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FORESTS, BIODIVERSITY AND CONSERVATION IN COSTA RICA:
IS THE SINAC A SOLUTION?

A Research Paper presented by

Andres Calvo Barrantes

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Members of the Examining Committee

Mr. J. Guimaraes
Mr. G. Lathrop

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Enquiries:

Postal Address:

Institute of Social Studies
P.O. Box 29776
2502 LT The Hague
The Netherlands

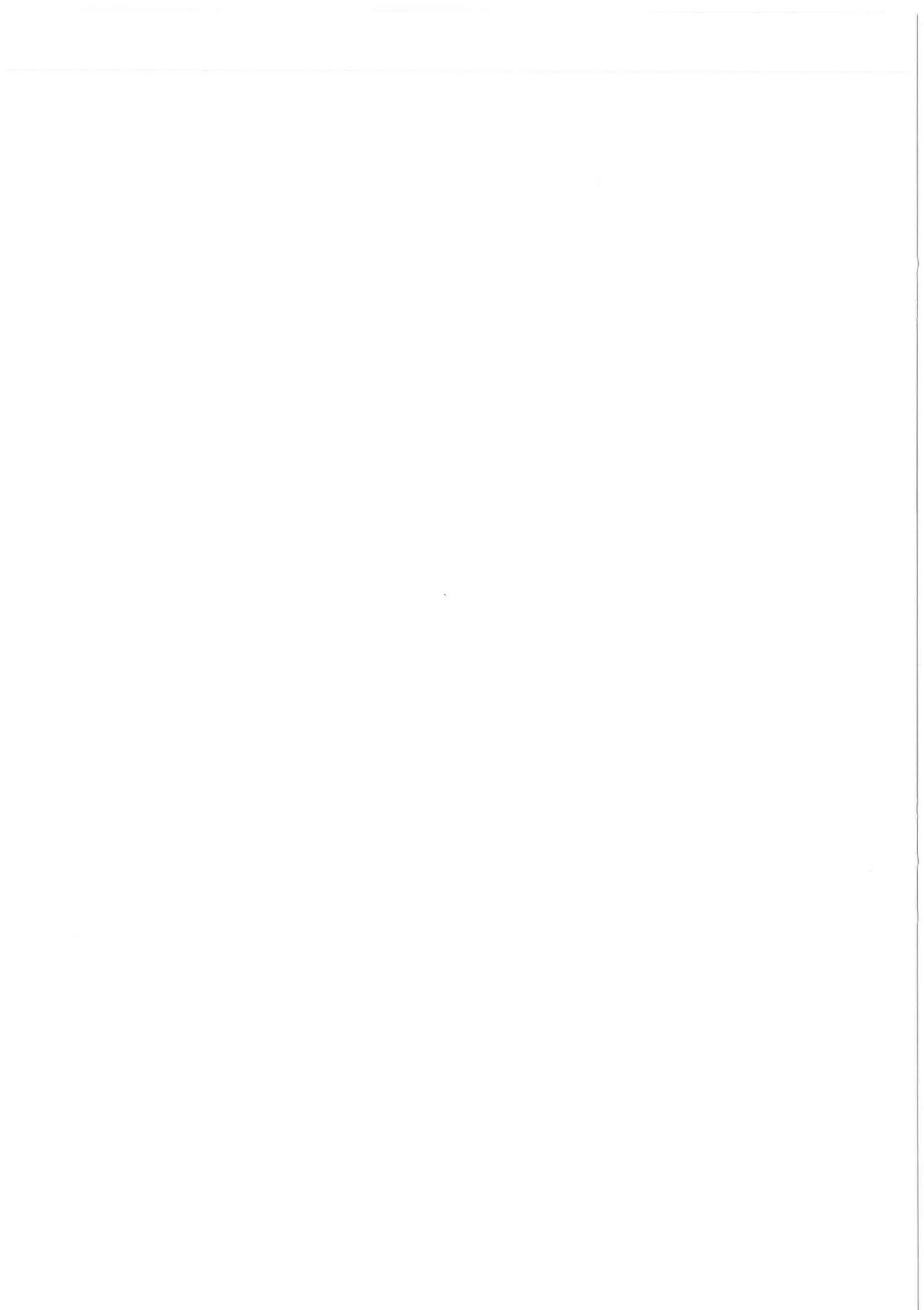
Telephone -31-70-4 260 460
Cables SOCINST
Telex 31491 ISS NL
Telefax -31-70-4 260 799

Location:

Kortenaerkade 12
2518 AX The Hague
The Netherlands

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FORESTS, BIODIVERSITY AND CONSERVATION IN COSTA RICA:
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INTRODUCTION

i. Statement of the problem

Costa Rica has a land extension of 51,100 square kilometers, a maximum width of approximately 120 Km. and a maximum length of around 460 Km. (Report for ECO 92, 1991). The country lies in the Intertropical Convergence Zone, between 8 and 11 degrees North Latitude.

Costa Rica is an interesting case for environmental conservation policy. According to recent figures, up to 22.1% of the country's territory is within absolute or partial protection: this scheme helps to protect river basins, soil composition and biodiversity. There are 74 areas within the range of National Parks, Biological Reserves, National Monuments, Wildlife Refuges, and Forestry Reserves (Document by Service of National Parks, 1993).

However, Costa Rica faces very high yearly deforestation rates. Its primary forest has been destroyed at a rate of 300 to 500 km² per year on average since 1950, based on estimations from the Forestry General Commission (DGF) and a recent study from the Tropical Science Centre (CCT) and the World Resources Institute (1991).

Deforestation is a major cause of biodiversity loss in Costa Rica. The best proxy to be used for its quantification is the average annual rate of deforestation. There are repercussions in habitat loss, as deforestation transforms ecological communities to other uses. Besides, the disappearance of tropical forest ecosystems is a main trigger of local and even global warming (United Nations Environmental Programme, 1995).

In terms of biodiversity, Costa Rica has an estimated 10000 plant species, 850 bird species, and more than 15000 species of butterflies. A majority of these species are dependent on the forest for their survival. Their extinction presents economic costs, as well as an aesthetic and scientific loss. Many of these species are potential inputs to new medications or agro-industrial engineering. They also are the source of a variety of non-timber products. Experiences in other countries (Ex: study by Peters, Gentry and Mendelsohn on Amazonian rainforest) suggest that the value of these products can compete with the wood value.

In this context, Costa Rica must improve the design and implementation of public policies to decrease deforestation and minimize biodiversity loss, as a guarantee for their sustainable use.

This paper aims to discuss, ex ante, the implications of the Integrated National System for Conservation Areas (SINAC). This is a law project in discussion for approval by the Legislative Assembly since April 1993, with the background of the United Nations Conference on Environment and Development (Rio Summit of 1992) and the Convention on Biological Diversity (CBD). SINAC involves a restructuring of the Ministry of Environment and Energy (MINAE) and the creation of Conservation Areas in the country. Its main aim is to achieve sustainable use of the biodiversity in national protected areas.¹

SINAC will merge the National Parks, National Monuments and Biological Reserves (under the Service of National Parks) with the Forestry Reserves and Protectorate Zones (under the Forestry General Commission) and the Wildlife Refuges (under the Wildlife Commission). The Conservation Areas, as SINAC territorial outcome, have a wider scope than the present protected zones. They would consist of 16760.8 Km² or 32.9% of Costa Rica's territory (MINAE, May 1995).

The Conservation Areas are the following:

- | | |
|--------------------------|------------------------|
| 1)Guanacaste | 2)Tempisque |
| 3)Arenal | 4)Central Pacific |
| 5)Central Volcanic Range | 6)Tortuguero Plains |
| 7)La Amistad Pacific | 8)La Amistad Caribbean |
| 9)Osa | 10)Cocos Island |

A Conservation Area is a grouping of wildlife areas with similar geographical and geological features. Each will comprise:

- 1)Core areas of public ownership and no human settlements
- 2)Influence areas, of public and private ownership, with extensive borders.

¹ In the very last stage of the research, it was confirmed that there is an Executive decree, dated 7 February 1994, about the creation of the Integrated National System of Conservation Areas and Sustainable Development, SINACODES. The decree was not available for analysis.

The influence areas should be "buffer zones" to the core or nuclei areas.

The influence areas include land under current or in risk of deforestation. Even the core areas are in danger of destruction, by encroachment, poaching and tree cutting. Bribes, smuggling and difficult access often hinder effective protection.

As a natural resource management proposal, SINAC is supposed to be effective in decreasing biodiversity loss. Its scope is nation wide, but with the aim of decentralizing decision making at the community or local level.

ii. Justification and research priorities

Costa Rica has one of the highest levels of biodiversity density on the planet: between 4% and 5% of all terrestrial plants and animals, in about 0,04% of the total land extension on Earth.² Several factors explain this feature: climate, latitude, thermic regulatory action from both Pacific and Atlantic Oceans, numerous geologic events (sinks, volcanic eruptions, earthquakes), but especially the location between such land masses as North and South America. As a result, there are many endemic animal and plant species, adapted for local living conditions.

Figures on flora and fauna species in Costa Rica (1988)

Group	Total No. of species	No. endemic species

FLORA		
Angiosperms	9000	1300
Orquids	1200	325
Ferns	825	300
FAUNA		
Birds	848	7
Mammals	205	8
Reptiles	216	19
Amphibians	160	32
Fish	1630	n/a

Source: Neotrópica Foundation, 1988

² Gamez, Rodrigo, Alfio Piva, Ana Sittenfeld, Eugenia Leon, Jorge Jimenez and Gerardo Mirabeli, "Costa Rica's Conservation Program and INBIO" in Biodiversity Prospecting. A World Resources Institute Book, May 1993.

The real figures are much higher, as unidentified species are not included. Certainly, biodiversity is a main asset in Costa Rica: as a source of non-timber forest products, for increasing flows of scientific and ecological tourism, and for returns from research and development of biotechnologies.

A major share of the US\$ 440 million earned from tourism in 1992 (Statistical Bulletin 1994, Consejo Monetario Centroamericano) -around 16% of total export income- can be attributed to Costa Rica's eco-tourism industry, which markets the country's forests, wildlife and scenic rivers. Eco-tourism could grow significantly if natural resources were protected and managed adequately.

Recent Costa Rican governments have been aware of the need of biodiversity preservation. Since 1963, up to 74 areas have been created within the range of National Parks, Biological Reserves, National Monuments, Protectorate Zones, Forestry Reserves and Wildlife Refuges (Document by Service of National Parks, 1993). As mentioned before, up to 22.1% of the country's territory is within protection status.³

Costa Rica has become a "pilot country" to test conservation ideas and programmes. There has been experience with debt-for-nature swaps, reforestation incentives, joint implementation, carbon dioxide sequestration, community forestry models, etc.

Some of these policies have got implications for Central America. The Esquipulas Agreements of 1986, stressing peace and security, also remarked on the implementation of the Tropical Forestry Action Plan. Besides, the Central American Commission on Environment and Development (1989) served as background to further agreements on toxic waste management and biodiversity conservation, in the World Summit held in Rio de Janeiro in 1992 (Roxana Salazar, 1996:4).

After the Rio Summit, the Legislative Assembly of Costa Rica approved both the Convention on Climate Change and the Convention on Biological Diversity (CBD). The current administration (1994-1998) has made explicit commitments for their implementation. In this context, the Integrated National System of Conservation Areas (SINAC) is being implemented in "pilot stages", while its approval in legislative plenum is still pending.

³The Reserves for Indigenous People comprise 3208.90 ha (6.28% of national territory). Due to different administrative schemes and legislation, they are out the scope of this paper.

PURPOSE OF THIS STUDY:

- 1) To understand the operationalization of the Conservation Areas.
- 2) To make an ex ante assessment of SINAC as its design stage.
- 3) To work out a national agenda for public policies in forest management and biodiversity conservation.

iii. Hypothesis and research questions

HYPOTHESIS

The Integrated National System of Conservation Areas (SINAC) will not decrease biodiversity loss in Costa Rica, as long as the underlying causes of deforestation are not addressed in a national strategy. So far, SINAC is an administrative proposal. It only stresses decentralization, without considering biased economic policies against forestry, and definition of property rights at the community level.

RESEARCH QUESTIONS

- 1) Which are the main causes of deforestation in Costa Rica?
- 2) What social forces and government policies underpin deforestation?
- 3) How can the existence of proper forest management decrease the loss of biodiversity (primary and secondary forests, natural regeneration)?
- 4) Is the SINAC realistic? Which are the main assumptions under which it should be effective? The following issues are to be stressed:
 - * Definition of property rights for land
 - * Cost-effective economic policies for forestry management and biodiversity conservation
 - * Community participation in decision-making
- 5) Does Costa Rica need a reformulation of its forest and biodiversity policies? If so, what should be the basic elements of a new strategy?

iv. Methodology and plan of the research paper

This research paper will be based on analysis of relevant literature and secondary data. References will be done to the most important indicators: the annual average rate of deforestation, and the number of species lost in the country.

Chapter One will be a review of books and journals for the essential concepts to be considered in the research. Some examples are: environmental resource management, the "strong" approach to sustainability, natural capital, conservation, biodiversity and forestry.

Chapter Two will discuss the issues of deforestation and biodiversity loss in the Costa Rican context. Forest depletion is studied under the development strategy carried out in the country since the years 1940s, and the recent economic reforms in line with liberalization, export promotion and a retrenching public sector.

Chapter Three will describe the SINAC proposal in depth. Additionally, there will be an attempt to further understand the setting and operationalization of the Conservation Areas.

Chapter Four will include the assessment of the SINAC proposal, paying attention, in its first part, to strong points and omissions in areas of administration and legislation in the country. The main considerations from this chapter will serve to weigh the accuracy of the paper's hypothesis, in terms of decentralization, local institutions and participation. The second part of the assessment of the SINAC refers to the socioeconomic environment. The main considerations from this chapter will serve to weigh the accuracy of the paper's hypothesis, in terms of deforestation and biodiversity loss.

Finally, Chapter Five is the summary and the conclusions of the research paper. This includes answers to the main questions, and elements for future policy agendas beyond the SINAC proposal.

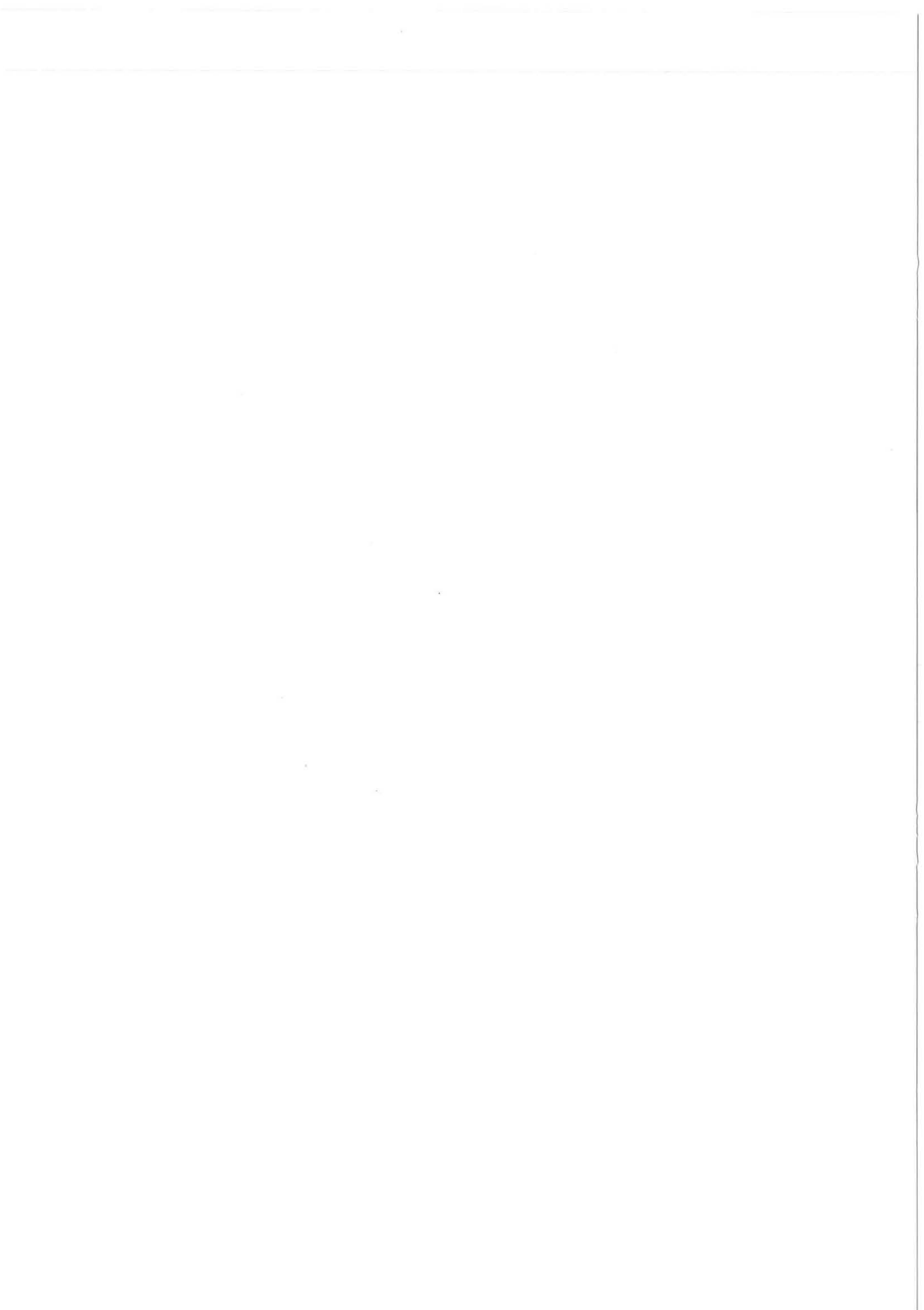
Statistical data and economic indicators will be shown in the different chapters of the research paper, as required.

v. Limitations of the study

The research is based on the most updated available literature concerning SINAC. Oral impressions from officials and policy makers may be missing, because of obvious distance constraints, as the study is not being done in Costa Rica. Unfortunately, key pieces of legislation as the Organic Law of the Environment (issued in September 1995) and the Forestry Law (from February 1996), as well as the SINACODES decree, were not available for first hand consultation. Quantitative information for the topic (Ex: land tenure shares, annual budgets, yearly income by source, updated expansion of the Conservation Areas in Km²) is lacking or very scattered, insufficient for thorough analysis.

Additionally, any discussion about biodiversity conservation faces the problem of *uncertainty*. In other words, there is no information on the overwhelming majority of species: ignorance is still immense. Michael Flint (1992:440) refers to two types of uncertainty: scientific uncertainty, which is the lack of knowledge about what genes, species and habitats will exist in the future; and economic uncertainty, which is the lack of knowledge about future trends and patterns of income, preferences and technologies. These, in turn, will determine which aspects of biodiversity become useful (Ex: demand uncertainty). The future value of biodiversity is, in a very real sense, the valuation of the unknown. (Flint, 1992:440) For example, it is not clear whether technological change will increase or reduce the demand for, and therefore, value of, biodiverse products or services. Our assumption in this respect is that, if the potential costs of genetic erosion are large, the most sensible course of action for a risk-averse society is to "play-safe" (D. Pearce, 1989). In that respect, conservation of biodiversity has a rationale for Costa Rica.

Linked to the issue of uncertainty, our research is constrained by the impossibility of an accurate measurement of biodiversity. There have been useful distinctions (Pearce and Moran; Barbier, Burgess and Folke; Flint) in terms of genes, species and ecosystems. If species tend to be discrete (C. Tisdell, 1995:216), this measurement should be the easiest. However, this is clearly only one dimension of a multidimensional attribute. Our assumption is that, despite measurement problems, there is decline of biodiversity in all its dimensions due to human impact, and that this process has been accelerating over the last few centuries and particularly decades. For the purpose of this research, a database with number of species for Costa Rica is not available.



CHAPTER 1: THEORETICAL FRAMEWORK

1.1 Biodiversity and Sustainability

In the last five to ten years, biodiversity has become a leading term in the environmental jargon of scientists, policy-makers, business, non governmental organizations (NGOs) and community based organizations (CBOs). The concept is broad and very complex. Basically, it is used today to refer to the richness of the living world. The most important point is to understand biodiversity as the degree of variety in nature, rather than nature itself (M. Flint, 1992:438). Otherwise, the term becomes confusing.

