRISMA 2002. Based on data from PROCAFE.

urban development; (4) contraction of credit, and (5) the continuing problems of banditry, extortions, and theft of products in rural zones.

Its use of shade trees in one of the most ecologically sound and venerable commercial agroforestry systems has been key in maintaining El Salvador's biological diversity (Komar, 1998). Today about 7,000 ha of organic groves exist, and these have the potential to enter the high end "green" market. Studies from Mexico (Bray *et al.*, 2003; Primack, Bray, Galletti, & Ponciano, 1998) note that peasant cooperatives in Mexico have now become the world's largest exporters of organic coffee, whose net returns often average about 30% above those of other traditional producers. Gobbi (2000) reports that the most viable agricultural investment opportunities for El Salvador are in its traditionally managed coffee farms. While Salvadoran coffee can participate in "fair trade" ventures, 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% of the country, and of these roughly 80% are the high biomass, high diversity shaded coffee. Coffee is the largest generator of foreign exchange in agriculture and a significant source of direct employment. About 30% of the waged income in the agricultural sector—some 120,000 full and seasonal jobs—and roughly another 26% of the jobs in agro-industries are linked to coffee (MAG, 1998).

The data on man days in the coffee harvest show the volatility of the sector. The price fluctuations in the global market reverberated throughout the coffee economy mainly because of the monopsony of its central buyers. While some cooperatives are seeking to further integrate themselves into fair trade markets, the

sector as a whole is a price taker, and even though it receives roughly 80% of the agricultural credit in the country, this is less than 4% of the credit applied to all productive sectors. Investment funds are still quite scarce for small holders. The economic condition of these owners precludes shifts to sun grown coffee, and minimizes the use of biocides in small holdings. This is a plus for biodiversity and the ability of these producers to enter niche markets if marketing coops can be developed (Figure 4).

5. FACTORS IN FOREST RECOVERY: STRUCTURAL ADJUSTMENT POLICIES

In the period from 1960 to 1980, El Salvador began to diversify its export base and transform the structure of its agro-economy. In an effort to modernize the agro-export sector, extensive land uses like cattle, and intensive industrial, high input agriculture like cotton and sugarcane exploded (Conroy *et al.*, 1994; Faber, 1993; Paige, 1999). This dynamism was stimulated by an ensemble of fiscal incentives that were reproduced in many Central and Latin American countries, including subsidized credit for land, animal, and machinery acquisition, duty free equipment importation, tax holidays, land grants, and infrastructure development (cf. Downing, Hecht, & Pearson, 1993; Hecht, 1993). Protected and preferential markets further buffered these activities from external competition. Agricultural modernization in El Salvador 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 (Durham, 1979; Paige,

1999). Export agriculture combined with an expulsion front of small scale subsistence production generated an extremely aggressive deforestation frontier (Faber, 1993; Paige, 1999; Utting, 1994).

Structural adjustment programs (SAPs) were put into place with the Peace Accords as a means of addressing the problems caused by the array of subsidies: inefficient production, corruption, coterie economics, and as part of the policy package necessary for receiving multinational development funds. This involved trade liberalization, reduction of subsidies, greater reliance on markets, and decentralization policies. SAPs, in this case, had three 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 from the international markets. This undermined national grain production, reduced income from agricultural sales, and diminished the role of agriculture in the national economy. The second impact was the elimination of fiscal incentives and subsidized credit (except in the case of sugar) 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 coastal ecosystems; and (2) unraveling the highly subsidized livestock sector, a key factor in direct and indirect deforestation; and (3) the removal of grain production subsidies. While the state was not entirely against subsidized credits to other sectors, such as the *Maquiladoras*—the manufacturing assembly plants—rural areas were under severe austerity programs and sharp import competition. Agrarian debates and fiscal transfers to agriculture, historically among the most central populist political concerns in Latin American history, were off the agenda.

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. Whether decentralization improves natural resource management remains controversial. As one of the key elements of structural adjustment program, decentralized governance was implemented throughout the developing world and its results have been mixed (Hecht *et al.*, 2002; Ribot, 2001). While some finances accrued to the municipalities—

a mere 6% of the national budget—the reality is that decentralization, especially within poor rural areas, often produced economically impoverished, isolated and thus quite powerless local governments. 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 evolve, largely through NGOs and civil organizations. With agriculture waning as an economic alternative, rural areas increasingly came to be viewed less as producers of crops, than as suppliers of environmental services. This was a profound deflection in the rural development discourse away from agrarian to ecological issues.

