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Tourism in a Critical Environment:

Brazil's Atlantic Coastal Forest

By

Robert G. Healy

FPEI Working Paper No. 53



School of Forest Resources
North Carolina State University



School of Forestry and Environmental Studies
Duke University



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Southeastern Center for Forest Economics Research

Box 12254, Research Triangle Park, N.C. 27709

Telephone (919) 549-4093

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About the Authors

Robert G. Healy is Professor of Environmental Policy and Public Policy Studies at the School of the Environment, Duke University. He also serves as Director of Duke's Center for International Studies. His current research interests include integrating tourism with resource protection and rural development in protected areas, particularly in developing countries. Dr. Healy holds a Ph.D. in economics from the University of California at Los Angeles.

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TOURISM IN A CRITICAL ENVIRONMENT:

Brazil's Atlantic Coastal Forest

Robert G. Healy
Professor of Environmental Policy
School of the Environment
Duke University
Durham, NC 27708-0328 USA

phone (919) 613-8025
fax (919) 684-8741
e-mail rhealy@env.duke.edu

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ABSTRACT

Brazil's Atlantic Coastal Forest, an ecosystem of exceptional biological diversity, once stretched for over 3000 km down that country's eastern coast, but has now been reduced to about 8.8 percent of its original area. Among the largest remaining intact patches are located in the Southern states of Sao Paulo, Parana, and Santa Catarina. Much of this forest is under various forms of governmental protection, including some large areas in national and state parks. Although most tourism in Brazil's southern coastal states is beach-oriented, significant numbers of tourists visit protected areas, particularly for hiking, rock climbing, scenic drives, and visits to caves, waterfalls, and natural swimming areas. This paper treats the relationship between beach tourism, forest-oriented tourism (ecotourism) and the protection of the Atlantic Forest ecosystem in the region between northern Santa Catarina state and southern Sao Paulo state. The paper notes that a significant portion of the Atlantic Forest in the study area is privately owned, and that both public and private lands are subject to deforestation for agriculture and cattle ranching, and the illegal extraction of wood, heart of palm, and other products. It is argued that a key link between tourism and resource protection is the ability of tourism to generate economic benefits for local communities, as well as for public and private forest reserves. Policy recommendations include better management of land development, programs to create economic benefits for local people, and creation of modes of sustainable use of the ecosystem, including promotion of nondestructive forms of tourism.

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TOURISM IN A CRITICAL ENVIRONMENT:
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Brazil's Amazon forest is generally considered that country's most critical environment. Yet the Amazon is an enormous area, much of it still inaccessible by road, and about 80 percent of the original forest cover remains intact. Much less known, but more endangered, is Brazil's Atlantic Coastal Forest. It once stretched along almost the entire Brazilian coast, a linear distance of over 3000 kilometers, and extended inland in some places several hundred kilometers. However the historical settlement of Brazil began along the coast, and today most of Brazil's large urban centers continue to hug the coast. The combination of agricultural clearing, forest harvesting, and urbanization has reduced the Atlantic Coastal Forest to an estimated 8.8 percent of its original area. Along the 1500 km. stretch of coast in Brazil's northeast, only small fragments of the original forest remain. Most was long ago removed in the course of establishing sugar cane cultivation.

The Atlantic Forest, even in its present much reduced state, contains an unusual concentration of biological diversity. Of 207 species of Brazilian fauna officially listed as endangered, 152 live within the Atlantic Forest Domain. Many of these are endemic to Atlantic Forest habitats and do not occur elsewhere. (Fundacao SOS Mata Atlantica, 1992). Among them are 10 species of primates (monkeys, marmosets and tamarins), jaguar, giant otter, maned sloth, sea turtles, yellow-throated caiman, and 13

kinds of parrots. So unexplored are parts of the Atlantic Forest that Brazilian scientists have recently discovered a previously unreported species of primate (the black faced lion tamarin) on the island of Superagui and the adjoining mainland, only 250 kilometers by air from the huge city of Sao Paulo.