From our review of literature, biodiversity is defined as "the number, variety and variability of living organisms in a given assemblage" (Pearce and Moran, 1991:1); or "the variety and variability of all animals, plants and micro-organisms of Earth" (M. Flint, 1992:438). Biodiversity has three related components at different levels of organization: genes, species and ecosystems.

Genetic diversity refers to variability within species, "it is the sum of genetic information contained in individuals of plants, animals and micro-organisms (Pearce and Moran, 1991:2). The significance of genetic diversity is often highlighted with reference to global agriculture and food security. As the reliance of the human population is on a small number of staple food species, there is more and more vulnerability to pests and diseases." (in Pearce and Moran, 1991:3)

Species diversity refers to populations within which gene flow occurs under natural conditions. Within one species, all normal individuals are capable of breeding with individuals of the opposite sex (Pearce and Moran, 1991:3). Species diversity is commonly considered the measure of biodiversity: 1.7 million species have been described, although estimates reach as much as 5-40 million (even 100 million), mainly insects and microorganisms (Swingland, 1993:118). The best catalogued groups are vertebrates and flowering plants, in contrast with lichens, bacteria, fungi and roundworms (Pearce and Moran, 1991: 3-4).

Finally, *ecosystem* diversity is the broadest point of reference, and possibly the most blurred for systematic analysis. Ecosystems (or habitats) are variety of habitats, biotic communities and processes in the biosphere; thus biological diversity can be distinguished in terms of functional abundance, sizes of communities and spatial distribution of landscapes. (Pearce and Moran, 1991:5)

Biodiversity is not evenly distributed in geographical space. Some areas are richer in diversity than others. Conservation of 10% of the habitat area could, for example, keep 50% of the species. Therefore the distinction between biodiversity and overall biological resources. (M. Flint, 1992:438)

A serious manifestation of environmental degradation is the accelerated destruction of habitats, due to the increased burden of human economic activity. This is the case of forests and biological diversity. According to the World Bank, forests account for about 28% of the world's land area, or 3.6 billion ha. Currently, about 17-20 million ha of forest area are lost per year worldwide, the major share in tropical moist forests. As this type of forests account over half the world's biodiversity, and many species are endemic to relatively small areas, ecologists estimate that hundreds of species are becoming extinct each year. Experts state that about a quarter of the world's total biodiversity is in serious danger of extinction during the next 20-30 years (M. Monasinghe, 1992:227).

As habitats are reduced or adversely affected by humans (a trend that has strengthened in last decades), there is not sufficient knowledge about the extent of changes in variety, number and distribution of species. Some reduction in biodiversity is inevitable. Existing estimates of species depletion, although an approximation, are very worrisome:

TABLE 1: Estimated rates of species extinction based on forest area losses

% loss per decade	Period	Estimation method	Source
4	1975-2000	extrapolation	Myers, 1979
2-5	by 2020	Species-area	Reid-Miller, 1989
1-5	1990-2015	Species-area	Reid, 1992

Source: Ian Swingland, in Economics and Ecology, 1993

Recent discussions highlight the kind of services provided to mankind by biological diversity.

First, the environment is a source of essential raw materials and inputs that support human activities. In particular, natural habitats provide the basis for food and cash crops, fish stocks, forests, domesticated and wild animals, and other natural assets,

all of which benefit society. Ecosystems help to generate and maintain soils, whose living components contribute crucially, at the same time, to the support of crops and forests. (M. Monasinghe, 1992:227).

Additionally, the environment serves as a sink which absorbs and recycles the waste products of economic activity. Natural habitats, in its physical and biological systems, play an essential part in accepting and breaking down pollutants, as well as recycling nutrients.

As a third kind of service, the environment provides life-support functions without which life on earth would be either changed or ceased. This is the role of stabilization of climate and hydrology (e.g., forests and marine ecosystems), and also the maintenance of essential gene pools. Its diversity helps to preserve the resilience and richness of living organisms (Mc Neely, 1989:311).

Thus, biological diversity plays a key role in the preservation of what has been called the "global web of life". There is an open array of potential direct uses, most of them still in the verge of discoveries and applications. "Only a small portion of plant species have been screened for potential medical value (Ex: quinine against malaria), and only 7000 plant species are currently used for food, out of a possible total of 75000 plants reported to have edible parts. Tropical moist forests comprise a significant segment of the genetic library, containing between 50% and 90% of all species (Munasinghe, 1992: 232)."

Species diversity increases as the habitat becomes warmer, wetter and lower in altitude. Authors refer to a "zenith" of biodiversity in tropical latitudes, even though moist forests cover only 7% of the earth.

Rates and patterns of biodiversity loss differ according to the location of ecosystems. On islands, species introductions and habitat losses are main reasons. In oceans, the most important factors tend to be overharvesting and pollution. Countries in tropical latitudes are particularly vulnerable to the loss, fragmentation and degradation of its leading habitat, forestlands (Global Biodiversity Assessment, 1995:20).

Now, if environmental issues are ordered according to a geographic scale, natural habitats and ecosystems are important at every level. First, among the truly global environmental issues, the preservation of biodiversity has been internationally accepted as a priority problem that is comparable with other issues of transnational scale (Ex: global climate change, ozone layer deterioration, water resource degradation). In the same context,

ecosystems like forests play a vital role in regulating the planetary climate. At the national and sub-national levels, there are issues like air pollution, water contamination and land degradation caused by a range of urban-industrial and rural-agricultural activities. Such impacts on the environment degrade natural habitats on the local scale, threaten the sustainability of living species and diminish biodiversity. Many biologists believe that there will be a critical threshold beyond which remaining forests will be unable to maintain the climate necessary for regeneration. The deforestation of watersheds affects the regional hydrological cycle, leading to higher incidence of alternating floods and droughts, and aquifer depletion (Munasinghe, 1992, 236).

Biodiversity has become such an important national concern that the developing countries need to formulate policies that recognize its economic importance. In that respect, the United Nations Conference on Environment and Development (UNCED), in 1992, was a forum for the institutionalization of dialogue channels between social groups (business, NGOs, local communities) and ministries and agencies concerned with biodiversity. One of the main specific outcomes of UNCED was the Convention on Biological Diversity (CBD).

Environmental Economics explains the role of biodiversity as natural capital. Literature on "sustainable" economic development suggests that two mainstream interpretations of the concept have emerged (Barbier and Markandya, 1993: 11). First, there is a wider concept concerned with economic, social and ecological development, and then, a more narrowly defined concept largely concerned with 'environmentally sustainable development'; that is, the maximization of net benefits of economic development, maintaining the services and quality of natural resources over time.

In the second sense, the "strong approach" to sustainable development requires the preservation, in absolute terms, of a certain quality and quantity of natural assets (forests, rangelands, coral reefs, oceans, fisheries), in spite of technological innovation. There is no perfect substitution between "physical" and "natural" capital: in few words, factories would not replace forests perfectly (H. Opschoor, ISS Research Seminar, 1996). It is required that both man-made and natural capital are kept separately, on the assumption that they are more complements than substitutes. If complements, then the one in shortest supply will be the effective limit on development. "In the past, man-made capital was the main limiting factor, in the future natural capital may be limitative." (G. Foy-H. Daly, 1991: 296).

This differs from the "weak approach" by Robert Solow and others, for whom sustainability is ensured as long as a total capital base remains equal over time. The components of this "capital base" vary, because the innovations in technology replace natural resources being depleted.

Biodiversity, as variety and variability in nature, is considered as a *non renewable and partially marketable natural resource*. Thus, it is in danger of exhaustion from excessive use and habitat destruction. This latter includes drainage of wetlands, destruction of tropical forests, flooding of wilderness areas, effects of pollution on wildlife, and the introduction of 'exotic' species into previously stable environments (Pearce and Turner, 1990: 262-263).

1.2 On Economic Valuation of Biodiversity

A basic complication with biodiversity lies in the calculation of a total economic value. This is a formidable task, because of so many issues involved in the tracing and measurement of human activities on the environment. A growing body of literature describes theoretical work and case studies in different countries where there has been an attempt to value environmental assets (J.T. Winpenny, Values for the Environment: A Guide to Economic Appraisal; John Dixon and Maynard Hufschmidt Economic Valuation Techniques for the Environment).

Conceptually, the total economic value (TEV) of a resource consists of its (i) use value (UV) and (ii) non-use value (NUV) (Pearce and Moran: 1994:20). Use values may be broken down further into the direct use value (DUV), the indirect use value (IUV) and the option value (OV) or potential use value. The categories of non-use value are bequest value (BV) and existence value (EV). Therefore, this can be stated in the following general equation:

$$\begin{aligned} \text{TEV} &= \text{UV} + \text{NUV} \\ &\text{or} \\ \text{TEV} &= (\text{DUV} + \text{IUV} + \text{OV}) + (\text{BV} + \text{EV}) \end{aligned}$$

In general, use values are conceptually clear. They can be *direct* or actual (fishing, timber extraction), as well as values that derive from ecosystem functions; that is, *indirect*. Option, bequest, and existence values are more ambiguous since they can spring from similar or identical resources, while their estimation could be interlinked. *Option value* is based on how much individuals are willing to pay today for the option of preserving

the asset for future direct and indirect use. *Bequest value* is the value that people derive from knowing that others (perhaps their own offspring), will be able to benefit from the resource in the future. Finally, *existence value* is the perceived value of the environmental asset unrelated either to current or future use, simply because it exists. Its basic guideline are aesthetic values and moral obligations (Munasinghe, 1992:228).

The next diagram gives a brief description of the perceived values from primary forests, as an example of renewable environmental resources.

Total Economic Value

Personal Use Value			Non Use Value	
Direct Use	Indirect Use	Option	Bequest	Existence
*Food	*Ecological	*Biodiversity	*Habitats	*Habitats
*Biomass	functions	*Conserved	*Irreversible	*Endangered
*Recreation	*Flood control	habitats	changes	species

SOURCE: Munasinghe, AMBIO, May 1992.

It is more difficult to value a potentially renewable natural resource (such as forest lands) than those which are not renewable (such as mining products), readily renewed (such as farm products) or wholly manufactured. The length of time to make that renewal is also uncertain, compared with annual or biennial agricultural crops. And further on, "how to value indirect products such as perennial flows of clean water, stabilization of the soil on steep slopes and improvement of micro-climates" (D. Poore, 1989:163).

Biodiversity, as mostly found in forest lands endangered by depletion, is involved in non-efficient private allocative decisions. There is an underlying disparity between the private and social costs and benefits of biodiversity use and conservation

(Dixon and Sherman, 1990: 20). Private costs and benefits refer to those losses and gains as perceived by the immediate user of the environment: (farmers, industrialists, squatters, consumers). Social costs and benefits refer to the losses and gains that accrue to society as a whole.

The major issue concerning biodiversity loss is that while individual decisions may have been privately rational given the information available to the decision-maker, they do not represent the best outcome for society. There are so called 'externalities', as impacts of an activity that affect outsiders. In words of Pearce and Moran "...what is good for me as an individual may impose costs on the rest of society". (1991:16)

Biodiversity depletion is a real problem, although unmeasurable with accuracy, because full costs and benefits are kept out of calculations. It has an effect on what has been called "the assimilative capacity or the regenerative capacity of the environment." (G. Foy-H. Daly, 1992: 299).

1.3 Conservation, Biodiversity and Tropical Forests

Preservation policies would imply to isolate completely a certain habitat from human influence. This is the best way to keep environmental resources as "untouched" or intact natural capital, but it is mostly unfeasible (D. Poore, 1989:15). Human population grows as a result of demography, and social, economic and political factors. Besides, lifestyles and patterns of consumption are in process of change, linked with rising incomes. Use of natural resources cannot be avoided, with population growth and increased economic activities.

Rather than the preservation approach, the present research paper focuses in conservation. The distinction, although it may sound superfluous, is central. Let us quote the definition adopted by the World Conservation Strategy of the International Union of Nature Conservation (IUCN):

"Conservation is defined as the management of human use of the Biosphere so that it may yield the greatest sustainable benefit to present generations while maintaining its potential to meet the needs and aspirations of future generations" (IUCN, 1980, sec. 1.4; from Tisdell, 1991:26)

A pragmatic approach to conservation should combine resource protection plus its sustainable productive use. The fundamental goal of biodiversity conservation is not species preservation for its own sake, but the protection of the ecosystems' productive potential for human activity. Although forests have been mostly cleared in temperate regions, Mediterranean climates and subtropics, conservation practices are expected to have implications in curbing depletion in the tropics. This research will explore whether this approach is present in the proposal of the National Integrated System of Conservation Areas (SINAC).

Current knowledge in ecology confirms the destructive effects of deforestation, especially in terms of soil erosion. Most forest lands in the tropics are difficult to settle or cultivate, either because of disease or soil infertility. Thus it is easy to destroy all plant and animal species, along with the woodland, in the wet tropics. Additionally, a new institutional setting (including UNCED, the Tropical Forest Action Plan, etc.) has strengthened consciousness about "sustainable use and conservation of tropical forests" (Duncan Poore, 1989:2-3).

In a general sense, by forests we may understand "...enormous macrocosms of intricately related ecosystems hosting an array of biotic and abiotic processes occurring from within the forest canopy on down to substrate minerals and micro-organisms" (World Bank, 1991a; quoted by Andrew Aeria, 1992: 11). Depending on differences in altitude and rainfall, a country as Costa Rica is endowed with dryforests, rainforests, semimontane and montane forests, as well as scrub lands.

The following are some of the critical roles played by forests, for local, regional and global environmental quality:

- 1) *Repositories of biodiversity*, which is an insurance against uncertainties, and also an investment for future possibilities in quality of human life.
 - 2) *Function of hydrological and watershed conservation*. Forests hold soil, absorb rainfall, as well as release rainfall in streams and river channels.
 - 3) *Regulation of the global carbon cycle*, against greenhouse effect.
 - 4) *Habitat for forest dwelling peoples*.
 - 5) *Supply of commercial resources* (both timber and non-timber products).
 - 6) *Increasing source of recreation and tourism* for urban populations.
- (Aeria, 1992:12)

For the present paper, relevant forestland will include the following:

Primary forests

- 1) Virgin forest unmodified by human activity. They can contain gaps caused by the normal death and regeneration of trees and may include areas or phases which have been affected by natural events (landslides, typhoons, volcanic activity).
- 2) Forest whose composition and structure may have been modified by the hunting and gathering activities of indigenous peoples.

Secondary forests:

- 1) Forests subject to a light cycle of shifting cultivation or where cultivation has been abandoned, thus allowing a full tree cover of indigenous species to develop.
- 2) Forests subject to different intensities and frequencies of logging, but which still remain covered with a tree or shrub cover of indigenous species. (Duncan Poore, 1989:4).⁴

1.4 On Management and Political Economy of Biodiversity

Most forest areas and protected lands in Costa Rica are characterized by open access: neither market incentives nor effective public enforcement exist to use these renewable resources sparingly. Land markets function poorly, or are very distorted. Thus, the relevant decision makers (farm households, agricultural firms, local communities and governments) fail to take into account the full social value of their resources.

The land markets operate in such a way that pasture land is more valuable than natural forest land, thus enhancing deforestation and biodiversity loss. Special attention will be given to tenure policies that favour land speculation. Laws have favoured forest clearing and pasture establishment to confirm individual possession rights over national land.

For research purposes, deforestation and biodiversity loss are considered not only as environmental processes, but also as issues of politics and economics. Power relations are present, as well as groups that can be considered as "winners" and "losers".

⁴Out of scope are the degraded forest land (areas intensively modified by cultivation or fire, so that they are covered by grass or non-forest weeds) and the forest plantations (forest crops raised artificially either by sowing or planting, whether native or introduced species).

In his research paper for the ISS, "Timber Profits or Forest Capital?" Sustainable Development of the Forest Sector in Malaysia (Dec. 1992), Andrew Aeria refers to forests from the perspective of environmental resource management. Following these lines, biodiversity is a potentially marketable resource. It can be seen as directly related to the specific relations of production and exchange, and to consumption patterns that exist within the country, and between the country and the world economy. A main assumption is that developing countries can make effective policy to safeguard their environmental resources. Sustainable use should be understood as maintenance of the forest ecosystem in a desired condition for maximum biodiversity conservation.

Another useful approach is that of Piers Blaikie (The Political Economy of Soil Erosion in Developing Countries, 1985). Even though his study is about soil erosion, it is an insight about bringing together natural sciences with social sciences. In line with Blaikie, deforestation has ecological explanations; but it should also be addressed in terms of social and economic change by which groups benefit or are marginalized. These are conflicts of interests, whose solution in favour of those living in poverty will require changes in the law, in the constitution, rearrangements in price structures, credit schemes, etc.

The comprehensive analysis of Blaikie includes two components:

- a) "Place based" issues, this is where both deforestation and biodiversity loss actually occur.
- b) "Non place based" issues, as the link of deforestation with land use, relations of production under which land is used, technology base and scale, prices, taxes, legal and institutional setting, etc.

In fact, the clearance of forest land is part of the broader problem of underdevelopment and inequalities between rural populations. Our attempt is to bring this framework of analysis, as the research leads into the reasons behind deforestation and biodiversity loss in Costa Rica. The book Trees, People and Power, by Peter Utting, characterizes major processes that explain deforestation in the Central American context:

- "-biased government policies or development strategies geared towards short-term economic growth
 - technocratic solutions to problems involving complex social and political issues
 - political systems that exclude the rural and urban poor"
- (P. Utting, 1991:x-xi)

1.5 For the Assessment of SINAC

An ex ante assessment of the Integrated National System of Conservation Areas (SINAC) implies, in a first stage, to discuss the scope of decentralization in decision making. For the purposes of this paper, decentralization is understood, as noted by Norman Uphoff, as "the process through which government agencies or local organizations obtain the resources and authority for timely adaptation to locally specific conditions in the field" (Local Institutional Development, 1986:221).

Our assessment in Chapter Four will keep in scope at least two main reasons of failure for biodiversity conservation efforts:

- a) Insufficient share of the total benefits by those directly undertaking conservation.
- b) Economic benefits from their conservation efforts as much less than the return from alternative uses of land. (Tisdell, 1995:218).

SINAC is supposed to create Conservation Areas in Costa Rica, and to work under the restructuring of the Ministry of Environment and Energy (MINAE). Localities and communities should be key players for the success of this strategy. They have the closest physical contact with conservation of biodiversity, and economically they are the most likely to be affected by biodiversity conservation programmes (Tisdell, 1995:218).

In that sense, SINAC cannot ignore incentives for local people, so that they can appropriate economic benefits from conservation. "Because of externalities, many of the benefits from this conservation flow to wider communities and even to the global community (existence, value, fixation of carbon, and so on). Even when benefits are enjoyed at the local level, these may largely be external to individuals engaging in conservation efforts" (Tisdell, 1995:218).

According to Norman Uphoff, people at the local level for each Conservation Area, should be considered as:

- a) Localities: Set of communities having social and economic relations: this is the same as the sub-district level where a market town is the sub-district centre.
- b) Communities: Relatively self-contained socio-economic residential unit (villages, towns).
- c) Groups: Self-identified set of persons with some common interest; may be persons in a small residential area like a neighbourhood, or an occupational, age, gender, ethnic or other grouping. (Uphoff, 1992:5)

The second stage of the proposed ex ante assessment for SINAC refers to the causes behind deforestation and biodiversity loss. Deforestation is understood as "the complete destruction of forest cover through clearing for agriculture of whatever sort. It means that not a tree remains, and the land is given over to permanent non-forest purposes." (N. Myers, in Pearce and Brown, 1994:28)

Likely reasons for depletion of forests in Costa Rica are the expansion of pastures for livestock, peasants (squatters) in search for land for food crop production, the expansion of plantation agriculture and demand for timber and firewood. (E. Alpizar, 1992).⁵

If the SINAC proposal does not address this problem by means of practical solutions, then it should be ineffective in its implementation. This requires, at the same time, to be very aware of the previous remarks by Clement Tisdell about failures for biodiversity conservation.

The answers obtained from the assessment will give the required guidelines for Chapter Five, where we will deal with conclusions and recommendations. If necessary, new policy agendas may be defined, for both forestry management and biodiversity conservation.

⁵A discussion about causes and implications of deforestation, with regards to the specific context of Costa Rica, will be done in Chapter Two. The list suggested here is by no means definite.