6. THE CONTEXT AND CONTRADICTIONS OF CONSERVATION

The rise of the rhetoric of sustainable development during the 1980s and 1990s as a part of an international discourse within the multilateral development agencies, academics, and the NGO community was a notable feature of international post-war recuperation aid throughout the war ravaged Central America. This approach was especially important in El Salvador due to its general reputation for ecological ruin, and the relentless suite of natural disasters: the earthquakes, floods, hurricanes, and ENSO (El Nino) related droughts of the late 1990s with their devastating social consequences. The rise of environmental concerns was associated with greater availability of international and private funds for the expansion of environmental institutions and projects, and the emergence of vast green NGO apparatus as agrarian assistance *per se* became scarcer. This greening of national politics was reflected at all levels, from former President Flores' five year plan: *Plan de la Nacion* (GOES, 1999) which emphasized that development would have to take on environmental issues in a substantive way, to the emergence of populist, peasant "Socioambiental" initiatives—such as CACH (Comite Ambiental Chalatenango)—the Chalatenango Environmental Committee.

In this new context, approaches to environmental governance tended in two contradictory directions: one focused on community resource management, the other on a highly privatized, "international" model of conservation. The

dominant areas of the “new” environmentalism—sustainable development and ecosystem services—focused on reconstruction efforts and community initiatives after the civil war. CACH, one of the earliest of such coalitions developed in the mountain areas of Chalatenango, a former rebel strong hold. Their approaches are based on collective environmental protection (such as fire control) regional forest management, watershed councils etc. and emphasizes broader territorial coordination among the municipalities through the development of *mancomunidades*—associations of adjacent municipalities—that are more appropriate for resource management and strengthens the political powers of the municipalities (CACH, 1999). The significance of CACH lies in its participatory practices and efforts that produce regional strategies and thus are more effective at overcoming the political impotence inherent in impoverished and isolated municipalities.

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, the Ministry of Environment and Natural Resources, inaugurated in 1997. The “formal” side of the El Salvadoran environmentalism produced a conservation strategy endorsed by the central state that followed the classic set aside models, and was also tailored to regional programs like the Meso American Biological corridor (MBC) and international financing. The programs emphasize El Imposible, a national park that is owned by a private foundation which creates endowments for the conservation area and provides its basic management services, and oversees the certification programs of adjacent private coffee forests. El Imposible 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 flow to developing coffee technology packages, organic certification programs and development of international markets forest guards and guides.

This policy and funding divergence has produced a disjuncture between “formal” *versus* “social” conservation in the country. By privileging privatized forms of conservation, inno-

vations that could affect a great deal more territory than the 4% of El Salvador’s lands likely to benefit from the MBC face a funding and policy void. Indeed, the areas where forest resurgence is most marked, the eastern mountain zone, is largely a “policy orphan” in spite of its importance for maintaining the Rio Lempa watershed, the key water course for energy and irrigation in the country. This divergence reflects an institutional divide as well as a legacy of deeper political schisms within the country.

Central American environmental approaches have historically been dominated by conservation ideologies that emerged from the United States or US trained ecologists. Many influential researchers (often informed by Malthusian models of resource destruction) emphasize “set asides” as the central approach to conservation (see, e.g., Sanderson & Redford, 1997; Shaik, Terborgh, & Dugelby, 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 their ability to mobilize international economic resources for ecological projects. El Salvador, with its reputation as an ecological ruin barely counts in their scheme of things, in spite of its extensive resurgent woodlands.

Their position has several implications. First, rural Salvadorans remain very poor, and absent economic transfers and market products that support agricultural incomes, they have increasingly focused on activities to enhance their ability to mobilize environmental funds as part of international cooperation, green trade, and fair trade initiatives, and through payment for environmental services (Piagola, Arcenas, & Platais, 2005; Rosa, Kandel, & Dimas, 2003). These efforts have produced formidable organizations for regional resources management as well as more local efforts to administer water courses, forests, and biodiversity through a range of collective agreements. The mobilization of such social capital creates good perspectives for success in these kinds of environmental enterprises (Bray *et al.*, 2003; Gibson, McKean, & Orstrom, 2000; Grieg-Gran, Porras, & Wunder, 2005). This positive trend in resource management runs up against serious bias, not just from Salvadoran ruling elites who have embraced the ideologies of privatization as matters of both principle and historical politics, but also from the international environmental community. Anthropogenic systems are viewed as

uninteresting ecologically (even though the empirical research on these systems contradicts this view) and so conservation agencies are usually unwilling to invest money, effort, and policy analysis woodland ecosystems other than those associated with coffee or indigenous people.