The Atlantic Coastal Forest is also exceptionally diverse floristically. Recently, scientists from the New York Botanical Garden and Brazilian colleagues, discovered 450 distinct species of trees in a single hectare (in Southern Bahia). This surpassed the previous record of 300 tree species per hectare, recorded in Amazonian Peru in 1986. (Journal da Mata Atlantica, 1993).

Nearly all of the remaining areas of Atlantic Forest, particularly those over 1000 hectares, have been protected either by their rugged terrain or by the fact that they are on low fertility coastal floodplains isolated from inland cities by mountains and from beachside settlements by rivers and wetlands.

Defining a Study Area

Even given that the present area of Atlantic Forest is drastically reduced from its current extent, the size and scattering of the remaining forest fragments is so broad that any serious discussion of tourism must focus on a subregion. For purposes of analysis, I have chosen to study tourism in a band of forest extending approximately 300 km along the southern Brazilian coastline from Peruibe (State of Sao Paulo) to the

northern edge of the state of Santa Catarina (See Figure 1) and extending approximately 100 km inland.

The area contains a major part of the largest remaining area of Atlantic Forest (although it does not contain adjoining areas in the northern part of Sao Paulo state and southern Rio de Janeiro). This forest is for the most part a contiguous expanse, particularly along the mangrove-bordered coastline and the mountain ridges. However, the landscape is dotted with clearings for banana plantations and cattle and buffalo ranches, and bisected on the inland side by a major north-south highway that connects Sao Paulo with the cities of the south.

Styles of Tourism

Given that the study area lies within a few hours' drive of approximately 25 million people, how has it been possible that so much of the forest has been little affected by tourism? The answer is simple--Brazil is a "beach culture". Each weekend, and for months during the summer (Christmas to Carnaval), millions of urban Brazilians descend on the narrow littoral zone, which boasts extensive and attractive sandy beaches. Residents of Sao Paulo (pop. 18 million) and Curitiba (pop. 1.5 million) journey to the coast in buses and automobiles, clogging highways and producing massive crowds at their destinations. Modern highways connect the cities directly to the major beach destinations, passing by viaduct and tunnel the forest covered mountains that separate the cities (which lie on a plateau at elevations of