CHAPTER 2: ECONOMICS, FORESTS AND BIODIVERSITY IN COSTA RICA

This chapter gives an insight into depletion of tropical forests and biodiversity loss in Costa Rica. The massive loss of forest cover since the 1950s has been triggered by complex processes that interlink social forces and economic policies. Sections one and two are devoted to the development strategies in the country since the 1950s, as well as to their effects on natural resource depletion. Section three discusses the linkages between deforestation and biodiversity loss, with the help of a political economy approach.

2.1 Import Substitution Strategy (ISI) and deforestation

Traditionally, the economic growth of Costa Rica has been based on export of agricultural products, with coffee and bananas as leading crops. Manufactured goods were almost exclusively imported. In the second half of this century, terms of trade fell sharply. A so-called import substitution industrialization strategy (ISI) was implemented, with the main aim of reducing dependency on imports. ISI encouraged agricultural diversification and industrial production, in order to achieve self sufficiency in food and manufactured goods.

The government allowed relatively cheap imports of industrial inputs through the overvaluation of the currency and the setting of import incentives. In the meantime, the domestic market was protected from international competition through import barriers: consumption goods were effectively protected by average tariffs of 231% (MIDEPLAN, 1993:3). Besides the promotion of private activity, the state became a direct agent in the manufacturing sector through CODESA (a public holding company). The government became involved in electricity, communication, security, petrol refining, public transport, fishery, cements and fertilizers (MIDEPLAN: 1993:7).

At the beginning, ISI was an economic success. Between 1960 and 1980 average annual economic growth was almost 6%. However, at the end of the 1970s, economic growth started to slow down. Import dependency never disappeared: in fact, dependency on consumer goods shifted to raw materials for manufacturing and to capital goods. Export dependency on few crops was only slightly reduced: by 1980, agriculture contributed 60% to total exports, with coffee and bananas still for 70% of this output (MIDEPLAN, 1993).

In terms of the environment, ISI hastened the clearing of forest cover in the country. One of the guidelines for export diversification was to promote beef sales to the North American market. In order to get the pasture required for livestock ranching, Costa Rica had to change land use patterns. Around 80% of the country was forest land in the 1940s (Solórzano et al, 1991). From the 1950s until the mid 1980s, Costa Rica's primary forest was destroyed at rates that varied between 30000 and 50000 ha per year (Peucker, 1992: 1). MIDEPLAN estimated that the percentage of the national territory under forest cover had shrunk to 35%⁶, by 1994.

2.2 1980s-1990s: Economic Crisis and Liberalization

As a development strategy, import substitution industrialization collapsed in Costa Rica. By the late 1970s, direct and indirect government intervention resulted in inefficient industries, which made excessive use of resources and foreign currency. Most of the firms were unable to compete outside Central America. Additionally, government intervention triggered state employment. Figures rose from 3000 employees in the public sector by 1950 to 36000 in 1975, with the absorption of 74% of the country's professionals and 82% of its technicians (MIDEPLAN, 1993: 20). The wide gap between costs and prices in government institutions caused high losses, as a result of which state expenditure increased from 13% of GDP in 1967 to 25% in 1980, and the public sector deficit reached 19.1% of GDP in 1981. To cover this deficit, the government had to borrow \$2700 million over the period 1975-1982, when the international interest rates on outstanding debts rose sharply (MIDEPLAN, 1995). The country also suffered the shock of falling terms of trade in a 33% of their level in 1977, as there was a drop in coffee prices while oil prices increased, between 1977 and 1981.

Because of its high dependence on imports of primary goods, on the export of coffee and on foreign finance to cover the government deficit, Costa Rica was strongly hit by these events. Inflation was 90% in 1982, from 1980 to 1983 GDP per capita dropped from US\$ 1960 to US\$ 1060, unemployment increased from 3% to 9% in 1982, and debt/GDP ratio reached 120.8% in 1982 (MIDEPLAN, 1995). As the elections were in 1982, the ruling party was reluctant to address the crisis with unpopular measures such as devaluation, tax increase and tightened budget management.

⁶ The calculation was 1,786,695 ha, including protected area and non-protected forest, as well as secondary and plantation forest.

After the elections, the new government took vigorous actions to regain control, by following economic measures with conditionalities from the International Monetary Fund (IMF) and the World Bank (WB). Stand-by agreements for stabilization were signed with the IMF in 1982 and 1985, with the main aims of curbing inflation, diminishing the fiscal deficit and strengthening the balance of payments. IMF conventions stipulated the importance of the market and equal distribution of the burden of the economic adjustment. Market forces would become the main allocating mechanism for the economy, while administrative controls and subsidies should be limited to a minimum of basic goods, with the aim of benefitting the lowest income groups. New stand-by agreements with the IMF followed in 1987, 1989 and 1992. These last conventions went beyond short term stabilization, and included structural reforms in the field of import tariffs, export incentives and the public sector (Chaves, 1993:4). As a complement to the new economic guidelines, Structural Adjustment Programmes (SAPs) have been implemented with the sponsorship of the World Bank. SAP I was ratified by Legislative Assembly in 1985, and focused in measures for stabilization of the economy. SAP II (1988) emphasized the increase of efficiency and economic capacity for modernization, and SAP III (1995) supports a strong restructuring of the public sector, with cuts in wages, transfers, interest payments and retirement funds (MIDEPLAN, 1993:78).

All these economic policies adopted since 1982 have had mixed outcomes for Costa Rica. Stabilization and adjustment programmes were intended to reduce foreign debt and the public sector budget deficit, as well as to improve the balance of payments and trigger economic growth. The four main objectives have been partly achieved. Since 1983, average annual economic growth has been 4.6% and the public sector deficit was reduced to 0.6% in 1993. Foreign debt as a percentage of GDP decreased from 121% in 1982 to 42% in 1993, but the total level of foreign debt actually increased from US\$ 2.9 billion in 1982 to US\$ 3.1 billion in 1993. The balance of payments did not improve either, as from 1983 to 1993 the deficit increased from US\$ 277 million to US\$ 560 million, mainly because rising imports, especially consumption goods (Consejo Monetario Centroamericano, 1994: 29-33).

International private banks and the United States Agency for International Development (USAID) also provided funds to Costa Rica during the 1980s. Compared with these, the loans of the IMF and World Bank have been relatively small. For example, in the period 1982-1990, total IMF and World Bank fund transfer amounted to US\$ 592.8 million, in comparison to the US\$ 1319.8 million support of USAID in the same period (MIDEPLAN, 1993:28). Nevertheless, the policy impact of the IMF and World Bank programmes has been substantial, as their conditionalities were agreed also by the larger lenders and donors.

Concerning the international scenario, liberalization measures in Costa Rica had the strong financial support of grants channeled by USAID. A large part came from the Economic Support Fund, a mechanism used by the United States to give assistance to countries deemed vital because of political considerations. This aid (basically grants) was essential to alleviate the social and economic pressures brought by liberalization, deregulation and privatization.

But as political unrest decreased in Central America, free bilateral funds have become scarcer. This is a major reason for the new governments to focus on issues of sustainable development, ecological limits, equity and regulation (O'Brien, 1996:27). As a consequence, the last two Costa Rican Administrations have striven to find new "bridges" by which foreign financial assistance can be assured again.

Environmental concerns, and deforestation in particular, were not incorporated in SAP I or in SAP II. There has been an increasing awareness in the Costa Rican government and the World Bank to give them a place in SAP III (Solórzano, 1995:). Environmental aims within SAP III are: 1)to incorporate all environmental and health impacts in the planning of the productive process, 2)to promote sustainable development as the central development criterion, 3)to change the attitude of the urban population in context of the protection and utilization of the environment (González, 1993: 34). However, after a revision of SAP III (published as Law No.243, 1994), the same author states that environmental issues are only touched on sideways. Conditions from the World Bank stipulate that the Costa Rican government is bound to contract consulting services in 16 areas. Two of those areas concern the environment; one area concerns the strengthening of the operational and institutional framework in respect to the environment, a second area concerns development of a system of environmental procedures for the multi-sectoral credit programme (González, 1993: 40).

What can be said concerning SAPs and deforestation in Costa Rica? Until the late 1980s, cattle ranching was the most important cause of deforestation. Since then, farmers have started to use their land for other purposes, especially for export agriculture. SAPs have encouraged the cultivation of non-traditionals, but they had mixed impacts on the livestock sector. Squatting has been considerable since the early 1980s, when economic crisis and stabilisation exacerbated social deterioration. In the case of the timber industry, it has never been significant, and even lost some importance over the last decade.

On one hand, SAPs may have increased deforestation through export promotion and high interest rates. On the other hand, liberalization is in line with the elimination of incentives (biased economic policies) on the loss of forest cover, and the easing of timber imports has reduced pressure on the national forest.

It is accepted that in the last decade, deforestation rates fell: while in the period 1986-1992 the average annual deforestation rate was found to be 17000 ha, it had fallen to 8000 ha in 1993 (Lutz, 1993: 5). The decline in deforestation rates is unlikely to be attributed to policies of liberalization and structural adjustment. In this respect, the role of SAPs has been very ambiguous.

Still, loss of forest cover is considered as a main environmental problem in the country. The highest rates of deforestation have been estimated for tropical wet forests, which are the life zones with also the highest levels of biodiversity (Solórzano and others, 1991).

2.3 Deforestation, Land Use and Biodiversity Loss: a Complex Linkage

The causes of biodiversity loss are complex and overlapping. The major reason seems to be that people can earn money from biodiversity as they harvest benefits of nature without paying the environmental costs. The costs are passed on to society as a whole, to be paid either in the present or in the future. In other words, "there is a disparity between the private and social costs and benefits of biodiversity use and conservation" (Pearce and Moran, 1994:16).

Pressure on forests has not come exclusively from the cattle ranchers. Land degradation takes place in several stages, involving loggers, squatters, ranchers and the public sector. The following is a schematic explanation of the process, as characterized by Jean Carriere:

- 1) A logging enterprise dedicated to the extraction of high quality hardwoods, often operating without an extraction license, clears a vehicle track through a sector of the virgin forest to extract the lumber.

- 2) Pressured by a wide range of lobbies, the Ministry of Public Works and Transport improves the rough muddy track to secondary road standard.

3) Local peasant families with little or no land pour down the new road and clear the trees and other vegetation left behind by the loggers. They grow crops for three to five years after which decreasing yields lead them to either sell or abandon the land, according to whether or not they had acquired legal title.

4) Urban-based real estate companies acquire large parcels of this abandoned and partially degraded land, still suitable however for pasture. It is sold to ranchers for whom it serves as unimproved pasture for four to six years, after which decreasing yields drive the ranchers away.

5) The land is now almost completely degraded: the soil has lost its nutrients, the organic structure is gone, there is heavy compaction and high rates of erosion. It is unsuitable for any kind of economic use and may either turn into permanent desert or gradually regenerate its topsoil by natural means after one to two centuries, depending on the bioclimatic environment.

6) Loggers, peasants and ranchers move further into the forest to begin the cycle again. (Carriere, in Goodman and Redclift, 1991: 188-190)

2.3.1. Non Defined Property Rights

The use and possession of untitled land have important implications for deforestation and forest protection schemes. Throughout Costa Rica, vast tracts of inhabited land area remain untitled. The Executive grants peasants "rights of possession", rather than title to their land. Possession is determined by "improvement", which is understood as any modification from the natural state. The most obvious and quickly profitable modification of forested land is clearing the trees. If ownership may be obtained at no other costs than that of clearing the land, the forest is seen as an open access resource and the cleared land as private property.

Few rural dwellers effort to obtain legal titles, because of the itinerant character of agriculture in many frontier regions, the low value of land, the complicated legal and administrative procedures and the high costs involved.

Land titling legislation in Costa Rica has encouraged deforestation for years. Up to the approval and ratification of the 1986 Forestry Law, the so called "Law of Ownership Information" (Ley de Informaciones Posesorias) allowed claimants to title up to 300 ha if land is to be used for cattle raising and only 100 ha if the land is to be used for agriculture. Reafforestation or management of natural forest was not even mentioned in the text.

The same law stated that people wishing to obtain title in areas where the majority of the land was covered in forest should provide evidence in the form of a public document issued more than 10 years earlier. As this requirement was so difficult, people simply cut 50% or more of the forest cover. This serious implication was not detected and undertaken until 1986, with a new law reform (Utting, 1991:40).

The "vicious circle" of land possession has hardly a way out, as all the involved agents (loggers, squatters, cattle ranchers) perceive short-term benefits. The long term costs, in deforestation, land degradation and biodiversity loss are charged to the entire society.

For the producer, land possession is a precondition for obtaining legal title and a defensive mechanism to prevent encroachment by land-seeking peasants or graziers who would not stake claims on settled land. On one hand, farmers using untitled land are ineligible for bank loans. The immediate incentive for producers is to undertake activities requiring limited operational capital such as selling logs and raising cattle.

Because of the lack of security in tenure, there is hardly any support to engage in long-term natural resource protection practices. Up to very recently, forestry bonds were only issued for reforestation projects on titled lands. Then, it has not been unusual for farmers to clear the natural forest, and then plant up part of it with fruit or timber trees.

On the other hand, existing government regulations have not been enough to regulate resource use, as land surveys and information about legal possession have been non-existent or out of date (Utting, 1991: 36-37).

2.3.2. On Loss of Forest Cover

Despite the lack of consensus about annual rates of deforestation in Costa Rica, it is clear that they increased sharply during the second half of the century.

Most of the country was forest land until the 1950s, and even as late as 1970, more than half of the territory (about 26000km²) remained forested. Up from the 1970s, annual rates of forest loss began to rise due to pasture expansion and other pressures, and by the early 1980s, the country was losing nearly 4% of its forests every year, the highest loss rate in the western hemisphere

including the Amazon basin (Carriere, 1991: 188). In a single decade, from 1970 to 1980, over 7000 km² of forest were cut, reducing the forest cover from 51% to 36% of the land mass. By 1987, the figure had been reduced to 31% and only 16000 km² of forested areas survived (Leonard, 1987: 28).

The following are major reasons behind deforestation and biodiversity loss:

1) System of land tenure

Pressure on land has been caused by skewed resource distribution and inappropriate land use patterns. Although the case of Costa Rica does not reach the levels of inequity found in neighbouring Guatemala or El Salvador, it has been argued that peasants are "victims of a particular socio-economic system which has made access to land and other resources in areas of greater agricultural potential increasingly difficult" (P. Utting, 1991: 14-15).

The top 20% of the population receives 54.8% of the national income, while the bottom 20% receive 3.3%. There is a highly skewed land distribution, as some 61% of land under cultivation is concentrated in 6% of the holdings (Carriere, 1991: 191). This situation has the effect of pushing peasant families to fragile, marginal lands, which they cannot help but overexploit and degrade for temporary livelihoods (G. Foy-H. Daly, 1992: 310). Frontier colonization can be used as an escape valve to relieve pressure on the land in other areas. Thus, the land tenure system triggers deforestation and land degradation.

2) Extensive livestock breeding

From the mid-1950s onwards, there was rapid growth in United States demand for Central American beef. As a response to this "livestock boom", land was cleared to make way for pasture. This has been called the "hamburger connection" (from Nations and Komer, 1987) and it was accompanied by the massive injection of foreign aid and investment, specially from the World Bank and the Inter American Development Bank. According to estimates, the value of cattle sector projects supported by those institutions in Central America amounted to almost \$500 million by the late 1970s (Howard, 1987: 38).

Cattle breeding was preferred among alternative activities by several reasons:

- a) Preference of local farmers and ranchers for straight dollars from exports.
- b) If property titles do not exist, cattle can facilitate access to credit by acting as collateral.
- c) As assets that can be sold as and when needed, cattle offered security in a highly risky environment.
- d) Cattle gives identity and social status. (Utting, 1991: 19).

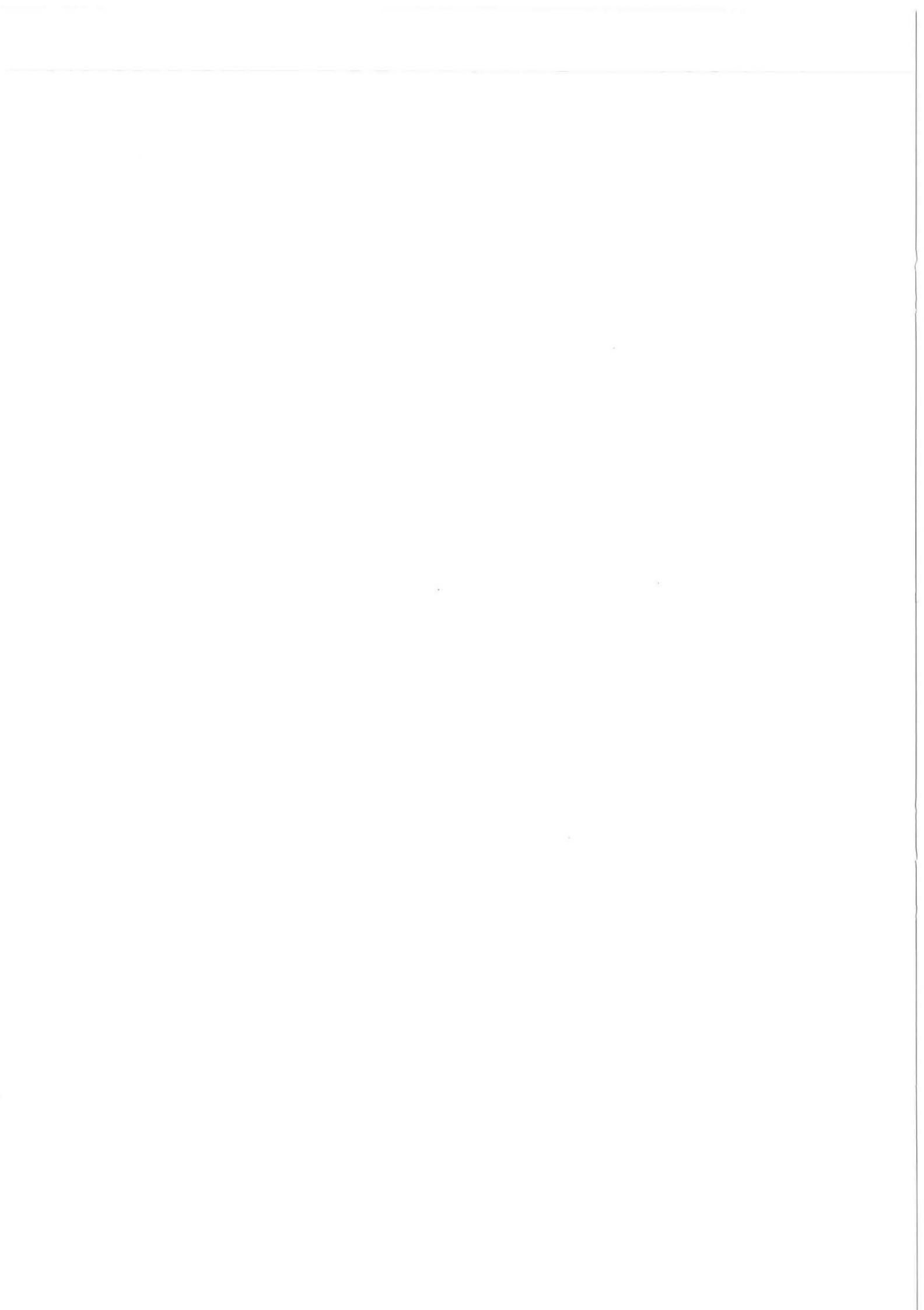
Destruction of forest for cattle ranching was partly determined by technological factors. Rather than by increases in productivity, growth in production relied on bigger herds and areas (Howard, 1987). The ratio of head per hectare remained very low. On average, 0.7 ha of pasture was required for every additional head of cattle and much higher ratios were common on poorer quality land (Utting, 1991: 20). The clearing process usually involved notorious middlemen, who profited in the short run. These were land speculators who quickly cut and burned areas of forest and sold the 'improvements' to peasant families or ranchers. In Costa Rica, the area under pasture increased from 12% to 33% of the total farm area between 1950 and 1984, while the percentage share of forest land fell by 35% to 16% (MIRENEM, 1990:4).

3) Infrastructure

Because of the new access to land, transport infrastructure such as highways, railways and roads are indirect triggers for deforestation. A clear example was the Inter-American Highway, which was to link North and South America since the 1960s. After the highway was finished in 1964, estimations were that the rate of deforestation on the Pacific side of Costa Rica increased five-fold (cited by Silliman, 1981: 65).

