

Biodiversity Conservation and Sustainable Community Development in the Los Cusingos--Las Nubes Biological Corridor in Southern Costa Rica

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Introduction

There is increasing evidence that national parks and other protected areas alone are insufficient for the conservation of the world's biodiversity, particularly within tropical environments where most of the biological wealth of the planet is concentrated. Similarly, sustainable community development in buffer zones around protected areas has proved to be elusive for rural dwellers adjacent to these areas.

Deforestation has not only taken a heavy toll on tropical forests and their respective biotas, but forest fragmentation into terrestrial islands has also been a powerful force for the depletion of biological diversity. Creative alternatives are needed to ensure the long-term survival of biodiversity and to enhance the achievement of sustainable development at the local community level. Three such alternatives are the creation of biological corridors, "green consumerism" and financial support for environmental services.

The Los Cusingos—Las Nubes Biological Corridor in southern Costa Rica illustrates each of these three approaches to biodiversity protection and sustainable community development. This corridor is the focus of a joint research and development project of the Tropical Science Center of Costa Rica and the Faculty of Environmental Studies of York University in Toronto. Conservation of regional biodiversity and sustainable development of local agricultural communities are important objectives of this project.

Environmental Description of the Corridor Region

Las Nubes, designated as a private biological reserve, is a montane rainforest at approximately 1200-1500 m on the Río Peñas Blancas on the Pacific slope of the Talamanca range in southern Costa Rica. To the northeast is Chirripó National Park that continues into La Amistad, an international biosphere reserve which Costa Rica shares with Panama. Las Nubes thus forms part of one of the largest contiguous rainforest ecosystems in Central America (Map 1).

The Río Peñas Blancas is the main river flowing through Las Nubes with its crystal-clear water cascading over rapids and waterfalls. Several deep gorges dissect Las Nubes, each presumably characterized by endemic species. Downstream lies Los Cusingos, a lowland wet forest at approximately 700 m in the middle portion of the river basin. This is the former homestead of the world-renowned ornithologist Dr. Alexander Skutch. The Tropical Science Center now protects Los Cusingos as a Neotropical bird sanctuary.

The Central American Commission on Environment and Development officially recognizes this watershed as a portion of the Mesoamerican Biological Corridor that extends from Panama through Mexico (Map 2). The Los Cusingos—Las Nubes Corridor is particularly significant in ecological terms because it connects forest fragments from the highest elevations to those near the Pacific coast, whereas most of the Mesoamerican Corridor connects fragments primarily at higher elevations (Map 3). The significance of the highland—lowland connection is that the dryer lowlands forests are the most threatened ecosystems in Central America. The Monteverde Biological Corridor in northwestern Costa Rica is another example of a highland—lowland corridor (Map 4).

Development of the Biological Corridor

The corridor consists of forest patches of various sizes and species composition, agricultural fields (primarily coffee and sugarcane), pastures, and degraded lands. There are several critical elements of the plan for the development of the corridor, the protection of its biological resources, and the sustainable development of its rural communities:

(1) The transition from sun grown coffee to shade grown organic coffee as a means toward stabilizing hydrological resources, enriching the soil, reducing soil erosion, and increasing biodiversity—of resident tropical birds and migratory species and or the arthropod fauna essential for soil structure. This is to be done by creating an incentive for local farmers to adopt the transition strategy. The incentive is to be provided through a local cooperative of growers who market shade-grown, organic coffee to a niche market, beginning at York University and expanding into the Toronto market.

(2) The creation of a model shade and organic coffee farm for demonstration purposes. This is to be financed through the Fisher Fund for Neotropical Research and Conservation. Several volunteer students from York University initiated the construction in early summer 2002 of a nursery for trees identified as the most appropriate species for shade coffee, economic productivity and ecological sustainability. The site for the first model coffee farm has been identified.

(3) The transition from degraded pasture lands to reforested land and agroforestry systems. The tree nurseries will ultimately provide the plants for reforestation of degraded pastures. However, considerable work must be done to involve the local cattle ranchers to participate in rehabilitation efforts.

(4) The transition to improved pastures, including the use of improved pasture grasses and partial tree cover.

(5) Reforestation of degraded (non-pasture) lands, largely for regeneration of water resources. These lands consist of abandoned subsistence farms, sugar cane plantations, and coffee-eucalyptus plantations. The efforts required in points (3) and (4) could utilize the resources of the Centro Agronómico y Tecnológico de Investigación y Enseñanza (CATIE) in Turrialba.