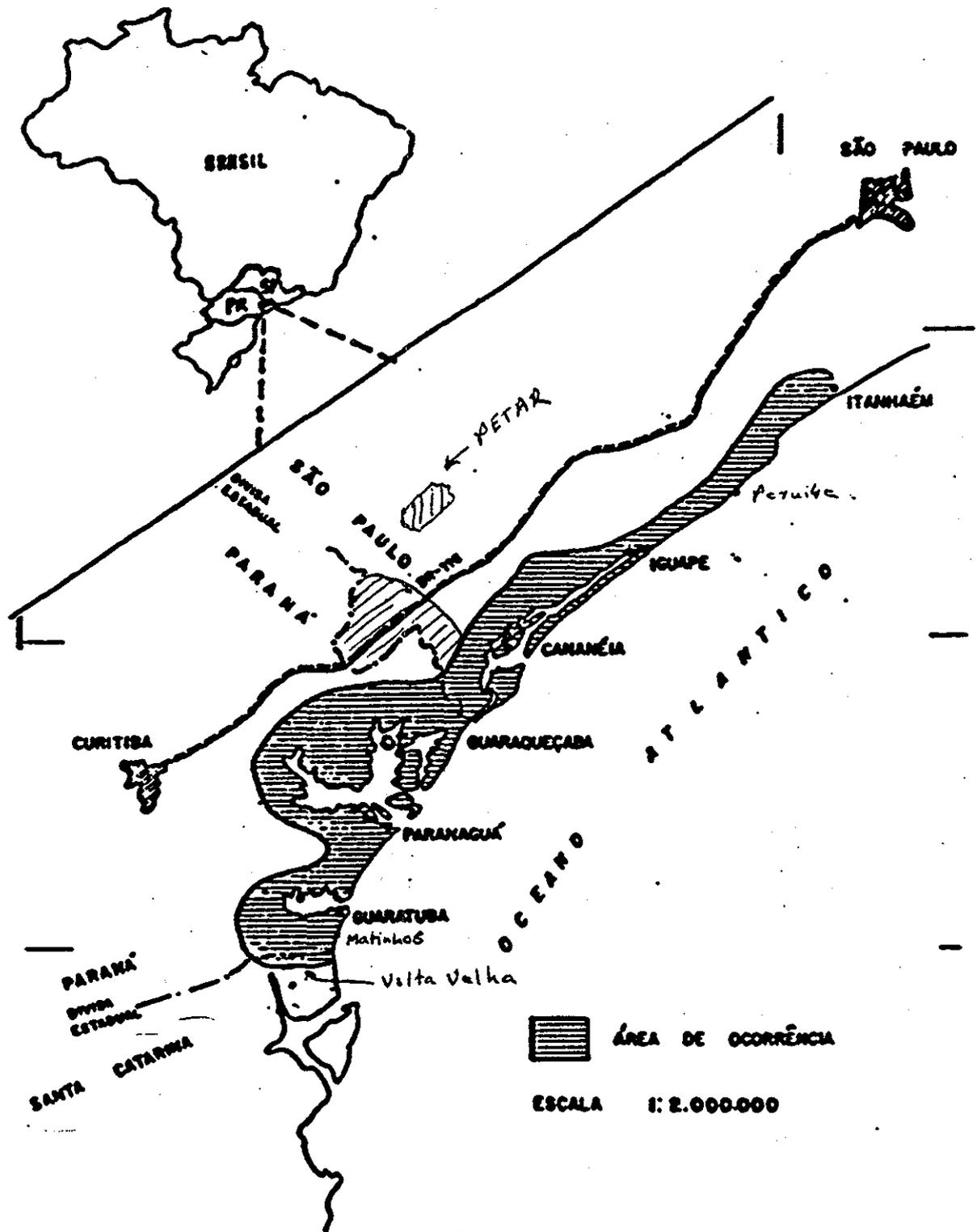


Figure 1: Atlantic Coastal Forest in Southern Brazil (Study Area)

about 1,000 meters) from the coast. Large remnants of Atlantic Forest cover these mountains--they are passed by beachgoers, but are not their destination. Moreover, the mountains are so steep and infertile that agriculture has traditionally passed them by.

In order to serve beach visitors, a string of resort towns has sprung up in the study area, including Peruibe (SP), Matinhos-Caioba (PR), and Guaratuba (PR).¹ Each boasts high-rise condominiums, many hotels, seafood restaurants, clothing and souvenir shops and video arcades. In each case (and in some smaller towns) public authorities have developed beachside promenades along the most popular areas.

During the beach season, the population of the coastal towns swells far beyond the number of permanent residents. In Peruibe, for example, an important destination for Sao Paulo residents, the permanent population (32,959) can reach 300,000 during the height of the season. Guaratuba (pop. 17,987), a favorite resort for Curitiba residents, can grow to 500,000.

In order to cater to these visitors, a wide range of accommodations is offered. There are deluxe hotels and guesthouses for the most affluent visitors. Middle class Brazilians are likely to patronize the many campgrounds, or to rent rooms in the homes of local residents. This latter phenomenon extends to the small villages outside the limits of

¹ There are also a large number of resort towns on the coastline north of Sao Paulo. They are not part of the study area discussed in this paper. These towns are subject to most of the problems identified here and are also adjacent in some cases to Atlantic Forest fragments, including state and national parks.

the resort towns, where farmers may simply open up a pasture and post a sign offering "camping".

Local people also operate food and drink stands, which line roads both in populated areas and on dirt tracks that stretch to undeveloped beaches. A popular item is "caldo de cana," the fresh juice extracted by crushing sugar cane in a hand-cranked press. Stands also sell souvenirs and local agricultural products, such as cheese.