At a more localized level, the so-called "road for timber" barter between landowners and loggers is very frequent. As described by Gerardo Budowski:

"In some areas, the various owners of forest land will happily sell out to logging companies because they will build a badly needed road, even if such a road may not last long since it was essentially built to take out only one crop of trees. In certain areas...the local community which established itself (illegally) on the steep slopes made a contractual agreement with a local owner of a tractor. In exchange for opening the road he could take all the available timber growing relatively close to the road" (Budowski, 1990; quoted by Utting, 1991: 27).



4) Logging

The Costa Rican forestry sector is very small, in terms of its share of the Gross Domestic Product (GDP), as seen in the following table:

TABLE 2
COSTA RICA: Share of Forestry Sector in GDP (current colones, millions)

Years	GDP	Silvic. GDP	For. Ind. GDP	Forestry GDP	Share of GDP
1980	41405	294	480	773	1.9%
1981	57103	496	598	1093	1.9%
1982	97505	688	767	1455	1.9%
1983	129314	894	1221	2115	1.6%
1984	163011	1365	1706	3071	1.9%
1985	197920	1436	1974	3410	1.7%
1986	246579	2031	2096	4127	1.7%
1987	284533	1631	2569	4200	1.5%

Forestry GDP = Silviculture GDP + Forest Industry GDP

Source: CCT-WWF, 1991; with data from Costa Rica Central Bank (BCCR)

From data of the Central Bank, it fluctuates in a range of 1.5% to 1.9% of GDP from 1980 to 1987 (in R. Solórzano et al, 1991:14). It may be responsible for deforesting as little as 20 ha per year (Lutz and Daly, 1990).

Despite mounting criticism within Costa Rica of traditional patterns of forest exploitation, there was little change in the practices of the lumber companies during the 1980s. The use of machinery to extract timber can cause major environmental destruction, when soils are not well drained. The 1990 Forestry Action Plan criticizes the degree of wastage in the lumber industry, claiming that only from 20% to 30% of what is cut is actually marketed (MIRENEM, 1990:8). Other sources refer to only 27% of the total, as wood which actually reaches the market: 46% is left in the forest to rot, while another 27% is lost at the sawmill (Arcia et al., 1991: 46).

This situation is partly explained by the use of inefficient technology and by the fact that sawmill owners are reticent about investing in improved machinery and equipment when the future of the lumber business appears risky. It is also a result of the price structure and market situation for wood. The value of the standing trees represents just 8% of the total. (P. Utting, 1991: 22-23). Extraction and transport activities in Costa Rica account for approximately 75% of the total value of the wood which arrives at the mill.

5) Production patterns of large scale agricultural companies

Bananas have been a major export crop in Costa Rica. They have also had severe implications for deforestation. Production dates from the late XIX century, as governments granted concessions to North American firms in Caribbean lowland areas (in Woodward, cited by Utting, 1991: 25-26). Large scale deforestation occurred because of conversion of forest to crop land, and because of the dramatic increase in demand for railway sleepers.

Migrant labourers were also responsible for the loss of forest cover. They were compelled to acquire land in forest areas, because of the unstable working conditions given by the companies. Many workers not only turned to forest clearance and subsistence agriculture as a means of eking out a living but would take up these activities with little knowledge of appropriate land-use priorities in tropical forest areas. In Costa Rica's northern Atlantic zone, some would stake claims or buy land while continuing to work in the plantations in an attempt to obtain the capital necessary to take up farming. (Utting, 1991: 26).

In recent years, liberalization measures have promoted the expansion of agricultural companies in other activities. Some examples of policies have been the setting of a favourable business environment, as well as direct and indirect promotion of exports. Recent figures show the following cases of clear cut of primary and secondary forest during the 1980s: some 3300 ha because of expansion of banana companies, and 526 ha of forest for pineapple cultivation (Peuker, 1992: 120).

Costa Rica faces a serious problem of unsustainable land use, which is strongly associated to deforestation. Abusive land uses have negative environmental consequences, as loss of forest cover endangers biodiversity, increases soil erosion and sedimentation, augments flooding during the wet season, and reduces water availability in the dry season (Peuker, 1992). Approximately 17% of the nation is severely eroded, while 24% is moderately eroded.

Besides, 24% of the country is only suitable for absolute protection of watersheds.

Table 3 compares data of land use capacity studies (LUCs) and current land uses in three different periods. Costa Rica has 33% of its territory as suitable for land uses other than forestry. Nevertheless, land use for forestry has dropped from 80% in 1950 to 42% in 1984 and 35% in 1989. In reality, by 1989, non-forest purposes occupied around 65%.

Because of severe deforestation and land degradation, the country has suffered the loss of construction materials and other wood products, as well as species of plants and animals that have direct use, indirect use, option and existence values. Biological diversity implies potential for consumption, industrial production, recreation, ecotourism, education and research. Concerns about the rich biological diversity in Costa Rica have been expressed by other countries and international environmental organizations (Persson and Munasinghe, 1995: 265).

So far, the strategies of import substitution industrialization and liberalization and export promotion have ignored the loss of forest cover as a pressing issue. Indirectly, the problem has become worse because of market and policy intervention failures. If the Costa Rican government really wants to operationalize its concern about forest and biodiversity conservation, there is still ample scope to revise policies, market functioning, and bring participation and decision making to the localities. We will discuss these issues in the following chapters.

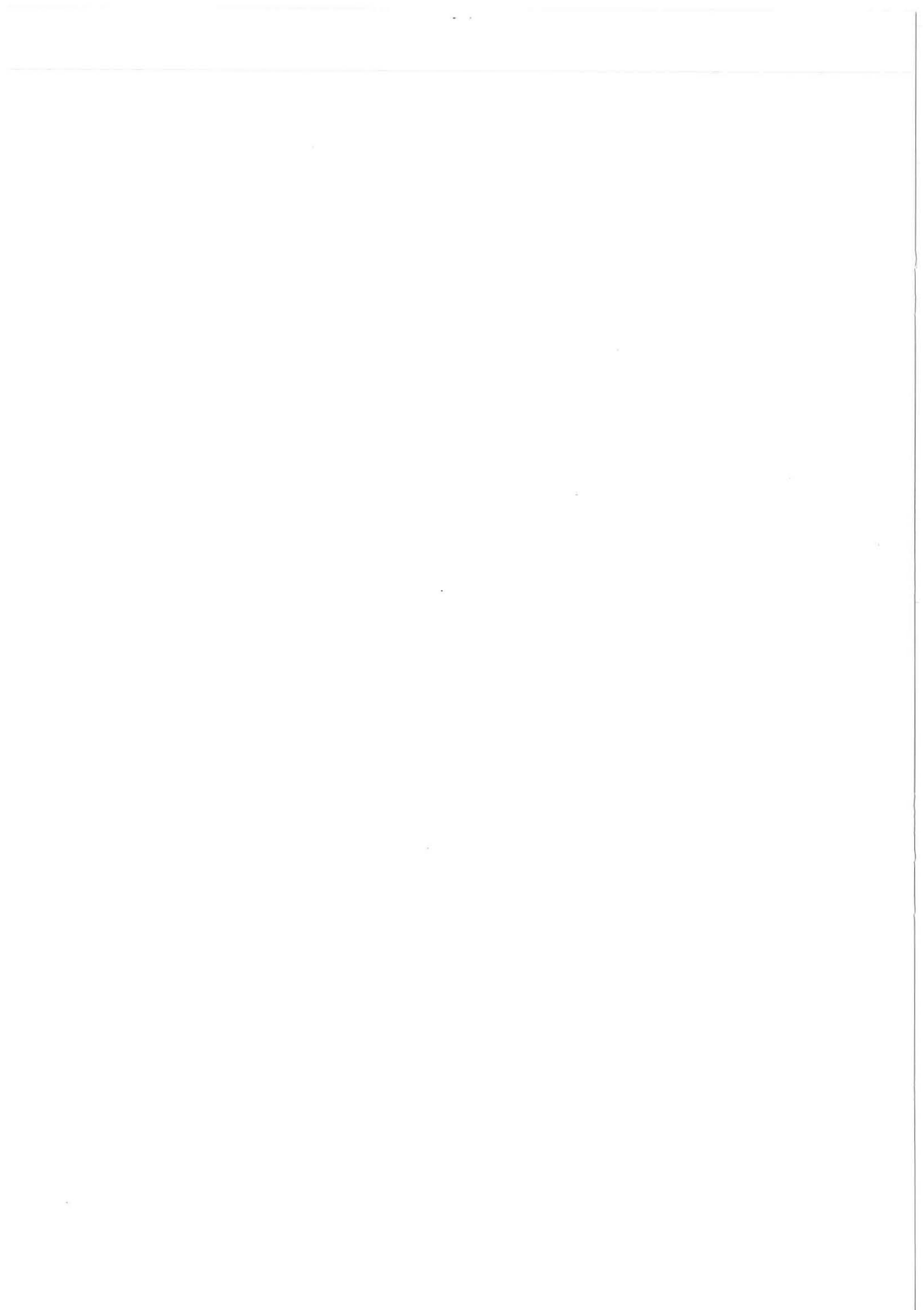


TABLE 3
Land use capacity and actual land use in Costa Rica

	suitable land, LUC			Actual land use ⁷ (km ²)					
	LUC ⁸	km ²	%	1950	%	1984	%	1989	%
Annual crops	1-3	7010	14	2200	4	3860	8	2850	6
Perennial crops	4	2970	6	1310	3	2360	5	2430	5
Pasture ⁹	5-6	5560	11	6170	12	16520	32	23100	45
Forestry ¹⁰	7-9	34390	67	40880	80	21460	42	17870	35
Other uses		1170	2	54	1	6900	13	4850	9
TOTAL		51100	100	51100	100	51100	100	51100	100

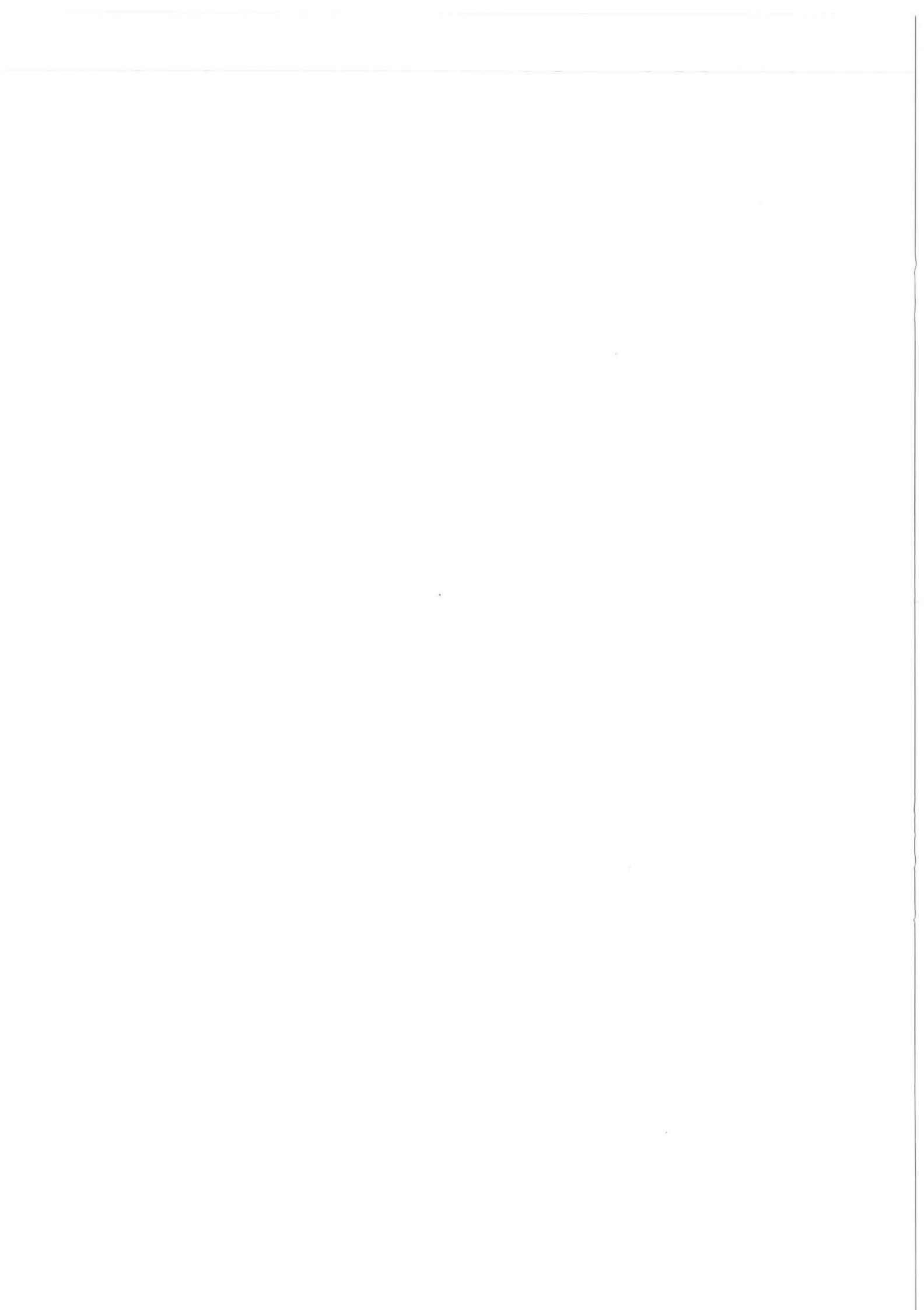
Source: Cruz et al, 1992, Peuker, 1992, Segura, 1992, MIDEPLAN 1995

⁷Estimates of different categories vary, especially in relation to forest cover. Presented data are based on the most common estimates.

⁸The Tropical Science Centre assigned a Land Use Capacity (LUC) number to each of Costa Rica's 420 districts. The numbers (1-10) correspond to the average land quality in a district. District land was grouped into three categories, good (LUC < 6), poor (LUC 6-8) and very poor (LUC > 8). Districts with LUC < 6 are considered to have good lands, suitable for cultivation, perennials and pasture. The districts with a LUC 6-8 are considered to have poor lands, suitable only for extensive grazing and managed forestry. The districts with a LUC > 8 are considered to have very poor land that should be dedicated to protection forests or extensively managed forest (Cruz et al., 1992, p.48).

⁹ Intensive pasture (LUC 5), 623 km², extensive pasture (LUC 6), 4940 km².

¹⁰ Plantation forestry (LUC 7), 2976 km², forest management (LUC 8-9), 13001 km², protection forest (LUC 10), 18410 km².



CHAPTER 3: SINAC: THE CONTEXT AND THE PROPOSAL

This chapter is an explanation of the Integrated National System of Conservation Areas (SINAC). The law proposal attempts to respond to the changing context for environmental policies in Costa Rica, especially in the 1990s.

3.1 National Policy Background

Because of the decline in foreign aid for Costa Rica, as part of the troublesome macroeconomics, the last governments have been on a clear bid to attract public funds and private investment for environmental projects (O'Brien, 1997: 32).

After the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro, the Calderón Fournier Administration (1990-1994) signed a bilateral cooperation agreement of Sustainable Development with the Netherlands, obtained the siting of the Earth Council in San José (the country's capital), and strengthened the work in biodiversity inventories by INBIO, the National Institute of Biodiversity (O'Brien, 1996:28). In this period, the SINAC is conceived as law proposal in file No. 11315 (date 19 August 1991), for discussion in the Legislative Assembly. The proposal was approved by the Permanent Commission on Agriculture and Natural Resources, on 23 April 1993. The next stage should be the discussion in legislative plenum, for definite approval.

The following administration, headed by José María Figueres (1994-1998), has kept "sustainable development" as a government guideline. Both the Convention on Climatic Change and the Convention on Biological Diversity (results of UNCED) were rapidly ratified as laws by the Legislative Assembly. The main policy guideline for the present government is the National Development Plan 1994-1998 "Francisco J. Orlich" (PND 94-98), whose environmental section is detailed in the National Plan for Environmental Action (or PNAA), issued in December 1995. The SINAC proposal still lacks the character of law, but it has been prioritized by the Ministry of Natural Resources as a new approach to strengthen biodiversity conservation in the country (PNAA, 1995: 22).

The PND 94-98 and PNAA envision that:

-Environmental protection and natural resource conservation must be shared responsibilities of the public and the private sectors.

-Sustainable development will be attained by economic incentives, non-economic incentives, and enforcement measures against illegal behaviours that harm the environment.

-Sustainable development requires participation mechanisms in environmental topics, proper environmental standards and rules of conduct. These mechanisms are to be open for the civil society, such as non-governmental organizations (NGOs), community-based organizations (CBOs), business interest associations (BIAs), labour organizations, and institutions of higher education.
(PNAA, 1995: 6-7)

As a result from diagnosis workshops with the participation of the public sector, business groups and NGOs, the PNAA has prioritized working targets in the following areas for the year 2000:

- Biodiversity and forestry
- Air pollution
- Pesticides
- Water pollution
- Solid waste disposal
- Soil erosion
- Fisheries and coastal resources (PNAA, 1995: 15-17)

The PNAA aims to become an analysis framework for the oncoming actions in environment protection and conservation, for the lapse 1995-2000. Thus, the main working areas of the PNAA have been identified as:

- 1)New attitude-building toward environmental problems
 - 2)Sustainable use and management of natural resources
 - 3)Control and prevention of environmental degradation
- (PNAA, 1995: 7)

The SINAC comes in the second action area, because it focuses in the minimization of biodiversity loss and the preservation of ecosystems. SINAC is officially presented as part of the "new legal and institutional frame" of the Ministry of Environment and Energy or MINAE (new name of the MIRENEM, as the Organic Law of the Environment No. 7554 came into force on 28 September 1995).

3.2 The Current Scheme and its Shortcomings

The traditional land protection scheme in Costa Rica has expanded gradually. Since the setting of the first area under effective management in 1963, 74 areas have been created within the range of National Parks, Biological Reserves, National Monuments, Protectorate Zones, Forestry Reserves and Wildlife Refuges

(Document by Service of National Parks, 1993). Estimations are of 22.1% of the country's territory within protection status. Today, areas are labelled under six different management categories:

National Parks: These are areas for protection and conservation of flora and fauna of national interest, under public enforcement and open to the public. They include ecosystems not transformed by human activities; species and geomorphological sites within the national parks should have a special scientific and recreational value (Reform to Forestry Law No. 7174, of 16 July 1990).

Biological Reserves: These are usually forest lands whose main use is conservation and research of wildlife and existing ecosystems (from Law 7174).

National Monuments: They comprise archeological, sculpture or painting sites whose features have an universal value in terms of history, art or science (from Law 5980).

Protectorate Zones: These are forests and forestry vocation lands, whose conservation supports soil protection, hydrological regime regulation, and watershed protection (from Law 7174).

Forestry Reserves: This is the category for forest lands whose main purpose is timber production (from Law 7174).

Wildlife Refuges: These are forests and lands suitable for protection, conservation and management of wild flora and fauna; and declared as such by the Executive. Wildlife refuges are clasified as public, private or mixed, according to the nature of property rights (from Law 7174).

The following table shows the expansion of protected land categories in the country, since 1973.