Large scale parks and preserves are becoming much less of a conservation option, and future efforts will require a landscape approach. In this emerging context, the importance of secondary, anthropogenic forests, and their role as elements in conservation remains largely unrecognized. While conservationists may have been emphasizing “hotspots,” the future must involve rethinking of the matrices between conservation areas.

7. THE MANAGED MATRIX

The recent scholarship on fragment ecology, usefully organized in the collections of Schelas and Greenberg (1996) and Laurance and Bierregaard (1997), present a complex picture of spatial structure and ecological change. One of the central points is that the matrix—the ecosystems surrounding a conservation site—is an important key to population support and for reducing extinction rates within reserves and regional metapopulations. The endless repetition of the metaphors of islands and oceans that infuses the language of conservation biogeography, and the development of research designs that analyze extinction rates in emphatically isolated forest fragments that are ecologically completely different from the surrounding ecosystems (i.e., water, young pasture) has obscured an important dimension of reality: forest fragments in the world are often found in complex matrices: coffee plantations, diverse tropical fruit orchards, manipulated and secondary successions, wood lots, multi-cropped milpas, agroforestry systems, abandoned or weedy pastures, door yard gardens, and 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 (Daily *et al.*, 2003; Gillespie, Grijalva, & Farris, 2000). 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 (Aldren, 1994; Chokkalingham, de Jong, Smith, & Sobogal,

2001; Daily *et al.*, 2001, 2003; Estrada *et al.*, 1993; Harvey & Haber, 1999; Komar, 1998). Data from Central America increasingly show that the diversity in these sites is often significant, and thus it may be human impacts on age and heterogeneity of habitats, seral complexity, and enrichment of matrices might be on a par with “naturalness” in generating and supporting diversity at landscape levels.

The larger problem has to do with the conservation discourse and its relentless focus on large parks, largely 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 by macroeconomic and structural adjustment policies 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 ecology every bit as vicious as that of the oligarchs.

8. IMPLICATIONS

The case of El Salvador has several implications that extend well beyond the boundaries of this small country. First this study highlights how the processes of globalization, in contrast to many other areas, have enhanced forest resurgence. War, international migration, remittances, the effect of free markets, and environmental ideologies all contributed to forest recovery and highlight the complexity of forest trend in globalized economies.

Second, in spite of the fact that 50% of its inhabitants still reside in rural areas, and its population densities are over 225 km⁻², El Salvador’s forests are making a comeback. This throws into question some of the long held Malthusian ideas about population and resource degradation, a rethinking that is overdue, and one that can only be understood in light of larger scale structural changes in economies.

Third, conservation practice has not really addressed the importance of matrix ecology in anthropogenic environments for conservation outcomes as well as politics. As Vandermeer and Perfecto (1997, 2002) among many others argue, this is a major lacuna in research. We suggest that it is also a major policy void. Forest regrowth is occurring elsewhere in Latin America (Aide *et al.*, 1997; Perz & Skole, 2003; Rudel

et al., 2002), and yet the social ecology, diversity dynamics, and political economy of these recovery 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 esthetics are largely “out of the loop” in today’s conservation focus.

Fourth, as structural adjustment policies have vastly reduced investment in many rural zones, environmental funding remains one of the few dynamic economic transfers to rural areas, and many forest communities have

mobilized to develop regional land management plans for environmental services such as the Kyoto Protocol’s Clean Development mechanisms (Rosa *et al.*, 2003). These groups and the forests they manage, unfortunately, are not viewed as priorities.

As long as anthropogenic and regenerating forests are “invisible” as conservation entities, they are potential sacrifice zones without environmental support. Certainly these biologically and socially important landscapes, and the people who inhabit them, deserve more policy attention that supports their positive impact on resources.

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