Although the destination for most visitors is the beach, increasing numbers are visiting alternative destinations within the Atlantic Forest. In some cases they visit publicly owned outdoor recreational sites long developed for fairly intensive tourism. In others, they pursue extensive recreation--hiking, camping, rock climbing--with little or no control over their use of natural resources.

One example of an intensively visited recreational site is the Graciosa Road in the State of Parana. This is an old colonial road, later upgraded to a two lane paved highway. It winds up and down the mountains between Curitiba and the well-preserved colonial town of Antonina. A highly popular form of recreation is to drive the scenic highway, stop for a picnic or at a roadside waterfall, and hike numerous side-trails, many of them parts of the old cobblestone road put down by slaves hundreds of years ago. There is also a popular train excursion from Curitiba over the forest-covered mountains. The train, which runs daily during the summer and on weekends throughout the

year, is among the attractions most heavily promoted to visitors to Parana. The train stops at several places as it traverses the mountains, allowing hikers access to trails. However, for many tourists, the train excursion is an end in itself and the Atlantic Forest is merely a scenic backdrop.

Another developed site is the Caverna do Diabo (Devil's Cave) in the State of Sao Paulo. The cavern is in the Parque Estadual de Jacupiranga, part of a complex of state parks in the Valley of Alto Ribeira, about 3 hours drive from Sao Paulo. The Caverna do Diabo is highly developed for tourism, with interior lighting, paved walkways, and a large restaurant. For decades, it was operated by a state-owned railways company (apparently a matter of administrative convenience), but in early 1994 administration was changed to the Sao Paulo Department of State Parks. About 50 kilometers away, another cavern, Caverna de Santana, offers trails, but no interior electric lights. Visitors, who are led through the cave in small groups by guides, wear helmets with an attached carbide torch, an eerie sight in the darkness of the cave.

The developed caverns exist in the context of two other kinds of natural resources. First, the two developed caverns are among literally hundreds of "wild caves," cut into the limestone topography. Some are regularly visited by caving groups, often using climbing equipment. Others are not fully explored. Second, the caverns exist within much larger areas of protected forest. For example, Caverna de Santana is surrounded by the

Parque Estadual Turístico do Alto Ribeira, with an area of over 35,000 hectares. Many trails begin at the cave entrance, leading to other caves, waterfalls, and scenic walks through the exuberant tropical forest (Sao Paulo. Secretaria do Meio Ambiente, 1991).

Another type of intensively visited recreational site within the Atlantic Forest consists of natural swimming pools in the numerous streams. The most popular of these often feature sliding rocks and waterfalls. In a few cases, there is obvious evidence of overuse of these sites. One popular pool, in the Jureia ecological park, near the coast, is visited by several thousand people on summer weekends. The result is eroded trails, a proliferation of food and souvenir stands, and, most likely, a water pollution problem.

Most visitors to our Atlantic Forest study area are either passive consumers of the landscape (drivers on their way to the beach, sightseers on the Graciosa Road or on the Curitiba-to-coast train) or have a particular destination in mind (the caverns, swimming holes.) However, there are also visitors who spread out through the forest to engage in various activities that one might term "nature oriented tourism."

One specific subgroup is the rock-climbers, who visit a variety of sites in the mountains. They blaze trails to popular climbing sites, and a few of them work as guides for visitors. Another group is sport-fishers, who frequent the many estuaries within the Atlantic Forest's littoral zone. There appears to be

a great deal of room for expansion of the number of sport fishers, though catches are hampered by overfishing by both commercial trawlers and the large number of artisanal fishermen.

Another group of tourists, whose number augments considerably during the summer, consists of persons who seek undeveloped beaches for swimming or camping. Although part of the littoral zone is highly developed, there are scores of kilometers of sandy beaches accessible only by water, and hence largely deserted. Tourists arrive at these beaches either by private pleasure craft or make arrangements with local fishermen. The most popular destination, Ilha do Mel (Island of Honey) is operated as a state ecological park and is served in the summer months by regular ferry service from the mainland.