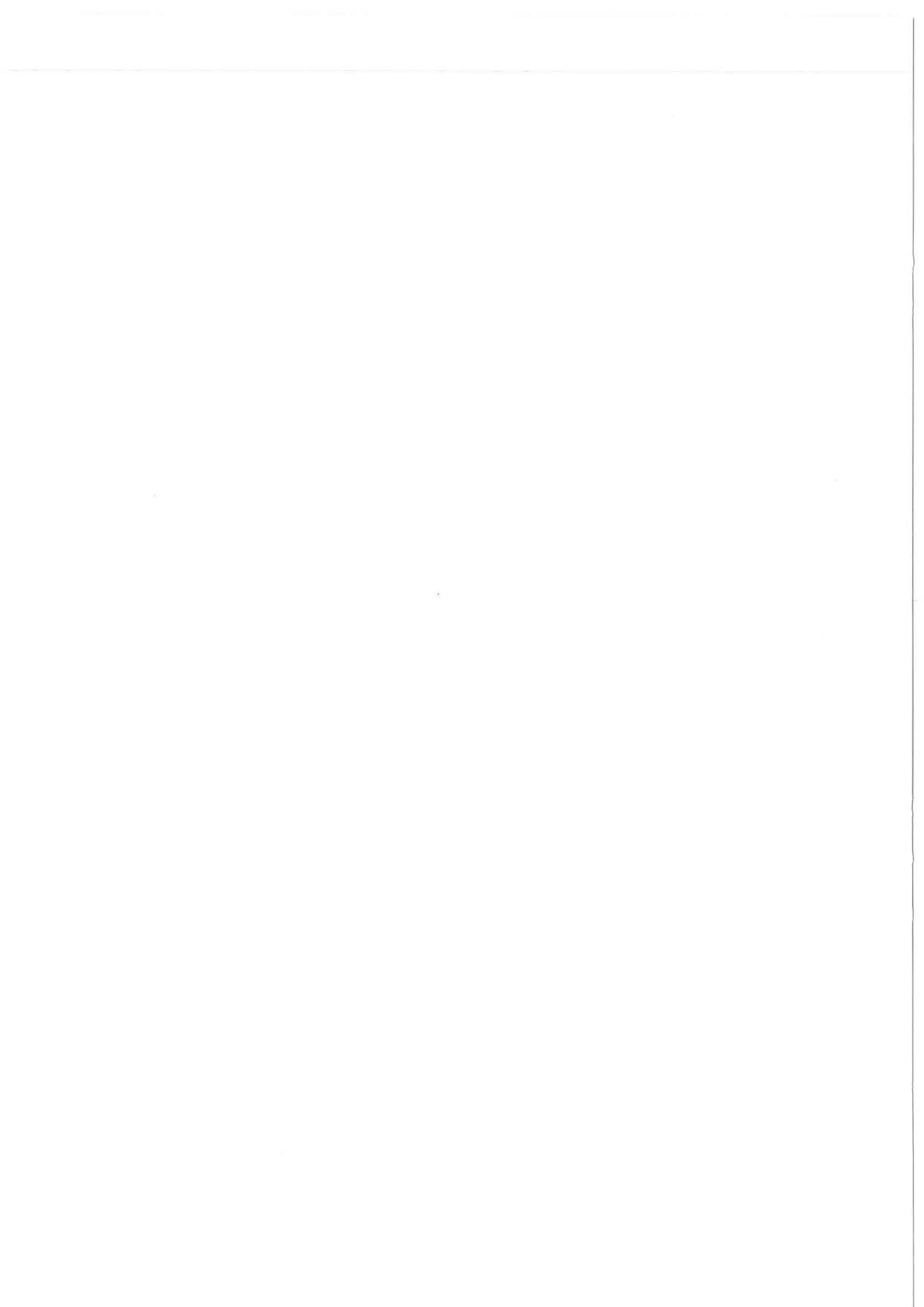


TABLE 4:

Costa Rica: Expansion of Protected Areas, according to management categories 1973-1984-1990-1993 (in ha)

Areas	1973	1984	1990	1993
National Parks	9878	432790	460655	501923
Biological Reserves	1181	15419	17653	17653
Protectorate Zones	-	58094	126201	187898
Forestry Reserves	94392	358367	358367	303385
Wildlife Refuges	-	12178	128027	113099
TOTAL	105451	876848	1090903	1123958
% of national land extension	2%	17.16%	21.35%	22.1%

Source: National Report of Costa Rica, Neotrópica Foundation-UNDP, 1992; and paper from Service of National Parks, 1993.

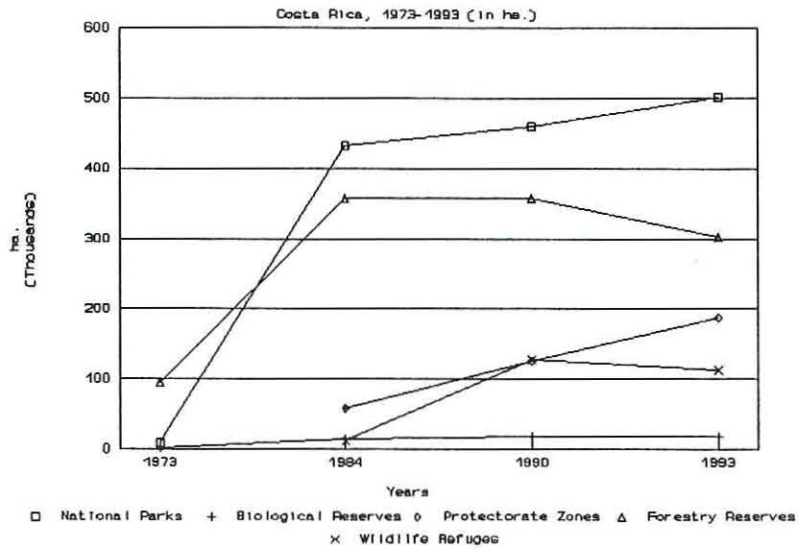
The National Parks, Biological Reserves and the National Monuments comprise about 10% of national territory and are under administration of the Service of National Parks (SPN). They are **total protection areas**, as the SPN focuses on absolute preservation of biodiversity.

Besides, the **partial protection areas** include about 12% of national territory. Approximately 80% are still under effective private property, because of unpaid expropriations (PNAA, 1995: 21). These are the Forestry Reserves, Protectorate Zones and Wildlife Refuges. Area monitoring is carried out by the Forestry General Commission (DGF) and the Wildlife General Commission (DVS).¹¹

The following graph gives a visual hint of the scheme expansion described above, since 1973.

¹¹ A description of different status and nature of protected areas, according to IUCN criteria, can be found in Economics of Environmental Conservation, by Clement Tisdell (Elsevier, 1991).

Expansion of Protected Areas



Additionally, Table Five shows the financial reach of the three subdivisions within the Ministry of Natural Resources. The Service of National Parks leads by large, while the Wildlife General Commission has been the weakest institution.

TABLE 5: Expenditures (constant CR colones, millions)

	1993	1994	1995	1996
Service National Parks	785.88	847.70	1782.88	1791.07
Forestry General Commission	175.5	627.10	580.64	867.28
Wildlife General Commission	-	74.26	73.89	112.74
TOTAL	961.38	1549.06	2437.41	2771.09

Base year 1993=100

Own elaboration, based on MIDEPLAN-MINAE, 1996

The current scheme has brought remarkably high shares of national territory under absolute or partial protection, in comparison to most developing and developed countries. The following table shows a comparison by 1985 between several nations in the tropics. Even though Costa Rica is surpassed in ha per 1000 people by most countries with scarce population density, it ranked third in percent of protected land.

TABLE 6: Tropical countries over 20000 Km² with over 10% of protected land, 1985

Country	Km2	Pop (mill)	Prot. Area	% under protect.	ha prot. per 100 people
Botswana	574978	726000	104393	18.16	14379.2
Central African Rep.	622996	2610000	74998	12.04	2873.5
Benin	115763	3377000	13775.5	11.9	407.9
Costa Rica	51100	2600000	8768.5	17.2	337.3
Malaysia	330669	12600000	38390.8	11.6	304.7
Tanzania	939762	16553000	108307	11.5	654.3
Zimbabwe	389361	6930000	43944	11.3	634.1
Bhutan	46620	1250000	9500	20.4	760
Senegal	197160	5085388	21302	10.8	418.9
Rwanda	26388	4368000	2740	10.4	62.7

1 Km2 = 100 ha

Source: IUCN, 1985; FLACSO, 1994

The protected land extension increased in Costa Rica to 21.35% by 1990 (Neotrópica Foundation-UNDP, 1992). Such a figure contrasts sharply with 4.6% in Pakistan, and 7.9% in Uganda; both figures for 1991: (Ghimire, 1993: 22). The latest figure available, for 1993, was 22.1% (SPN, 1993).

Nevertheless, the scheme is far from flawless. Different technical assessments, especially in the early 1990s, have resulted in criticism. The major problems identified:

-Many protected areas lack clear criteria in land use, and also in terms of ecosystem representativeness: some ecosystems are under-protected, while others are over-protected.

-Most of the protected areas have no clear links with the surrounding population centres. As a result, valued benefits from resource use by the neighbouring communities are scant, if ever present.

-The public sector management is constrained because of limited infrastructure, administrative deficiencies and high costs. Most of the time, management plans in protected areas are implemented by unskilled and nonexperienced professionals working in the ministerial offices in San José.

-The management of protected areas involves three separate dependencies from the MIRENEM (now MINAE): the Service of National Parks, the Forestry General Commission and the Wildlife General Commission. Each one of them has its own mandate and law; with the subsequent problems of discoordination and overlapping responsibilities.

-Although officially public property, major extensions in protected areas have not been paid to the previous owners. This is an irregular situation, as land can be still claimed by privates, thus the logic pressure on land use. Private owners have the support of the Constitutional Court, tribunal that monitors contradictions between laws and the present Constitution, issued in 1949 (PNAA, 1995: 22-23). In this respect, resolutions are made according to constitutional dispositions, which hold private property as an unrivalled judicial figure.

3.3 SINAC: Guidelines and Ecological Criteria

Official documents define the Integrated National System of Conservation Areas (SINAC) as "an institutional management model that stresses decentralization and participation, and that unifies competences of the MINAE in forestry, wildlife and protected areas, to attain sustainable use of natural resources" (MIDEPLAN-MINAE, 1995).

In its operationalization, SINAC is expected to open decision making for natural resource use in localities, and to intensify conservation from both ecologic and economic points of view. Ecologically, Conservation Areas are crucial to preserve biological diversity and natural processes. Economically, they can facilitate the generation of use and non-use values from biodiversity (Pearce and Moran, 1994: 28).

The general purposes of SINAC are:

- 1) To conserve the biodiversity of the country, by means of its non destructive use. SINAC is expected to ensure: landscapes, environmental quality, natural resource protection, research, ecological restoration, information about biodiversity, environmental education, energy potential, sustainable development projects.
- 2) To obtain the greatest social and economic benefit from protected wild lands in the country, specially for the neighbouring communities.
- 3) To maximize the reach of the conservation programmes, by means of control and information systems.
- 4) To give the public sector all legal, managerial and technical instruments required to show that protected areas are a social need and benefit.
- 5) To renew conservation areas schemes, with the aim of broadening the decision making process to regional and local members of the civil society.
- 6) To coordinate and promote rural sustainable development in the influence zones of the protected areas.
- 7) To implement finance mechanisms within the System. (MIRENEM-SPN, 1993: 2-3)

In its conception, the PNAAC classifies land in Costa Rica according to:

- a) Protected areas (further on called "core areas")
- b) Incentive use areas (further on called "influence areas")
- c) Productive areas

Within **productive areas**, the public sector should address policy and market distortions against forestry and biodiversity conservation. Its role is foreseen as enabling, rather than one of direct intervention. Therefore, SINAC is exclusively involved in the management of the first two classifications; that is, core and influence areas.

Protected or core areas are supposed to be strictly used for biodiversity protection and must be property of the public sector. Core areas include land currently being used for conservation of biodiversity (national parks, biological reserves, national monuments) and relevant new land. Their main activities would be:

- Biodiversity conservation
- Protection of ecological life processes
- Management of natural and cultural resources
- Opportunities for research, education and non-manipulative recreation (MIRENEM-SPN, 1993: 24)

Incentive use or influence areas are not restricted to protection categories under the public sector, but also include land in private hands, with the corresponding incentives. They are conceived as "transition zones between public lands for protection and private lands for unrestricted (PNAA, production". In fact, influence areas should merge objectives from different sectoral policies: forestry, agriculture, tourism and biodiversity conservation (PNAA, 1995:26).

The six land protection categories of the current scheme are expected to merge, within SINAC, in the concept of the Conservation Areas. Conservation Areas are "territorial units under the same strategy of administration, in which the public sector, the private sector and the civil society combine activities for natural resource management and conservation" (MIDEPLAN-MINAE, 1995). Their main objective is the safeguarding of existing biological diversity. Conservation Areas are territorial spaces that group different kinds of protected wildlife areas. Their physical linkage will be done through biological corridors and buffer zones (PNAA, 1995: 25).

The major idea within SINAC is the creation of **influence zones** from lands under partial conservation in previous management categories (Forestry Reserves, Protectorate Zones and Wildlife Refuges), plus contiguous lands not kept by any protection scheme, but also required to support the activities of absolute conservation in the **core areas**. Influence areas should be under both public and private ownership, with the main guidelines of:

- Sustainable rural development: agroforestry, silvo-pastoral systems, non-timber forest products
- Increased feasibility of conservation, by involvement of communities
- Strengthened participation in regional development processes (MIRENEM-SPN, 1993: 25)

Therefore, SINAC should have the following major features:

1) Conservation Areas are the new administrative units. They should ensure quality in the production of goods and services, as well as life quality in a given region.

- 2) While the core areas focus on protection of biodiversity, influence areas are foreseen to develop agroforestry, silvo-pastoral systems and productive activities that do not deplete the resource.
- 3) Autonomy of each Conservation Area in the selection of management activities; according to specific geography, habitats, specie richness, and the cultural context of localities.
- 4) Decentralization of management decisions, as they will be made by professionals and paraprofessionals in the Conservation Areas.
- 5) Wildlife management as a responsibility for the adjoining communities; neighbours should perform as employees and local administrators in the conservation areas.
- 6) Biodiversity and other resources of the wildlands are to be ensured in non-damaging multiple uses. (R.Salazar, 1996:4-5)

The influence areas within the Conservation Areas must perform as **buffer zones**, a concept first suggested in the Integrated Conservation Development Projects (ICDPs) of the 1980s. This scheme was vigorously promoted by conservation organizations as the World Wildlife Fund (WWF) and the International Union of Nature Conservation (IUCN). Their common objective is "to enhance biodiversity conservation through approaches which attempt to address the needs, constraints and opportunities of local people" (Wells and Brandon, 1993: 158).

ICDPs surpass the traditional scheme of land protection and expand protected-area management beyond park boundaries. Priority is given to economic benefit generation for local people through participatory social and economic development initiatives.¹² Main examples of these initiatives have been intensified agroforestry, irrigation, wildlife hunting, support for community social services, nature tourism, road construction for improved market access and the direct employment of local people. (Wells, 1992: 240)

ICDPs have involved the establishment of parks and reserves with protective zones around them. Buffer zones are "areas adjacent to protected areas, on which land use is partially restricted to give an added layer of protection while providing valued benefits to neighboring rural communities" (from 1982 World Parks Congress). Buffer zones become areas outside parks that are designed for protection. In other words, "zones, peripheral to a national park or equivalent reserve, where restrictions placed upon resource use, or special development measures are undertaken to enhance the conservation value of the area" (Wells and Brandon, AMBIO, p.159).

¹² ICDPs include buffer zones, biosphere reserves, multiple-use areas, regional land use plans with protected area components, and large-scale development projects with links to nearby protected areas.

In this respect, the SINAC shows major features from an Integrated Conservation-Development Project (ICDPs) at the national level. In the SINAC, influence zones emphasize both the protection of core areas and the generation of local economic benefits.

Concerning territorial extension, the number of Conservation Areas has changed. Eight were considered in the documents from MIRENEM-SPN of 1993 and the technical paper about ecological criteria by the GRUAS group, in May 1995. The most updated information (both the PNAA of December 1995 and the document from MIDEPLAN-MINAE of 1996) refers to the following ten:

- | | |
|---------------------|--------------------------|
| 1-Guanacaste | 6-Central Volcanic Range |
| 2-Tempisque | 7-Cocos Island |
| 3-Arenal | 8-La Amistad Pacific |
| 4-Tortuguero Plains | 9-La Amistad Caribbean |
| 5-Central Pacific | 10-Osa |

Ecological criteria have been vital for the setup of SINAC. In spite of its small land extension, Costa Rica is endowed with approximately 5% of the known biological diversity on Earth. This is due to its latitude location in the tropics, as well as its variety in landscape and climate.

Official documents insist in the coordination of forestry and biodiversity policies (PNAA, 1995:20). As explained in the previous chapter, land use studies establish that more than 65% of its territory is suitable for forestry. Because of Costa Rica's latitude, tropical forests have a key importance as sources of biodiversity. The country has 12 life zones and 4 centres of major endemism: serious estimations involve 10000 kinds of plants, 2000 species of broadleaf trees, some 850 species of birds, more than 200 species of mammals and some 300000 kinds of insects. In total, between 500000 and 1 million species are represented in Costa Rica (PNAA, 1995: 18).

Table Seven compares the extension of the present land protection system with the envisioned extension of SINAC. Because of non available data, there is exclusion of Cocos Island, and La Amistad is considered previous to its division in Pacific and Caribbean. Nevertheless, the figures are a very accurate approximation of the updated proposal.

TABLE 7										
COSTA RICA: Protected land schemes*										

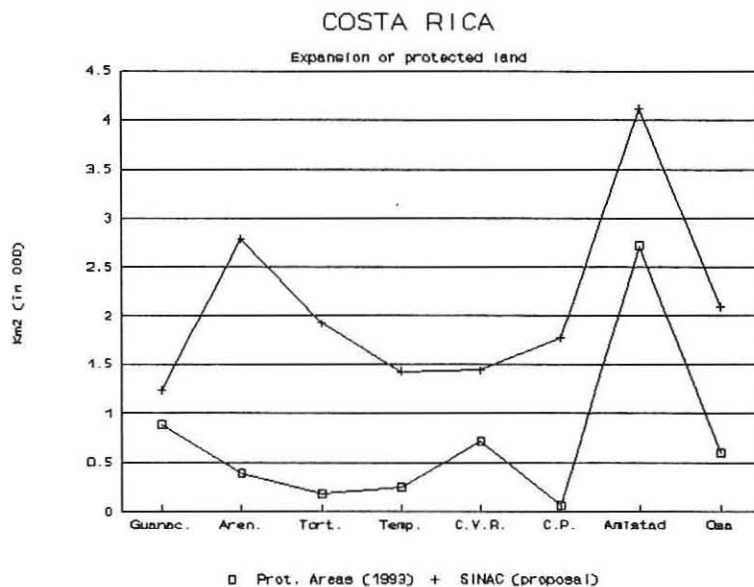
		Guanac.	Aren.	Tort.	Temp.	C.V.R.	C.P.	Amistad	Osa	TOTAL
COSTA RICA	Km2	3495	8363	4439	7561	5249	5131	12385	4534	51157
	% C.R.	6.8%	16.3%	8.7%	14.8%	10.3%	10.0%	24.2%	8.9%	100.0%
Core Areas (current)	Km2	887.5	396.7	190.8	257.2	717.4	73.25	2720	601.6	5844.45
	% C.R.	1.7%	0.8%	0.4%	0.5%	1.4%	0.1%	5.3%	1.2%	11.4%
Core Areas (proposal)	Km2	173.6	798	645.2	281.9	309.8	466.5	675.9	482.3	3833.2
	% C.R.	0.3%	1.6%	1.3%	0.6%	0.6%	0.9%	1.3%	0.9%	7.5%
Infl. Areas (proposal)	Km2	181.9	1595	1088	889.2	414.7	1230	716.1	1014	7128.9
	% C.R.	0.4%	3.1%	2.1%	1.7%	0.8%	2.4%	1.4%	2.0%	13.9%
SINAC overall	Km2	1243	2789.7	1924	1428.3	1441.9	1769.75	4112	2097.9	16806.55
	% C.R.	2.4%	5.5%	3.8%	2.8%	2.8%	3.5%	8.0%	4.1%	32.9%

Own elaboration, based on data from MINAE, 1995

*Only 8 Conservation Areas. There are no figures concerning 10 Conservation Areas mentioned in the last documents. Data on Cocos Island and partition of La Amistad (in Central and Pacific) were not available.

SINAC would incorporate 18.9% of national territory as core areas (public ownership, no human settlements, total protection) and 13.9% as influence areas (public and private ownerships, different incentive schemes). Overall, SINAC would have a land extension of 16806 km², this is 32.9% of Costa Rica's territory; a share of 57.6% would be core areas (in public hands) and the remaining 42.4% would be influence areas (combined public and private ownership) (PNAA, 1995: 27).

The following graph shows the surface enlargement under protection, from the current scheme to the implementation of SINAC.



A successful implementation of SINAC would imply a substantial expansion of conservation areas such as Arenal (from 396.7 to 2789.7 Km²), Tortuguero (from 190.8 to 1924 Km²), Central Pacific (from 73.4 to 1769.8 Km²) and Osa (from 601.6 to 2097.9 Km²). La Amistad would remain as the biggest Conservation Area, of some 4112 Km², equivalent to 8% of the national territory.

The expansion of SINAC was done according to the criterion of vegetation macrotypes, from Biology Conservation theory. This criterion has already been used by UNESCO in the definition of Biosphere Reserves (Wells and Brandon, 1993: 159)¹³.