(6) Future land acquisition through direct purchase of forest lands and other critical ecosystems within the Corridor. This is an attractive component of the strategic development plan jointly being implemented by TSC and FES. York University owns the Las Nubes Rainforest in the upper reaches of the watershed, Tropical Science Center owns the Los Cusingos Sanctuary in the lower portion. A program to purchase additional land would strengthen the long-range sustainability of the Biological Corridor by removing certain lands from potential threat. Two potential purchases have been identified: one is an extension of the Las Nubes forest into lower elevations which is critical for the altitudinal migration of resident species; the second consists prime riverine forest at middle elevation (ca. 1000m). This property is adjacent to the proposed model coffee farm and could serve as a baseline for forest ecosystem data.

(7) Municipal provision of public lands to NGOs for forest protection and regeneration. One such example is the “Parque Natural” on the Río Peñas Blancas that is leased to TSC and managed by a local community group--COCOFORES--for restoration and environmental education activities. This park has been selected as one of the potential sites for a tree nursery.

(8) Participation of local community groups in small business activities. A women's cooperative at Reserva San Luís in the Monteverde Biological Corridor, for example, is making bamboo furniture and paper products from bamboo wastes. A similar cooperative could be established in the Los Cusingos—Las Nubes Corridor for the manufacture of paper products from the wastes of coffee, banana, bamboo and sugar cane production. Organic fertilizers for coffee fields and home gardens could also be made from these waste products.

(9) The construction of a community environmental center (with library, laboratory and computer facilities) will serve as the focal point for joint research projects and for outreach and training activities. The Fisher Fund for Neotropical Research and Conservation currently has Cdn \$50,000 to invest in such a centre. The design and the equipment needs of the center were discussed with TSC and with local community members. COCOFORES is particularly enthusiastic about the possibility of using the center as its base of activities. The local teachers' organization has also expressed a keen interest.

Green Consumerism

There have been numerous attempts to market ecologically certified products from the tropics, such as timber, coffee, cacao, tea and others (recently summarized by Hardner and Rice, 2002). The consensus, however, is that the pressures of commercial logging and deforestation for agriculture and pastures are of such a scale that the marketing of sustainable timber and agricultural products can not prevent the loss of biodiversity on a large scale. Nevertheless, the opportunity remains to capitalize on green products to protect local and even regional biodiversity. In fact, regional landscape

conservation—based on a mix of protected areas, buffer zones, sustainable forestry and agriculture, and international marketing—may offer the best hope for protection of biodiversity in some tropical areas, including southern Costa Rica. Furthermore the quality of the agroecological matrix in a tropical montane landscape is an important determinant of the maintenance of biodiversity (Perfecto and Vandermeer, 2002)—quite apart from the capacity of the landscape to produce certifiably “green” products.

Much of the coffee produced within the Los Cusingos—Las Nubes Corridor is “technified” sun-grown coffee that is produced with little to no shade cover, a high density of coffee plants, and significant inputs of agricultural chemicals (fertilizers, pesticides, herbicides and fungicides). Other coffee farms have varying amounts of shade cover provided by a small number of tree species, and a few follow traditional shade grown coffee production techniques.

A major objective of the research/development activities within the Los Cusingos—Las Nubes Corridor is to convert sun grown technified coffee to more traditional forms of shade grown organic production. The benefits from traditional production include erosion control, particularly on slope land susceptible to accelerated erosion; greater soil moisture retention; enriched soil fertility and improved soil structure through organic farming practices; and increased biodiversity, particularly of resident forest birds and Neotropical migrants (Znajda, 2002). An increase in the diversity and abundance of surface-dwelling beetles in more traditional forms of production has also been observed (Hall, 2001). The species of ground-foraging ants was significantly higher in a landscape matrix of forest fragments and shade grown coffee than in one with forest fragments and technified coffee farms (Perfecto and Vandermeer, 2002).

In spite of the natural values of shade grown, organic coffee, there has been a trend toward the technification of coffee production based on sun tolerant varieties, largely because of higher yields. However, there is such a glut on the world coffee market that many small producers are abandoning their coffee farms for other means of gaining a livelihood. Even larger producers are now leaving coffee unharvested because the cost of harvest and marketing exceeds the potential profit.

Small producers are better positioned to survive the currently saturated market by producing high quality shade grown organic coffee for the “botique” market in Europe and North America. The small farmers in the Corridor region of southern Costa Rica are willing to invest in the conservation practices associated with shade grown organic coffee if they are guaranteed a fixed price for their product that will cover their investment and provide a wider profit margin.