These last three groups of tourists--climbers, fishers, and seekers of deserted beaches--have definite destinations in mind, although they do spread across the landscape to a greater degree than do the developed site recreationists. What of the forest itself, already mentioned as a site of incredible biological diversity. To what extent is it frequented by "nature oriented tourists" or "ecotourists," a type of tourism growing extremely rapidly in other tropical forest regions throughout the world?

The answer is that there is at present very little of this type of tourism, but that the potential for its development is great. The study area has the potential to draw tourists from Brazil, particularly the nearby states of Sao Paulo, Parana, and Santa Catarina. Together, these states contain 44 million

people, and their level of economic development is the highest in Brazil. The vast majority of the residents of these states live in urban agglomerations within a few miles of BR-116, which is the major north-south highway in southern Brazil and which bisects the study area. Numerous roads, some paved, others dirt tracks, lead off BR-116 to mountain and forest areas.

Much of the present ecotourism development is related to state and national parks and reserves. The study area contains 7 federally protected areas, with a total extent of 946,000 ha. and 13 state areas, totalling 1,126,000 ha. They are operated under a bewildering variety of management categories ("state park," "ecological station," "area of touristic interest"). In a few cases, the area is clearly demarcated, park guards are in evidence, and there is a reception area for visitors. In others, the boundaries are not marked, and it is unclear how much of the land is publicly owned and how much is private. Over all of these specific management systems is a national Law of the Atlantic Forest, which sets strict federal controls (often ill-enforced) over the clearing of forest and the extraction of forest products.

At least a few of the parks and reserves in the study area are actively managed for ecotourism. For example, the state government of Sao Paulo operates the Ecological Station of Jureia-Itatins, stretching along the southern Sao Paulo coast beyond the place where intensive beach development ends. During the season, personnel of the ecological station conduct hikes

into the forest and conduct environmental education activities. Similar trips are offered at the Ilha do Cardoso State Park, along the coast to the south. At Ilha do Cardoso, package excursions including hiking and beach visits are offered by Sao Paulo based tour operators, and simple accommodations and guide service is made available by local fishermen (Diario do Grande ABC, Sao Paulo, 1994)

A form of ecotourism that is small numerically, but potentially of great importance is use of the Atlantic Forest by scientists. On Ilha do Cardoso, the state of Sao Paulo operates a research station called the Center for Applied Research on Natural Resources (CEPARNIC). It provides accommodation for forty scientists or students, laboratories and an auditorium. There is also a Center for Marine Studies, operated by the Federal University of Parana. Although located at Pontal do Sul, at the edge of the developed part of the Parana beaches, the Center is well sited to be the jumping off point for research in the Bay of Paranagua, just to the north.

Scientists have several important functions relative to ecotourism. First, they are a form of "pioneer tourist" who blaze trails, explore the area, and provide initial economic benefits for local residents. Second, scientists publish books and papers, both scientific and popular, that attract future ecotourists to a given site. Third, scientists serve as a type of unpaid forest guard, protecting the resources they study from poaching or other damage. Indeed, one might argue that

scientists are among the best guards, as most prefer to spend their time in the forest itself, rather than at park headquarters.

In addition to ecotourism that depends on government-protected lands, the study area contains an interesting privately-owned natural area, linked to tourism.² Private, tourist supported tropical forest reserves are also found in Costa Rica and Ecuador, among other locations (see Healy, 1988, Alderman, 1990) In the case of the Atlantic Forest, the private reserve is Volta Velha, located in Santa Catarina state, just over the border with Parana. The reserve originated several years ago, when a Curitiba based accountant purchased 1000 hectares of pristine Atlantic Forest, with the idea of raising cattle upon his retirement. The accountant's son, a university-trained biologist, persuaded his father that preservation of the forest was both worthwhile and potentially profitable. The land, which remains privately owned, has been voluntarily put under the protection of the Brazilian National Environmental Agency (IBAMA), and has since 1992 been operated as a site for biological study and for ecotourism. Facilities capable of housing a dozen researchers have recently (1994) been constructed on the site, and trails and sample plots have been laid out.