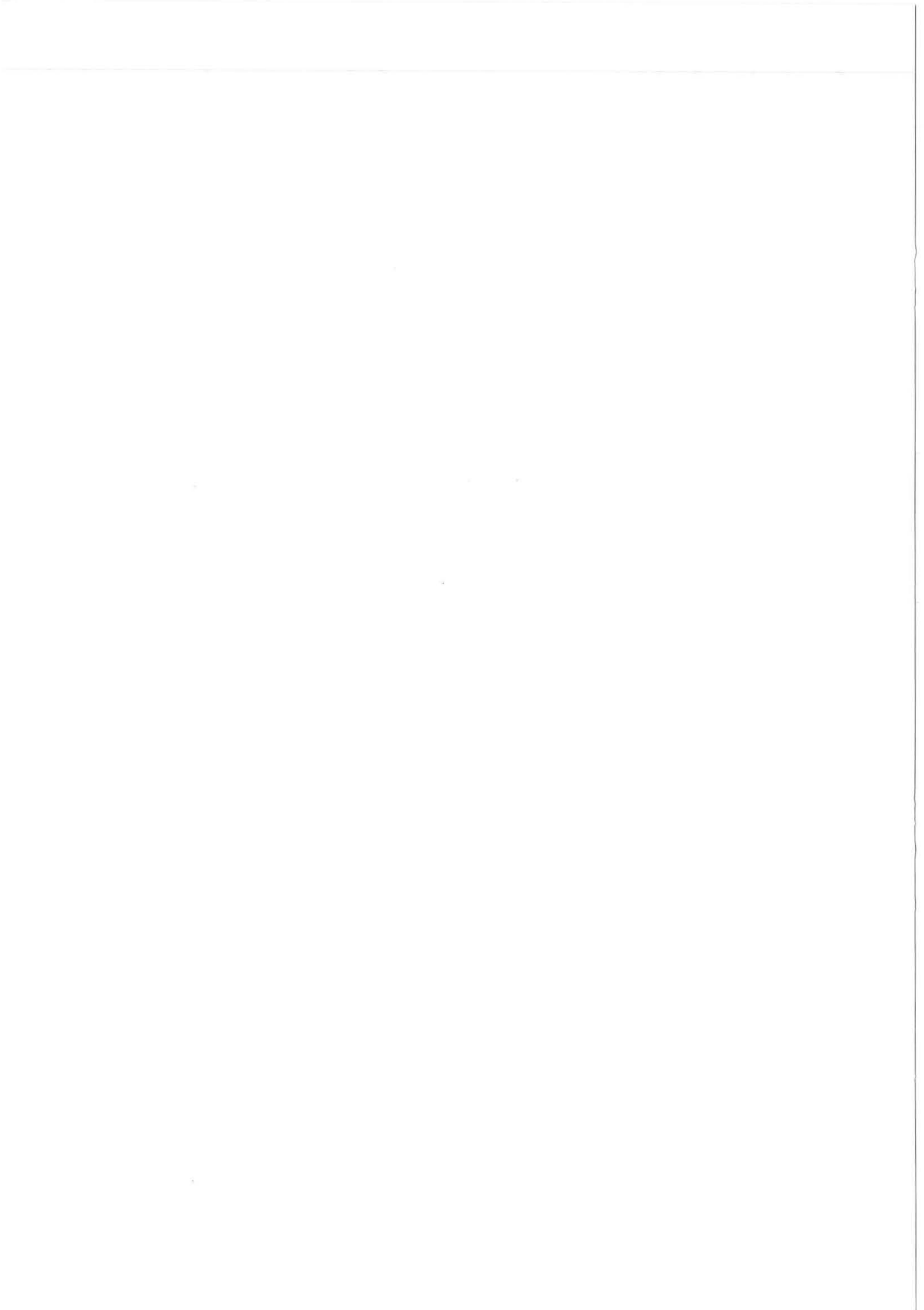
In this respect, the main contribution was completed by GRUAS, an interdisciplinary staff group from MINAE and other relevant institutions. Their document "Technical Proposal for Territorial Extension of the Integrated National System of Conservation Areas" (4 May 1995) has been the primary support for the statements in the National Plan for Environmental Action (PNAA).

Based in the GRUAS study, a successful and complete implementation of SINAC would result in a 58.7% representation of the country's macrotypes within core areas (almost 20% more than today) and up to 73% including the influence areas (PNAA, 1995: 29).

¹³ Conservation Areas envisioned in SINAC follow most of the guidelines of Biosphere Reserves as understood by UNESCO:

"Biosphere Reserves are approved by the International Coordinating Committee of UNESCO's Man and the Biosphere (MAB) Programme. Biosphere Reserves include a strictly protected core area, surrounded by buffer zones of less strictly protected areas, followed by even less protected areas such as multiple-use management areas which may include cultivation. Such a system of reserves recognises that interconnectedness of land use can be important for the survival of many species. Island-like national parks and highly protected areas are often too small to provide adequate protection to some species targeted for protection and these species need to spill out on to nearby areas. Where this is not possible, protected areas may need to be increased in size to achieve the target and this could result in greater cost and economic hardship to local communities."

(Tisdell, 1991:124-125)



3.4 SINAC: Finance

The law proposal mentions the following income sources for SINAC:

- 1) Entries in ordinary and extraordinary national budgets.
- 2) User fees from sales, services, concessions.
- 3) Resources given by Art. 7 of Law of National Parks, No. 6084, dated 17 August 1977.
- 4) Donations and grants.
- 5) Returns from equity funds, to be determined in each Conservation Area. (Law proposal, art. 32)

All resources collected by SINAC should be administered by means of the figure of the trust, using customary mechanisms for public funds. SINAC is strongly recommended to create equity funds for each Conservation Area, to strengthen the system operation in the long run. (Law proposal, art. 34)

For all income to the SINAC, the following procedure is recommended: 75% of funds for the specific Conservation Area itself, (own development programmes and equity fund), while the remaining 25% is channeled to non self-sufficient SINAC areas and broad activities. (Law proposal, art.35)

Different user fees for nationals and foreigners without residence permit can be determined to increase income generation and service provision in each Conservation Area. Furthermore, travel agencies, and retail tourism offices must pay to the Ministry of Natural Resources for leisure and research visits in lands within SINAC jurisdiction (Law proposal, art.36-37).

Effective disbursement budgets of SINAC are shown in Table Eight:

TABLE 8: SINAC, expenditures from 1993-1996 (constant CR colones, in millions)

	1993	1994	1995	1996
I) SPN	785.88	847.70	1782.88	1791.07
National Budget	-	188.48	677.21	249.44
Fund of National Parks	215	212.68	404.06	624.86
Found. Nat. Parks (FPN)	570.88	446.55	701.61	916.77
Conservation Areas	537.8	444.71	416.30	295.69
Gl. Envir. Facil. (GEF)	-	-	252.85	621.08
PL 480	33.08	1.84	32.46	-
II) DGF	175.5	627.10	580.64	857.28
National budget	-	423.02	425.40	631.68
Forestry Fund	175.5	204.08	155.23	235.61
III) DVS	-	74.26	73.89	112.74
National budget	-	24.2	24.26	60.08
Wildlife Fund	-	50.06	49.63	52.66
IV) Foreign funding	750	757.34	816.25	469.52
V) Main Office	26.6	35.46	51.87	-
TOTAL (I+II+III+IV+V)	1738.8	2341.86	3305.51	3240.62

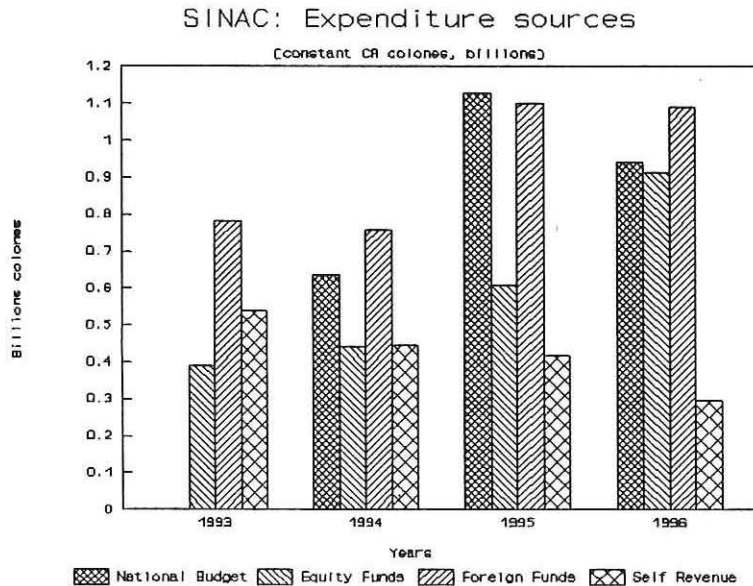
Base year: 1993=100

For 1996, estimations done in May

Source: MIDEPLAN-MINAE, 1996.

The next graph shows possible oncoming trends for fund raising within the SINAC. National budget entries, essential in 1994 and 1995, dropped for 1996 and are expected to keep on decreasing. Reliance on this source cannot longer continue because of future public expenditure cuts, due to the budget deficit as a main trigger of the country's internal debt (Treasury Ministry, 1996). Returns from the equity funds in the subdivisions within MINAE (SPN, DGF, DVS) increase vigorously, and have become a quite promising source of income. Foreign funds are still the first source; bilateral funds have decreased considerably, but the overall amount still rises because of the recent influx from the Global Environmental Facility (GEF), as seen in Table Eight (accounting for 252.85 and 621.08 million colones for 1995 and 1996, respectively).

About self finance in each Conservation Area (as user fees and concessions), there is an urgent need to strengthen existing mechanisms and to devise new ones. As seen in the graph, their contribution to overall expenditures in SINAC is still meagre, and even declined in 1996.



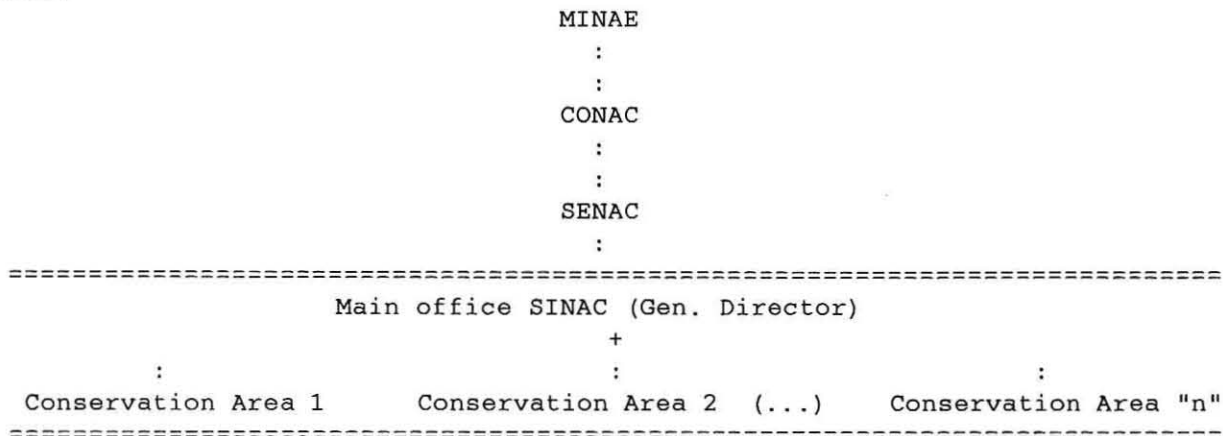
3.5 SINAC: Political and Administrative Structure

SINAC is expected to be part of the Ministry of Natural Resources, Energy and Mining (now Ministry of Environment and Energy, MINAE), public sector entity in charge of protected areas. The proposal is supposed to undertake decentralization as a foremost guideline.

Decentralization is understood in SINAC as the "process of moving functions and responsibilities, without a loss of authority in the General Direction of SINAC" (MIRENEM-SPN, 1993: 35).

The following scheme summarizes the SINAC and its different entities:

SINAC:



In the law proposal being analyzed, the current Service of National Parks (SPN) is transformed in the National Service of Conservation Areas or SENAC (Art. 6). The main justification behind SENAC is "the need of a centralized information system for decision making and support of planning and control activities." (MIRENEM-SPN, 1993: 35)

SENAC comprises a Central Office and the entire group of Conservation Areas. SENAC is in charge of decisions on an executive, day-to-day basis, and will ensure the autonomy of each Conservation Area. The Central Office would run the System, and be responsible of implementing the policies defined at the Ministry level. SENAC is to be headed by a General Director and a Subdirector; both of them for charges of 5 years, with labour contracts that can be either rescinded or prolonged. The basic structure within each Conservation Area would be:

- a) One Area Direction
- b) One Local Council (the LCs)
- c) Management Programmes
- d) Programme Committees

"The SENAC should elaborate a strategy for the management of SINAC, and overall Terms of Reference (TOR) within the System. This strategy should be build according to the National Planning Law and the Law of the MIRENEM" (Art.7).

SENAC asserts that the current Protected Areas (and future Core Areas) are the management priority. Existing deficiencies in long term planning are acknowledged. About mid term planning, work has been done in general management plans (GMPs) or five-year plans for each of the current protected areas. Recent texts insist in the need of General Management Plans (GMPs) for each Conservation Area as soon as possible. GMPs are to be operationalized through Annual Work Plans (AWPs) that will depend on specific characteristics of each Conservation Area (MIDEPLAN-MINAE, 1996, p.16). Planning would be done in close collaboration with neighbouring communities and the corresponding organizations.

Even though its executive tasks, SENAC is supposed to facilitate participation from local beneficiaries. This point is emphasized in both the law proposal and general documents, but there is no elaboration on how this is to be achieved.

SENAC must safeguard representativeness in the main ecological regions, as well as endemic biological diversity. It should perform as the manager of the core areas within the Conservation Areas of the country, keeping an efficient coordination with the sustainable productive activities in the influence zones.

Article Nine lists the overall competences of SENAC:

- To administer of the Conservation Areas in the country
 - To properly attain relevant policies and legislation
 - To propose MINAE all policies and guidelines for the management of SINAC
 - To incentivate and get involved with neighbouring communities to the Conservation Areas, in activities of management, education and sustainable development
 - Proposals to MINAE concerning new national parks and biological reserves
 - To protect, plan and develop private natural reserves, especially in nearby zones to each Conservation Area
 - To guarantee the proper use of financial resources of the SINAC, as well as to lobby for more funds in the national and international levels
 - To promote training and skill development among the employees of SINAC
- (MIRENEM-SPN, 1993: 176-177)

SENAC represents SINAC within the Ministry, and also performs as the networking body with other public sector institutions, the private sector, and the international dimension. SENAC is supposed to ease the long term operationalization of SINAC, through agreement negotiation, project development and economic resource use regulations.

In terms of membership, SENAC is open to "all interested public and private institutions, besides national and local NGOs within the System. SENAC should encourage the participation and collaboration of local NGOs built by the communities themselves (in fact, CBOs), to work in protected areas."

SENAC is given the faculty of contracting out specific services with private agents, except the non-delegate functions (law enforcement, security, General Management of the System, and/or the Conservation Areas). Additionally, activities that cause depletion of natural resources in the Conservation Areas by private agents are forbidden. Contracts with private agents will support the strategies and plans of the corresponding Area, with the endorsement of the Treasury National Inspector. SENAC is expected to monitor all implementation, and revoke contracts when required. The services and activities to be given in concession are to be detailed in the regulations within SINAC law. (Proposal, art. 10)

The law proposal mentions the following responsibilities for SENAC outside the direct scope of the Conservation Areas:

-Negotiation with institutions and persons, prior to development of activities in Conservation Areas that can trigger external effects.

-To advise neighbouring communities on the values and services given by natural resources.

-Employment generation, within each Conservation Area, with priority to inhabitants of local communities.

-Attention to needs and development of communities: priority being given to: development associations, organized groups in communities.

-Agreements with both physical and legal persons willing to incorporate lands in conservation and sustainable use schemes, especially if they border the Conservation Areas. (Law proposal, art. 23-30)

Within the SINAC framework, there is a consultive organ called the National Council for Conservation Areas (CONAC), in charge of broad policy decisions, and expected to hold regular meetings three times per year. In terms of plans and strategies for the System, the CONAC is the second office for analysis and consultation, the first will be the Local Council of each Conservation Area. If conflict arises, final decision will reside in the Ministry of Natural Resources. (Law proposal, art.20)

The members of CONAC are:

- Viceminister of MINAE (double voting)
- General Director of SENAC
- Director of Forestry General Commission (DGF)
- Geology and Mines Director
- Director of Wildlife General Commission (DVS)
- Representative of Tourism National Institute (ICT)
- Representative of National Institute of Biodiversity (INBIO)
- Representative of National Chamber of Tourism (CANATUR)
- Representative from Local Councils of Conservation Areas
- Representative from public sector universities
- Representatives from the Ministry of Culture, Youth and Sports (MCJD)
- National Museum representatives

The attributions of CONAC will be:

- a) To propose MIRENEM all policies and guidelines about the management of the SINAC.
 - b) To ease interinstitutional coordination for the achievement of the objectives of the System.
 - c) To analyze plans and strategies in SINAC, according to the guidelines defined by the MIRENEM.
 - d) To examine all accounting and auditing information, concerning financial sources and fund raising in SINAC, as well as general reports.
 - e) To recommend candidates for General Direction and Subdirection of SENAC to the MIRENEM.
 - f) To perform ongoing evaluations of SINAC and the specific Conservation Areas.
- (Law proposal, art.21)

At the level of each Conservation Area, the law proposal conceives a Local Council (LC), with representatives from the public sector, BIAs, CBOs and NGOs. The Local Councils have the following major aims:

- To ensure that management plans and strategies coincide with the needs of the corresponding communities.
 - To improve coordination links between the management staff of the Conservation Areas and the communities.
 - To ensure ongoing activities for natural resource conservation.
- (Law proposal, art. 40)

Additionally, each Local Council should perform these duties and functions:

- Proposal of policy and guideline changes, related with the management of conservation areas
- Recommend candidates for the charge of Director of the corresponding Conservation Area
- Approval of strategies and plans for each Conservation Area, according to policies defined by both SENAC and the Ministry of Natural Resources
- Budget approval for the Conservation Areas
- Opinions and recommendations concerning reports and ongoing evaluations in each Conservation Area
- Support the work of the Director and staff in each Conservation Area
- Advice to the General Director of SENAC, concerning the management of the relevant Conservation Area (Law proposal, art. 41)

These are the major features of SINAC, as deduced from the reading of the law proposal as well as official documents from the Ministry of Natural Resources. Chapter Four uses most of the highlights to attempt an ex ante assessment of the System. The criteria required will refer to the complementarity of forestry and biodiversity policies, the extent of decentralization and the degree of participation from communities.

CHAPTER 4: EX ANTE ASSESSMENT OF SINAC

The present chapter attempts to define the conditions by which SINAC would be feasible in its main objectives. These objectives are stated in the law proposal as follows:

- "a) Conservation and restoration of the most important ecosystems of the country, with their corresponding biodiversity.
- b) Promotion of socioeconomic development in the neighbouring communities, by means of sustainable productive activities that do not clash with the management of the Conservation Areas.
- c) Protection and restoration of the cultural resources found within the Conservation Areas." (SINAC law proposal, Art. 4)

Some assumptions must be made, due to limitations in the present research. "Biodiversity" in objective a) will be understood in number of species, with focus on those endemic to the geography and ecology of Costa Rica. The "sustainable productive uses" in objective b) are the assortment of non timber forest products, agroforestry schemes, silvopastoral systems and services to be generated in the tropics. Finally, objective c) refers to the way of living and indigenous groups in Costa Rica, most of them in reserves with specific legislation. However, "cultural resources" are out of the scope of this research, as mentioned before in Chapter One.

This assessment of SINAC is exclusively ex ante, with the aim to delineate the conditions of success and favourable impact in biodiversity conservation. The main assumption is that the implementation of the proposal has not begun. Nevertheless, at the time this research has been undertaken, SINAC is being tested by MINAE in the conservation areas of Central Volcanic Range, Guanacaste and Tempisque.