The York University—Tropical Science Center project in the Corridor therefore has two thrusts: one is to aid the local farmer to convert to shade grown coffee which can be certified, and the second is to guarantee a portion of the international market for this green product. According to this scheme, the project will finance much of the conversion costs from technified to shade grown coffee. The farmers will be guaranteed a “fair trade” price (currently about double the world market price). The remaining benefits will be funneled into local community sustainability and to finance additional research and program activities.

Such a program is not likely to solve the problems of the loss of tropical biodiversity except at the local level. However green consumerism, together with other forms of alternative conservation practice and financing, will contribute toward saving

tropical biota. Furthermore, the successful marketing of green products yields other societal benefits such as forest protection, hydrological stabilization, and pollution reduction.

Financial Incentives for Conservation

Government payments to private landowners for the natural environmental services provided by forested ecosystems are a significant incentive for conservation. These services include carbon storage, erosion control, soil fertility, maintenance of water quality and quantity, and protection of biodiversity. Costa Rica has been a leader in developing such conservation grants. Administered by the environment ministry's National Fund for Forestry Financing (FONOFIFO), this is becoming an increasingly important mechanism for protecting forest land in Costa Rica. The Tropical Science Center, through its agreement to protect York's Las Nubes Rainforest, receives an annual government payment from this program. Another objective of our project is to enlist a larger number of landowners within the corridor to participate. We anticipate considerable success from this effort since the maintenance of land under forest cover is now more profitable than conversion to coffee and other agricultural crops or pastures.

A "bold new approach" initiated by Conservation International, investment in "conservation concessions," is similar to the mechanism for the payment for environmental services. According to CI:

conservation concessions provide a powerful way to expand the green market from its present dependence of products to the broader notion of green services—the opportunity to purchase biodiversity preservation directly (Hardner and Rice, 2002, p. 89).

Rather than leasing forested land in the tropics to logging and mining companies, governments and landowners lease land to conservationists at competitive prices. Contrary to popular opinion, conservation organizations can compete effectively with corporate users because of the relatively low costs. This system of conservation concessions contributes to biodiversity protection and sustainable development in several ways. As conceived by Hardner and Rice (2002), the “New Green Market” has the following characteristics:

- It enables tropical countries to capitalize on their biological wealth and reduces their dependency on more volatile markets for timber and cash crops.
- It provides hard currency that pay government taxes and fees and that can be invested in part in local communities and social programs.
- It provides for the immediate protection of biodiversity of the leased forested land.
- It offers an investment opportunity for corporations wishing to promote a “greener” image.
- It is a potential conservation mechanism in areas where the establishment of national parks and other protected areas is problematical and/or more costly.
- It reduces risk by establishing ongoing economic incentives for continuing cooperation not susceptible to volatility and unpredictability.

The Value of the Los Cusingos—Las Nubes Model

The Los Cusingos—Las Nubes Biological Corridor offers a possible model for the protection of tropical biodiversity within a framework of regional landscape

conservation and sustainable community development. It also represents a unique way to finance research and conservation efforts, viz., through land donation, private philanthropy, institutional collaboration between a Canadian university and a Costa Rican environmental NGO, and indirect Canadian government support (in the form of research grants to graduate students).

In summary, the objectives of this model are being achieved through:

- collaborative research and institutional capacity building
- the transition from sun grown coffee to shade grown organic coffee in order to produce a certifiably green product for a specialty market
- marketing of shade grown, organic, fair trade coffee in a local Canadian market
- reinvestment of profits from green products into research, improved farm efficiency, conservation practices, and in social services in local farm communities
- participation of local communities in landscape decision-making and small business enterprises
- acquisition of additional land for protected area status
- government payment to private landowners for environmental services of forested ecosystems
- exploration of the potential application of the concept of conservation concessions to the region
- promotion of a high quality agroecological matrix of mature forest fragments and productive sustainable farming systems which mimic natural systems.

The Faculty of Environmental Studies established The Fisher Fund for Neotropical Conservation to support joint research and conservation activities with the

Tropical Science Center within the biological corridor encompassing the Las Nubes Biological Reserve and Los Cusingos Neotropical Bird Sanctuary. Both FES and TSC are committed to ecological protection and sustainable development through resource and information sharing, student and faculty research, and environmental education, local community involvement, and institutional capacity building.

We believe the success of the overall research program demonstrates the value of “partnership” in achieving conservation goals. It also illustrates a different approach to philanthropy and conservation in tropical environments that are so threatened by unwise economic development projects. It goes beyond the conventional way of thinking of conservation as “national parks” and “protected areas,” explores new ways of problem-solving and international cooperation, and transforms traditional university thinking about social and environmental responsibilities.

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