The family has also constructed a small hotel (attractive

² Also, the director of Curitiba's Municipal Botanical Museum, Dr. Gerdt Hatschbach, operates a private reserve near Morretes, containing both natural forest and cultivated plants, which is occasionally visited by tourists.

cottages and a restaurant) along the coastline, about 20 miles from the nature reserve. The hotel is promoted as a site for "ecotourism and leisure". Guests can enjoy water sports, a swimming pool, and visits to the historic town of Sao Francisco do Sul, as well as the possibility of visiting the nature reserve. The owners have hosted groups of students from Antioch College (USA), who stay in the hotel facility while pursuing environmental studies in the reserve.

Problems of Biodiversity Protection in the Atlantic Forest

The forest and coastal resources on which present tourism depends and on which the future development of ecotourism must rely are under a number of serious and immediate threats. Tourism itself threatens the resource (see below) but its impact is minor compared to other influences.

Perhaps the most important threat to the Atlantic Forest, both in the study area and elsewhere, is the large amount of land being deforested by private owners for agricultural pursuits. For example, in the Guaraquecaba region of Parana, which is designated as a federal area of environment protection, large tracts of lowland forest have been cleared for grazing water buffalo, an Asian animal recently introduced into southern Brazil. In Sao Paulo, other areas of protected Atlantic Forest have recently been cleared for banana plantations. Even when land is not cleared, a great deal of extraction of forest products, such as wood, palm heart, and wildlife, is taking

place. This degrades the inherent quality and diversity of the forest, even though overall forest cover remains.

Another threat to the forest is real estate speculation. On the island of Superagui, which contains the 20 km Praia Deserta (Deserted Beach) and which is accessible only by water, it is said that real estate agents have laid out several hundred thousand lots, presumably for sale to affluent urbanites.

The Law of the Atlantic Forest, a series of federal decrees meant to protect the forest, has proven to be quite problematic for the "caicaras," local people who live within the forest and draw their livelihood from forest and marine resources. There are an estimated 6,000 of these people in the Guaraquecaba area of Parana--and perhaps two or three times that number in the study area as a whole. These people are in general of Portuguese and other European extraction, though some are Tupi-Guarani Indians and others are of mixed ancestry. Isolated and generally poor, they are essentially "country people," who have evolved distinctive methods of fishing, of canoe making, of food preparation, and even a characteristic dance, the fandango (for information on caicara culture, see Alvar and Alvar, 1979 and Roderjan, 1981) By creating uncertainty and encouraging illegal activity, the Law of the Atlantic Forest has actually tended to delay the vital task of finding ways in which local people can co-exist sustainably with their world-class forest resources.

The dependence of the caicaras on the forest is indicated by the following quote from Roderjan (1981):

"The [native]³ of the coast makes [for himself] all implements necessary to his survival, retaining elements of his own environment." (p. 49)

These include the dugout canoes used for fishing, the simple wooden machines employed to process manioc into flour, and even the homemade instruments used in the fandango. Other locally made products include artisanal foodstuffs, particularly manioc flour (farinha), cacacha (a fiery drink distilled from sugar cane), and heart of palm (palmito). For those living immediately adjacent to the coast, or along rivers, the most important economic product is seafood, including both fish and shrimp.

The livelihood of the caicaras depends on the forest in several ways. First, the forest supplies raw materials for various articles of production. Hearts of palm are gathered by cutting the living trees, generally at about age 7-10 years. Cupiuva (*Tapirira guianensis*) and caroba (*Jacaranda puberula*) are among the woods used for making dugout canoes. Caxeta (*Tabebuia cassinoides*) is a light, easily carved wood used for making a variety of household articles and artistic carvings, as well as musical instruments. Vines and bamboos are also collected from the forest for use in basketmaking.