The implementation of SINAC must be done keeping in mind major reasons for the failure of biodiversity conservation efforts, in the frame of the ICDPs described in Chapter Three:

- 1) Populations at the local level receiving very little share of total benefits.
- 2) Benefits from biodiversity conservation are meagre, when compared to benefits from alternative uses, (Tisdell, 1995:218)

The following questions will be kept under consideration for the SINAC proposal, in terms of decentralization:

- 1) How is SINAC supposed to fulfill expectations of people dwelling in the influence zones of each Conservation Area?
- 2) How will SINAC attempt to build consensus among the different stakeholders in each influence zone?
- 3) What kind of information gathering about forest ecosystems and biodiversity will be done through SINAC, on each Conservation Area? Will this information be available and useful for local people?
- 4) How will SINAC take advantage of the skills, technical insights and ideas of the local people, in its organizational structure? How will SINAC recruit locals?
- 5) Which participation mechanisms will be created? What kind of consultations will be made to local people on management of biodiversity?
- 6) Are there existing institutions and programmes to develop substitute land-use activities in the influence zones of each Conservation Area? Are there new ones to be created under SINAC?

Additionally, the following questions will guide the assessment of SINAC, in terms of deforestation and biodiversity loss:

- 1) Which specific incentives will there be to compensate people from losing access to land added in core zones for each Conservation Area?
- 2) What regulations will SINAC bring to prevent encroachment in core areas? In a preliminary diagnosis for the situation in Costa Rica, the regulations should consider:
 - Lack of definition of property rights
 - Bias of economic policies, favouring livestock breeding and extensive agriculture
 - Irregular income streams in forest exploitation, for both timber and non-timber products
 - Very long gestation periods of investment
- 3) What is the economic feasibility and impact of alternative buffering activities in the influence zones (Ex: ecotourism, agroforestry, silvopastoral systems)? Are the benefits quick and tangible for local people? Will SINAC include ways by which costs can be deferred and diluted between locals?

4.1 Private Property and Social Interest

A first assessment area for SINAC is the intervention degree by the public sector on defining land property rights. The current Constitution (issued in 1949) is the most important document in the legal framework of Costa Rica, over international treaties, laws, decrees, regulations and actions (either from the State or from private agents).

Article 45 of the Constitution addresses property. The first paragraph comes from the former constitution of 1871, and its main spirit is the protection of individual rights from state abuses. Therefore, it forces expropriation prior indemnization, as the only mechanism by which the state can acquire property under private dominon. Nevertheless, the second paragraph was written and approved in the 1940s, when the public sector got a leading role in economic and social development, with proper guarantees for freedoms. The paragraph sets limitations and duties to landowners because of social interest, by means of laws to be approved by the votes of 38 members of Legislative Power; that is, two thirds of the entire legislative body. The new Forestry Law (from 5 February 1996) is a relevant example.

In this line, the SINAC law proposal should be approved by the same number of votes and procedure, and its implementation should be under aegis of the Constitution. Major action lines of the System will have to be land purchases for the expansion of core areas, and the adding of private holdings for buffering use in influence areas, basically for non-timber forest uses. Otherwise, the longlasting problem of pseudo expropriations would not be solved, and SINAC would be ineffective. There are three major points in which conservation area management interlinks with ordering of land use:

- 1- Natural resource and environmental conservation confer social interest.
- 2- Consequent limitations on land use are not against labour freedom.
- 3- Limitations of this kind are in line with Article 45 of the Constitution. (CEDARENA, 1995: 19-20)

4.2 Linkage of Forestry and Conservation Area Management

A major point for the successful implementation of SINAC is found at the general level of policy design. Costa Rica is a tropical country, where the main depositories of biodiversity are tropical forests. Besides, more than 60% of its territory has

forest suitability (PNAA, 1996: 18). Forestry and conservation areas management policies must be clearly defined and also integrated. Both subjects are to be included within the "green" component of environmental policy. The main concern should be to prevent irreversibilities and strengthen what has been called "one of the world's most dense biodiversity stocks". This is to become responsibility of the Costa Rican Executive and Legislative Powers.

Data from Chapter Two shows that 67% of Costa Rica has forest suitability, with some 18410 Km² for protection forest and 15977 Km² for commercial productive forests and plantations. The country, from the view of nature conditions, has potential to strengthen the share of the forestry sector in the economy. However, the economic base of Costa Rica has been strongly agricultural, by means of an inappropriate use of most of its territory. (PNAA, 1995: 20)

Recent official documents stress a new approach toward forests, so that they are not merely for the exploitation of timber and the conversion into pasture lands. Sustainable use of primary and secondary forests should imply the following additional functions: nutrient recycling to the soil, erosion and flooding prevention, watershed protection, carbon dioxide sequestration and biodiversity conservation (MIDEPLAN, 1996:2).

Additionally, a biodiversity policy is now seen as having three main components:

- 1) Protection: By management of Conservation Areas
- 2) Knowledge: Updating of biodiversity inventories
- 3) Sustainable use: Prospecting from inventories, for pharmaceutical uses (MIDEPLAN, 1996: 3)

Initially, the SINAC was to be developed under the aegis of the MIRENEM, created by law 7152 of 21 June 1990. The original legal framework for the System was the following:

1. Convention for protection of flora and fauna of the Americas, subscribed by Costa Rica in October 1940.
2. Law of National Parks, No. 6084, of 17 August 1977.
3. Creation Law of the MIRENEM, No. 7152, of 21 June 1990.
4. Reform to Forestry Law No. 7174, of 16 July 1990.
5. Wildlife Conservation Law, No. 7317, of 19 October 1992.

This framework was already attributed with confusion and overlapping for the purposes of SINAC as an unified system. The proposal (in file 11315, Legislative Assembly) stresses on further community participation. Besides, localities should take part in management of the influence areas at their corresponding Conservation Area. There was no elaboration on how this participation would tie together with dispositions in so many different laws.

Now, the approval and implementation of SINAC as national law will have to be coherent with recent legislation, specifically the Organic Law of the Environment No.7554 (28 September 1995) and the Forestry Law No. 7575 (5 February 1996). These mainstream laws on environmental issues are expected to merge forestry and biodiversity conservation policies in Costa Rica.

Concerning the Organic Law of the Environment, approved in September 1995, its text was not available for a direct analysis in this research. In any case, conflicting views on the new legal context for SINAC have been found in the literature.

On the first hand, documents from the Ministry of Planning and Economic Policy (MIDEPLAN) remark that the Organic Law of the Environment will strengthen the main features from SINAC. By means of the mentioned new law, MINAE creates the Natural Resources High Commission, which is a merge of the Service of National Parks, the Forestry General Commission and the Wildlife General Commission, plus the Regional Directions. This new commission should lower costs, simplify red tape and attain higher efficiency. There is an expected increase of administrative decentralization, while local governments and communities consolidate as stakeholders in management of natural resources (MIDEPLAN, 1996: 6).

On the other hand, the National Plan for Environmental Action (PNAA) is intensely critical of the Organic Law of the Environment. The main interest, it is argued, will be to deepen centralization in one entity, the Ministry of Environment and Energy (MINAE). Additionally, the law is attributed to be very general and vague, as well as matter for further confusion. The institutional setting for SINAC in this new law becomes:

- The Ministry of Environment and Energy (MINAE)
- The National Environmental Council, as a deliberation and consultation organ of the Executive Power with advisory tasks to the Presidency of the Republic.
- The Regional Environmental Councils, adscribed to the Ministry of Environment and Energy. They allow the participation of civil society in analysis, discussion and control of activities, programmes and projects in environmental affairs.

-The National Environmental Technical Secretariat (former Environmental Impact Studies Assessment National Commission), in charge of ensuring coherence between aspects of environmental assessment with productive processes.

-The Environmental National Inspector, in charge of the follow up of budget allocations, and the proper application of the Law itself.

-The Environmental Administrative Tribunal, that receives accusations-reports in issues of the environment.

Thus, the following are major unsolved issues from the Organic Law of the Environment:

1) The Law does not solve the problem of scattered laws and competences. When different issues come out in the text (such as pollution, land use, environmental education), the sole reference being made is to "concerned authorities". These "authorities" range from the Ministry of Agriculture and Livestock Breeding, to the Ministry of Health, to the Ministry of Environment and Energy. No decrees nor laws are rescinded, neither explicitly mentioned if they should instead define specific tasks for the "concerned authorities".

2) There are no references to specific complementary legislation in environmental issues. As no modifications are done to current laws, there is no harmonization at all. The most frequent quotation is, again, "...the concerned authorities...".

3) The Organic Law merely adds up to existing environmental legislation. There was no consultation process to relevant public sector institutions, private sector nor civil society.

4) There is no explicit set of differences between MIRENEM and the new MINAE, while changes in flowchart and management attributions must be assumed.

5) The Organic Law sets up the Regional Environmental Councils, adscribed to the Ministry of Environment and Energy. These councils allow the participation of civil society in analysis, discussion and control of activities, programmes and projects in environmental affairs. However, they will overlap with:

-Environmental offices by the National Ombudsman

-Environmental Attorney

-Local Councils (LCs) within the SINAC

-COVIRENAs, created by decree, 9 Sept. 1993 (should be equivalent to the Programme Committees in each Conservation Area)

6) The Organic Law creates the Administrative Environmental Tribunal attached to the Executive Power. Nevertheless, it will lack all law enforcement capability, which is under the scope of the Judicial Power.

7) Gradual changes (via Executive decrees, law proposals) for the strengthening of SINAC are ignored. Chapter Seven "About Protected Wildlife Areas" is attributed with erasing all previous work done in line with SINAC.

8) The decision making structure built by the Organic Law of the Environment is exclusively subordinated to the Executive Power, therefore prone to corruption:

In the scheme:

Executive Power

MINAE

(complete control of law monitoring and enforcement)

Regional Environmental Councils (complaints)	National Technical Secretariat (EIAs)	Environmental Administrative Tribunal (resolutions)	National Environmental Inspector (overall Org. Law)
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(based on PNAA, 1995: 78-80)

As derived from the analysis, the expected integration of forestry and biodiversity conservation policies will be very complex, if ever achievable in real decision making.

4.3 Decentralization and Participation

Another major concern for the implementation of SINAC should be effective decentralization and participation. SINAC is a natural resource management proposal at the national level, that must evolve in a long-term, comprehensive and coherent policy approach, beyond the traditional public sector interventions. A renewed state action will require, for success, "organization and decision making of local communities, to overcome bureaucracy and damaging interests." (O'Brien, 1996)

To discuss decentralization for SINAC, the concept is understood as "dispersion or distribution of power from the centre. In political-administrative levels, authority shifts from the national government agencies to subnational units" (Wolman: 1990:32-33).

Decentralization can be advocated on various grounds: greater efficiency in the provision of social welfare, democratization, and closer coherence between public preferences and public policy (Wolman: 1990: 32-33). More specific advantages are:

- a) the generation of additional resources, as well as their more efficient use
 - b) increased people's participation in planning processes
 - c) greater relevance of decisions to local needs
 - d) higher coordination between decision-making and their implementation
 - e) speed and flexibility in management processes
 - f) new linkages between social organizations and the public sector, because of the more permanent participation by localities
- (DERSOT, 1996: 13)

Nevertheless, the process is not free of bottlenecks, especially in the short term. In such context, SINAC must define for its operationalization:

- i) Kind of activities for which power or authority is transferred
 - ii) Kind of powers or authorities that are transferred
 - iii) Levels of transfer
 - iv) Individuals or organizations that will be in charge
 - v) Legal, political and administrative mechanisms for the decentralization
- (DERSOT, 1996: 13)

Decentralization is expected to be hand with hand with participation. The latter is to be understood as "empowering people to mobilize their own capacities, be social actors rather than passive subjects, manage the resources, make decisions and control the activities that affect their lives" (Wells and Brandon, 1993:160). Participation must surpass the enthusiastic involvement of individuals and groups in a specific programme. For development aims, it must be envisioned as "capacity building of local groups, particularly disadvantaged ones, to influence decision-making and planning processes" (Utting, 1991: 127). To what extent this is guaranteed through the SINAC proposal is a question at stake.

A first weak point from the analysis is the lack of definition concerning the local target groups: there is no framework by which localities, communities and groups can be distinguished (following Norman Uphoff, from Chapter One). Every social cluster is merely called a "community", with no references to provinces, cantons, districts or other subnational units. In that sense, the operationalization of each Conservation Area misses a clear starting point. Obviously, the decentralized decision making can easily dwindle because of vagueness.

The reading of the law proposal rises further doubts concerning the degree of decentralization and participation in environmental management. Article 5 clearly states the administration of the SINAC to be in hands of the Ministry of Natural Resources, through the National Service of Conservation Areas (SENAC). In the meantime, tasks of the National Council of Conservation Areas (CONAC) and the respective Local Councils are labelled as "collaborative" ones. Neither the structure nor the tasks of both CONAC and the LCs are explained in depth, with the consequent risk of obstructing each other, and involving each other in decision making quarrels.

Decentralization efforts are in a very shaky position. For example, Article 20 of the proposal states the Local Council to be the prime body in planning and management for each Conservation Area, while the National Council plays the second role. Nevertheless, no details are given about the nature, composition and financial reach of the Local Councils. As commented earlier, both the CONAC and the LCs may be absorbed in power conflicts with the SENAC.

The SENAC remains as the overall decision making entity for the System. It is to be formed by "the personnel required to perform its functions and duties" (from Article 11), and headed by a General Director and ViceDirector. Its nature is executive, managerial. In the meantime, CONAC becomes a consultive organ within SINAC, made up of 14 members from different organizations, with three ordinary meetings per year, and extraordinary meetings as required. The Local Councils are rather undefined, as their membership is expected to come from "public organizations, BIAs, CBOs and individuals related to the respective Conservation Area" (from Article 39). The LCs are supposed to work as the General Assembly for each Conservation Area. From the LCs, nine members should be elected as an Executive Committee (from Articles 42 and 43). Again, notorious gaps are left in terms of work implementation at the local level.

In terms of financial diversification, the law proposal indicates various income sources beyond the National Budget allocations. The figure of the trust is recommended for the System overall (Article 33), while equity funds are advocated in each Conservation Area (Article 34). Additionally, the need of different user fees between nationals and foreigners without residence permit is highlighted in Article 36. These points move in line with decentralization in terms of fund raising. However, they should be seen according to annual expenditure budgets of SINAC. Data concerning shares for current expenditures (wages, operational expenditures) and investment expenditures (land purchase for extension of core areas, tourist and scientific infrastructure) were not available. It is not clear if the equity funds will be based on capitalization of profits, rather than on sinking resources. These key points cannot be left undefined or ignored.

In the case of SENAC, Article 10 refers to the need of contracting out services within each Conservation Area. Permissions given by SENAC must be in line with the General Management Plan (GMP) of the Area, and obtain the endorsement of the Treasury National Inspector. Other key attributions for SENAC concern local employment generation (Article 25), agreements with communities supposed to stop encroachment and unsustainable activities in both core and influence areas (Article 27), and contracts for setting up private nature reserves (Article 29).

In the most favourable scenario, SINAC is a proposal for decentralization as deconcentration. Everyday management may be distant from the centre (in each Conservation Area, by its Director and Local Council). Resource mobilization is centralized and decentralized (combination of national budget, international cooperation, self finance, equity funds), but accountability of localities on decisions is strategically kept on the SENAC and the MINAE.

The problem goes beyond the creation of an all-mighty central body within System, specifically the SENAC. It is mostly the questionable approach by which depletion of forests and biodiversity can be solved by written institutional arrangements, instead of addressing the persistent market and policy intervention failures.

4.4 On Market and Intervention Failures

Deforestation is not only the major concern for forestry management in Costa Rica, but also a main cause of its biological diversity loss. Evidence shows as well that forests with the richest biodiversity have been the most affected by depletion, such as the premontane moist forest and the tropical moist forest. Those forests have suffered around 70% of overall deforestation since 1966 (PNAA, 1995: 19). According to the Biodiversity National Study (1991), between 10% and 12% of species are under threat because of over-exploitation or illegal extraction (PNAA, 1995: 19).

Notorious disparities between actual and potential land use in Costa Rica (previously discussed in Chapter Two) are a manifestation of economic and institutional distortions. Of the total land deforested from 1966 to 1989, 57% became pasture for livestock; nevertheless, only a share of 14.1% was suitable, while another 20.7% was suitable for crops. In the meantime, 65% of deforested lands had forest suitability. Additionally, the loss went beyond forest cover, as it included 12.5 million m³ of sawnwood, as the volume of used wood in the period was merely 11% of total standing and then cut. (PNAA, 1995: 28-29)

The distortions that have triggered loss of forest cover can be grouped as follows:

1) Tenure insecurity by which forest lands become an open access resource, with non-rival and non-exclusive consumption. The entitlement legislation has encouraged land clearing to secure possession; this is basically through the Law of Ownership Information of 1941, still valid with amendments. *Markets are non-existent or uncomplete*, and there is no maximization of social welfare. The forestry resource is in an open access situation, and subject to depletion (M. Flint, 1992: 448).

2) Incentives favouring agriculture and livestock breeding, with consequent negative externalities on forestry activities. Policies have included all types of subsidies for investment, such as long-term loans, tax credits, monetary inducements, duty-free imports of capital equipment. This is a major case of *policy intervention failure*, with the creation of so called "perverse incentives". Tax and subsidy policies increase the private rate of return to investment, and thus encourage activities which would not have been undertaken with more competitive prices (Repetto, 1988; in M. Flint, 1992, 452). In the Costa Rican context, exploitative behaviour has increased forest clearance and the destructive logging of a few timber species, with the consequent reduction of biodiversity.

3) Protectionism toward the forest industry, by bans to sawn wood exports and high import tariffs to finished wood products. Competitiveness and more efficient productive processes have been discouraged, and forest lands in private holdings have not been attractive enough for sustainable use in both timber and non-timber activities. As mentioned in Chapter Two, the forestry GDP has kept an insignificant share in the country's economy.

SINAC must secure funds for the purchase of land in both core and influence areas. This issue has a strong link with the financial strengthening of the proposal: resources for expansion are to be channeled from national budget and returns in equity funds (MIRENEM-SPN, 1993: 23). Uncomplete expropriations are a critical unsolved problem in the current scheme of protected areas. Officially, land may be in hands of the state, but former private owners keep power of use. In spite of non availability of data for the entire System, the case of the Central Volcanic Range Conservation Area is worrismatic. By 1996, only 37.42% of land had been effectively paid and kept under public sector ownership, while the remaining 62.58% is still in effective private hands (MIDEPLAN-MINAE, 1996: 23). Unfinished expropriations thwart any continuity and reliability in policy implementation. This can still be a major barrier for the success of SINAC.

Unavoidably, the SINAC will have to increase its reliance on private ownership for the expansion of influence areas. This is a shift that will be compulsory by future public expenditure constraints for expropriations. Rather than expensive land purchases, the state should design contractual relations with the private sector, within the schemes of integrated conservation-development projects (ICDPs).

As a third challenge, SINAC must include all buffering-use non protected forest lands as part of the influence areas. By 1987, they accounted for almost 47% of non protected forest nationwide, as shown in Table Nine (Solórzano, 1990: 6). This study covered tropical rain forest, tropical dry forest, moist and dry deciduous forest, as well as hill and montane forest (also known as cloud forest).

TABLE 9: Non protected forest by region, 1987 (in Km2)

REGION	Buffering Forest	Share in the region	Productive Forest	Share in the region
Chorotega	136	5.8%	273.2	10.2%
North Huetar	324	13.8%	1162.1	43.4%
Central Brunca	30	1.3%	37	1.4%
West Central Valley	241	10.2%	69.4	2.6%
Atlantic Huetar	845	36%	197.3	7.4%
Central	8	0.3%	24.6	0.9%
East Central Valley	161	6.8%	190.7	7.1%
South Brunca	606	25.8%	728	7.1%
TOTAL	2351	46.71%	2684.3	53.29%

Source: R. Solórzano, 1990

Such issue leads to the economic feasibility of new productive activities for the influence areas. These activities are expected to be the basis for the living of local populations (Wells and Brandon, 1993: 160). Examples of non timber forestry uses are agroforestry, silvo-pastoral systems, biodiversity prospecting and ecotourism. These uses must ensure the reproducibility of farming systems through adequate economic performance. Additionally, there is an ecological dimension: woody vegetation is less demanding of soil resources, exerts reduced biodiversity impacts, particularly on faunal species, and generates fewer fire-related externalities than other ground covers as pasturelands. For such reasons, it has been argued that non timber forest uses enhance sustainability in tropical areas. (Walker et al., 1996: 68)

The law proposal addresses this topic very vaguely, with attributions for SENAC on local employment generation (Article 25), the setting of agreements by which communities should cease encroachment and forest depletion (Article 27), the design of contracts for private nature reserves (Article 29), and the admission of districts, cantons and communities in incentive schemes for the influence areas (Article 47). In real life conditions, support from the public sector will be essential, especially in the early stages of the production shift.