Second, the forest provides the land used for small scale crop cultivation. Soils are sufficiently fertile in the lowlands

³ Although Roderjan uses the word caboclo (literally "civilized pure-blooded Indian") to describe the coastal dwellers, most are not of Indian descent. The term caicara ("poor, rural coastal peasant") is more generally employed and is more accurate.

so that true swidden (shifting) agriculture need not be practiced, and most farming takes place near residents' houses. Nevertheless, any expansion of area under cultivation comes from clearing nearby forests.

Third, the montane forest protects the quality of water entering the estuaries, while the coastal mangroves provide a nursery area for fish and shrimp. These marine products provide the livelihood for substantial numbers--probably the majority--of the rural people living in the study area.

Attempts by the Brazilian government to protect the Atlantic Forest have had the unfortunate tendency to make traditional extractive activities illegal, while failing to provide the caicaras with an alternative source of livelihood. As a result, a great deal of illegal extraction continues.

Relating Tourism to Environmental Protection

Tourism occupies an ambiguous position with regard to the Atlantic Forest. On one hand it is a contributor, albeit localized, to the forest's degradation. On the other hand, controlled ecotourism promises to provide an economic rationale for forest protection. These benefits can give landowners and the government an incentive to keep primary forest intact, and can, if carefully distributed, offer local caicaras compensation for loss of the ability to freely extract forest products.

Reducing Negative Environmental Impacts of Tourism

Tourism offers a number of potential threats to the environment, many of which are now being felt in the Atlantic Forest. One problem is the aesthetic blight associated with facilities that are either ill designed or simply out of scale with the surrounding community. For example, the small beach town of Peruibe, in Sao Paulo state, which consists mainly of 1-2 story homes and shops and which borders an important nature reserve, is dominated by a 16 story condominium complex. This development could easily have been made more attractive by reducing its height and bulk. Yet there are minimal, if any, zoning controls governing coastal development. One interesting policy, put in place in parts of Santa Catarina state, requires that future high rise developments rise in tiers away from the beach, with those in the row closest to the beach being only 2 stories in height, the second row 4 stories, then 8, et cetera (Ruschmann, interview, 1994). This allows the construction of high density tourist facilities, but in a more attractive pattern, and with less chance of casting shadows on the beach.

Another problem is the lack of urban infrastructure in many, if not most, of the region's tourist resorts. The most obvious problem is lack of sanitary sewer systems, leading to water pollution. Tourist facilities contribute to this pollution, but, more important, the resulting pollution becomes a problem for tourists. The extent of this problem can be gauged by the following observation--on a single summer day (February 17, 1994,

just following the Carnaval peak of beach visitation) the quality of water at popular beaches throughout Sao Paulo state was measured by the state environmental agency. Of 81 beaches sampled, 47 had "inadequate" water quality; only 23 were rated "excellent". (Folha de Sao Paulo, 2-22-94, p. I-14).

Real estate development along the coast is related to tourism in that most of the lots and dwellings are marketed as second homes. Such development causes demand for new road access to previously remote areas, and can present the problems associated with visual degradation and lack of infrastructure that are associated with mass tourism. Speculative lot subdivisions are particularly insidious, as they commit land to future conversion and deforestation, yet can occur in large number with no immediate physical effect, and hence do not engender the public outrage. Ilha Comprida, for example, has been extensively subdivided, but there is little actual development there.

The opening of new roads to and along the coast during the last two decades has been extremely important to the development of tourism and to land speculation. A proposed major highway linking Sao Paulo with Curitiba (BR 101) would cut through Jureia and cross the Parana border through the Parque Estadual do Jacupiranga. This would make it much easier to get to currently remote parts of the shoreline and would make it possible to develop thousands of already subdivided lots in such now pristine locations as Ilha Comprida. A proposed bridge connecting Ilha

Comprida to the mainland near Iguape would have a similar effect--and is being supported by the municipality and by land dealers (Bollmann, personal communication).

Tourism as a Contributor to Sustainable Regional Development

Among the most difficult problems in ecotourism is finding ways for its benefits to reach local people (Brandon, 1993). Healy (1994) offers a typology of three general ways in which local benefits can be generated: (1) fees can be collected from tourists, which are directly distributed to local people or used to support development projects; (2) local people can provide services to tourists, including guide service, transportation, food and housing; (3) local people can sell handicrafts, foodstuffs and other tangible goods ("tourist merchandise") to visitors.

Each of the above alternatives might be considered in the study region. With regard to fees, virtually none of the protected areas collect entrance fees from visitors. An exception is the developed caves, Caverna do Diabo and Caverna Santana, where a modest fee is levied. Parks are typically supported from state and national budgets, rather than being self-supporting. On the other hand, there is some precedent for looking at parks as sources of economic development. The Parque Estadual Turistico do Alto Ribeira (PETAR) is not only the largest employer in its region, but also has a new revenue sharing plan, in which 30 percent of entrance fees to the caverns

will go to local government, and 70 percent will remain in the park. The new revenue sharing would increase the main municipality's revenue by 316 times! (Clayton Lino, personal communication) In another Sao Paulo park, Jureia, a park-sponsored economic development project is helping 7 caicara families, living deep within the protected zone, to manufacture banana candy, which is then packed in 5 kilogram containers and sold in Sao Paulo.

With regard to tourist services, local participation varies greatly from place to place. Towns such as Guaraquecaba, Iporanga, Cananeia, and Paranagua all provide food, lodging and transportation for tourists who then venture within protected zones. Small communities within the parks, such as Ilha do Mel and Superagui offer simple food and lodging to visitors, sometimes in private homes. There appears to be unexploited potential for sportfishing, which would be an excellent complementary activity for the hundreds of artisanal fishermen who work the waters of the region.

The third option, sale of tourist merchandise, also offers possibilities. Unfortunately, under the current Law of the Atlantic Forest, most products are extracted illegally. Research is now being performed to determine how such products as heart of palm and caxeta can be harvested sustainably, with an eye to developing systems of use that the government might legalize. An interesting possibility for adding value to local products is a labeling system for artisanal foodstuffs implemented by a state

agricultural extension agency in Parana, EMATER. The agency extends technical assistance to producers of various foodstuffs, then provides labels that offer consumers some assurance that proper sanitation procedures have been followed. There is a significant opportunity for using the existing EMATER system to guarantee the sustainability of consumer products extracted from the forest. Properly implemented, such a system could make products more valuable to tourists, both in direct producer to tourist marketing and in weekend and holiday markets held in coastal tourist towns.

Conclusion

Brazil's Atlantic Forest is one of the world's most threatened ecosystems, important both because of its high degree of biodiversity and the fact that more than 90 percent of its original area has been removed. A large remnant section of this ecosystem, totalling over 1 million hectares, and with contiguous extent of over 500,000 hectares, still exists in the southern states of Sao Paulo, Parana, and Santa Catarina. Protected by steep mountains and poor road access, this remnant forest has remained remarkably intact, despite its proximity to large urban centers and to an flourishing beach-oriented tourist industry.

Most of the remnant forest has been "protected" by inclusion in a complex system of national parks and reserves. However, these areas contain a large amount of private land, and are subject to considerable pressure for logging and conversion to

agriculture or grazing. There is also a threat of real estate development along the extensive coastal sections. While some parks are well bounded and well protected, others exist only on paper. The national government has attempted to protect the entire forest with a sweeping set of decrees called the Law of the Atlantic Forest. However, the primary result of this policy has been to threaten the livelihood of several thousand "caicaras" who are members of traditional communities dependent on the forest and adjacent waters.

The Atlantic Forest is just beginning to be affected by a growing domestic and international demand for nature oriented tourism, which includes hiking, camping, caving, amateur nature study, and professional and educational research. Thus far, such tourism has been confined to a small number of sites. Careful expansion of this type of tourism holds promise of providing resources for improved park management, as well as opportunities for the caicaras to use forest resources legally and in more sustainable ways.

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