Neighbouring localities will require substantial compensations from the loss of access to land because of SINAC implementation. There is no specific reference to new non-fiscal, cost-effective incentives to localities, by which income flows can be increased and assured.

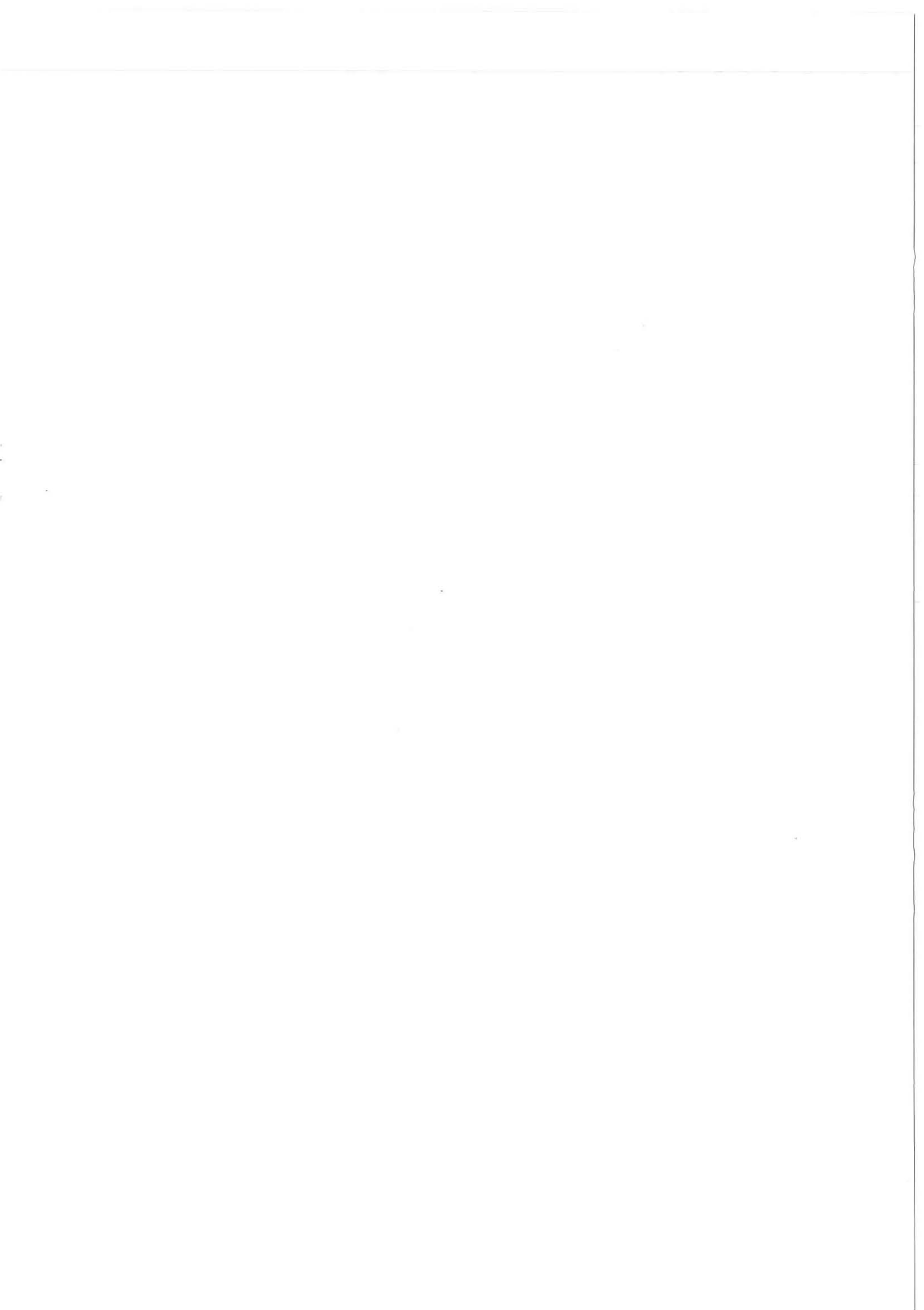
The tropical forest aptitude of the country's territory was remarked in previous chapters. A major step will have to be the effective implementation of core and influence areas in a comprehensive system, with the priority of safeguarding watersheds, high slope lands and all buffering forest lands. Then, as long as the SINAC works, the strong potential for silviculture and forest industry can be capitalized.

Costa Rica also requires a thorough revision of its incentives for reforestation, as part of the combined policies in forestry and biodiversity conservation. So far, reliance has been put on subsidies of a fiscal nature, such as the Forestry Payment Certificate (CAF), the Forestry Beforehand Payment Certificate (CAFA), the Forestry Payment Certificate for Management (CAFMA). The outcome has not been satisfactory; their main criticism on being expensive and ineffective for the public sector. Defects have been identified; especially the bias for commercial forest plantations, at the expense of natural forests and their environmental services as biodiversity.

The skew against natural forest has been so notorious that private landholders have often used General Management Plans (GMPs) for clearance and then setting of forest plantations, simply to obtain the incentives. Most of the time, the main beneficiaries have been large-scale producers, without considerations of small and medium landowners. (Forestry Sector Review, World Bank, 1993; from PNA, 1995)

A main task to be undertaken will be the arrangement of non-fiscal, cost-effective forestry incentives. Initiatives such as the Forestry Development Fund (FDF) and the Forestry Protection Certificate (CPB) attempt to fill this vacuum, both in the current Forestry Law No.7575. Incentives are needed because of the long gestation investment period in forest activities, and the trend of income accumulation at late periods, rather than because of profitability arguments. In fact, cost-benefit analysis have shown Internal Rates of Return between 12% and 45% for natural forest regeneration and reforestation projects in the country, at different stages (Solórzano, 1976, Raigosa, 1975, Sage, 1982; mentioned in Solórzano, 1990, 28).

In a tropical country as Costa Rica, forestry policy must be integral part of the protection and conservation of biodiversity. By deforestation reduction there will be less forest clearance, so a diminished burden for ecological impoverishment. This provisional assessment of the SINAC proposal, has shown that government policy design for the environment surpasses technical complexities. Effective policies to protect forests and biodiversity will require the solution of key social and political economy questions in Costa Rica. Most of them are still unanswered.



CHAPTER 5: SUMMARY AND CONCLUSIONS

5.1: Summary of the research

This study can be framed in the field of natural resource management, as it discusses the feasibility of the Integrated National System of Conservation Areas (SINAC) in the Costa Rican context.

Chapter One brings the definition of biological diversity (BD), as well as its distinction in three main levels of organization: genes, species and ecosystems. Species diversity is commonly considered the measure of biodiversity, which mainly consists of insects and microorganisms. The main concepts and constraints for economic valuation of BD are highlighted. Even though there are no exact figures on the loss of variety, number and distribution of species, the major reasons supporting preventive policies of conservation (protection plus sustainable productive use) are both uncertainty and irreversibility: on one hand, there is no information on the majority of species, and on the other hand, the extinction of species are effectively permanent. In the meantime, BD has enormous potential as natural capital for both the local (communities) and global (nations) levels. To understand biodiversity loss in Costa Rica, there is an explanation of why most of its BD is found in tropical forests, even though they are not the only ecosystem in the country. There is a strong association between deforestation and biodiversity loss. The SINAC proposal is introduced, with preliminary comments on its ex ante assessment: the guidelines will be decentralization and participation, besides social and economic forces behind the loss of forest cover.

Chapter Two is an overall explanation of the interlink of macroeconomics with deforestation and biodiversity loss since the 1950s. The Costa Rican economy is very vulnerable to the world trade and investment flows. This weakness has been the main reason behind the ambivalence in results from both development strategies of import substitution (1950-1979) and liberalization (1979-). In terms of natural resource management, the main responsables of depletion of forest cover (and the subsequent BD loss) have been the land tenure insecurity, as well as the policy bias in favour of livestock breeding and large-scale agriculture. Finally, there is mention to the unsustainable land use in the country, strongly linked to deforestation and a major threat to biodiversity, soil fertility, flood prevention and water availability.

From the features and shortcomings of the current scheme of protected land in Costa Rica, Chapter Three describes the SINAC law proposal. Attention is paid to its general purposes, the operationalization of the Conservation Areas by the merger of core and influence zones, and its expected geographical expansion. The goals concerning biodiversity conservation are defined according to the criterion of vegetation macrotypes. The chapter also elaborates on the suggested financial sources of the System, besides its political and administrative structure.

Chapter Four is the assessment *ex ante* of the proposal, in which problem areas that can thwart a successful implementation of SINAC are distinguished. Land pseudo expropriations, lack of coordination between the proposal and the newly approved environmental legislation (Organic Law of the Environment, Forestry Law), unclear participation channels for the localities, weak financial mechanisms, and few contract mechanisms to encourage public-private partnerships in biodiversity conservation are some of the major challenges to be addressed. There are major differences between policy statements and the reality concerning tropical forests and biodiversity in the country.

The concluding chapter brings together the main findings from the description and analysis of SINAC, in terms of their implications for natural resource management, forests and biodiversity. There is also a proposed agenda of public policies that may fill the vacuums on forestry and biodiversity conservation, before ending with suggestions for further research.

5.2 Conclusions

As a first general remark, it must be said that the working hypothesis for this research paper (stated in the Introduction) is likely to be correct. SINAC is too broad and undefined to tackle the causes of deforestation. It states very little in terms of biased policies against forestry (both its timber and non-timber use) and the insecurity of land tenure. The concerns about decentralization are also very fragile. Entities at the national and local levels will overlap. Additionally, there is too much vagueness concerning participation mechanisms for the neighbouring communities to the Conservation Areas.

About SINAC itself:

As stated previously, SINAC is a proposal conceived on line with the field of natural resource management for biodiversity. According to this approach, a major alternative to minimise the loss of species diversity in the planet is the consolidation of "in situ" conservation schemes. Populations surrounding the forest lands can be moved from zones of high biodiversity to "buffer areas" outside of the core zones for absolute conservation. In these defined "buffer areas", peoples are expected to extract resources and continue their living. At the same time, the System should use economic benefits present in the tropical forests to attract business and financial donours. As a requirement, forestry policies (stressing in timber forest uses) and biodiversity conservation policies (stressing in non timber forest uses) should be formulated, implemented and monitored in close coordination.

Nevertheless, the analysis carried out for this paper brings serious doubts on the degree of realism of the SINAC. The proposal studied (file 11315, approved by legislative commission on 23 April 1993) shows the following weaknesses:

- 1) The document may seem immaculate in paper, but it still lacks the character of law, which is essential for implementation and enforcement. The official support for the decree from the Executive can disappear after presidential elections are held again in 1998. Because of its uncertain status, all the work being done at this "pilot stage" can be abruptly stopped by a new administration. This is a very common trend in Costa Rican public administration.
- 2) It is unclear whether the current proposal fits or disputes the Organic Law of the Environment (approved in September 1995) and the new Forestry Law (February 1996). Unfortunately, these two laws were not available for the analysis in this paper. It is very likely that there was no consideration of SINAC when the mentioned laws were written, discussed and approved.
- 3) Even if the SINAC is approved as law, the current proposal does not refer to the need to overrule existing legislation. This is another serious flaw, because land tenure rules that have triggered loss of forest cover in the country (such as the Law of Ownership Information) are still valid, while the present scattered environmental legislation should be simplified. It can be argued that the SINAC proposal discloses apprehension for radical changes in decision making. Such fear is also common in the country at the public policy level.

4) In spite of its stress at the foreword and the contents of the law proposal, SINAC seems to bring pseudo decentralization. There are very serious doubts in relation to a smooth work between SENAC, CONAC, and the Local Councils.

No real autonomy is assured in decision making for the Local Councils in each Conservation Area, and SENAC may simply monopolize decision making and implementation in the System. Local Councils, in their early creation, have been attributed with lack of cohesion, leadership, and long term vision from their members (CEDARENA, 1995: 86). There is a strong circumspection to let local people take stances in matters of their direct concern. The law proposal has no specific measures to counteract this trend. Therefore, the consultation and participation mechanisms on localities have to be worked out. SINAC seems very behind in consensus building among stakeholders for each Conservation Area.

5) Additionally, even in the assumption that the Organic Law of the Environment and the SINAC complement each other, quarrels between entities will be very likely at two different levels. First, the National Council for Conservation Areas (CONAC) may duplicate tasks of the National Environmental Council; second, the Local Councils (LCs) from SINAC may overlap with the Regional Environmental Councils.

6) SINAC assumes that existing entities at local level are strong enough to undertake new responsibilities on forestry and biodiversity conservation. In the meantime, local governments in the country are well known by their reputation of being second-rate, without financial autonomy, and lacking skilled personnel. Therefore, the most likely outcome for SINAC will be centralization on decision making and implementation; already a prevalent management style in Costa Rica's public sector.

7) SINAC is still too broad and non specific in terms of sources of income. Funds will be essential, at least in two main directions: to carry out required expropriations for both core and influence zones in each Conservation Areas, and for the everyday functioning of the entire System. SINAC must clarify its structure of both current and investment expenditures, in line with future constraints on foreign funding from development agencies, and also national budget allocations.

8) Community participation should be together with effective decentralization in SINAC. Derived from the proposal and official documents, MINAE is being strengthened such as that there will be no acceptance of diverging views in natural resource management.

Strategies chosen and implemented by the communities themselves and the central entities will almost certainly differ. As an outcome, decentralization and participation will lack the required support. It would not be the first, neither necessarily the last time that such a problem occurs.

9) SINAC does not explain how will information gathering about forest ecosystems and biodiversity will be done on each Conservation Area. There must be guarantees that local people are recruited for these jobs, besides that information will be available and useful for the localities. It is also essential that the System takes advantage of the skills, technical insights and ideas of the local people.

10) It is unclear whether SINAC will enable consensus building among different stakeholders in each influence zone. The MINAE, as central entity for natural resource management, must be ready to accept different conservation strategies that may be chosen by localities. In other words, real decentralization should let people decide by themselves, while coordination is part of the job of SENAC and the MINAE.

11) In spite of the stress on alternative buffering activities for the influence zones (ecotourism, agroforestry, silvopastoral systems), there is no guarantee of economic feasibility. This is crucial, as all these productive activities are expected to support the living of communities in the country. Benefits must be substantial and tangible, while costs should be alleviated and deferred for local people.

As an overall consideration, the SINAC proposal seems to be very fragile in its realism degree. For its success, the Central Government should enable institution building at the local level, for both forestry and conservation area management. Additionally, it should be complemented with new measures to reinforce definition of property rights for land, and neutralize biased economic policies for forestry management and biodiversity conservation.

Finally, with the current background of the Organic Law of the Environment, a successful implementation of SINAC must solve in the short term:

- Competences and mechanisms between the MINAE and the Costa Rican Institute for Fisheries (INCOPECA) for protected sea areas.
- Responsibilities of MINAE concerning rivers in the jurisdiction of National Parks and Biological Reserves (future core zones in the Conservation Areas).

-Specification of the role of MINAE concerning natural resources inside Reserves for Indigenous Peoples, as well as institution and capacity building for these localities to get involved in their management.

-Setup of the legal and technical framework for wetlands management in the country.

On forestry management:

For decades, depletion of forest cover has been encouraged by prevailing conditions of open access. Legislation favouring land clearance for possession, besides economic inducements for livestock breeding and agriculture have set up artificial market prices for those alternatives, that surpass the "harvesting" costs of the forest.

This is the major reason for close policy coordination in the country, which should be complementary to the SINAC. In a tropical country as Costa Rica, forestry policy must be integral part for protection and conservation of biodiversity. Less deforestation will reduce biological diversity loss. First of all, there must be a clear distinction between forests for timber production (plantations, as well as primary and secondary forests) and for buffering and non timber production (these should be the core and influence areas within SINAC).

The following are new policy recommendations to be considered:

1) No more price protection nor other inducements for agriculture and livestock breeding, so that their corresponding markets can work without distortions. Therefore, alternative land uses will have lower rents.

2) Incentives for forestry management in private lands for watershed protection, so that profits are enough to recover all costs, including environmental investments.

3) Complete updating of land taxation and property evaluation, a task currently being done by Municipalities under the supervision of the Ministry of Treasury.

4) Promotion of non timber forest products and ecotourism in the designated forest lands (likely to be inside SINAC jurisdiction).

5) Road construction inside or very close to forested and protected areas must be subject to environmental impact assessments (EIAs), because of the damaging effects on forests.

6) Revision of inducements, so that they strengthen natural forest management and restoration forestry aptitude lands, rather than reforestation (usually done at the expense of existing natural forest). These inducements should be non-fiscal and cost effective (more revolving loan funds, less direct subsidies and tax exemptions), besides targetting forest owners that undertake environmental service provision (Ex: biodiversity prospecting, carbon dioxide sequestration, watershed protection, flood prevention). Some innovative inducements are mentioned in the National Plan for Environmental Action (PNAA):

"-National Fund for Forestry Financing (FONAFIFO), included in Forestry Law 7575 (5 February 1996)

-Sale of carbon dioxide sequestration rights

-Environment-friendly certifications

-Water purification canons, as reward from lowering operation costs because of sources in areas under private management

-Sale of biodiversity prospecting rights" (PNAA, 1995:33)

7) Private natural forest management should be encouraged, by new legislation. Official documents as the PNAA state that the recent Forestry Law (5 February 1996) either amends or eliminates regulations with an overall negative impact on forestry. Examples were the forestry regime without compensation, agricultural subsidies, and land entitlement schemes that propitiated agriculture and livestock breeding.

8) Less regulations on private forestry will require, simultaneously, stronger rules concerning forest cover on high slope lands and riverbeds.

On biodiversity conservation:

If biodiversity conservation really becomes an objective of forest management, forest products must be harvested in such a way that the composition of the forest as a whole is not destroyed nor radically changed. Biodiversity conservation is favoured by low intensities of logging rather than intensive practices, by adherence to felling cycles rather than premature re-entry, by planned timber felling and adherence to environmental standards than by indiscriminate logging, and by minimal silvicultural interventions rather than intensive application of chemicals. (Aeria, 1992:69)

Biodiversity conservation depends upon the preservation of specific ecosystems in relationship to various interlinked communities of plant and animal species. This seems to be a key consideration already done for the geographical expansion of SINAC jurisdiction. Nevertheless, formal designation of an area as protected is the easier step. Effective protection requires management; management, in turn, requires steady and sufficient funding. This is, ultimately the most serious constraint on protection.

Within the policy agenda for biodiversity conservation, the SINAC would have to ensure:

- 1) More enforcement capabilities from forest and park authorities.
- 2) Re-examination of existing policies for forest protection in the country

- a) Less stress on expensive buy-outs of private lands in declared reserves, while there is gradually more reliance on private ownership for expanded influence areas, by more private lands under forestry regimes. Contracts for public-private partnerships must be encouraged.

- b) More carefully designed reserves; attention should be paid to biophysical criteria, patterns of land use, and the social situation of the neighbouring localities.

The main costs of biodiversity loss may not be the loss of genetic material but the loss of ecosystem resilience and the insurance it provides against the uncertain future environmental effects. As this is as much a local and global problem, biodiversity conservation offers both local and global benefits. Since the causes of biodiversity loss lie in the incentives to local users, reform must begin there, for the problem to be tackled with success.

In the international perspective, the Costa Rican government must obtain additional funding for biodiversity conservation measures through the recent Convention on Biological Diversity (CBD), approved after the Rio Summit of 1992. An additional channel for funding should be the Global Environment Facility (GEF), which started in 1991 under the joint administration of the World Bank, UNDP and UNEP. The GEF has provisionally allocated up to US\$500 million in biodiversity conservation during its first three-year pilot phase (Wells, 1992: 243). Costa Rica has already been one of the recipient of assistance.

Developing countries attempt to incorporate the issues of biodiversity into their national, regional and local planning, while developed countries should provide most of the financial resources needed for compensation on the costs of conservation.

5.3 Suggestions for further research

Topics for further research can be the following:

a) An analysis of the institutional setting within the MINAE, concerning both forestry and biodiversity. Such a study should deepen in the extent of centralization, duplication and current inefficiencies; both from the scope of legislation and entities.

b) A state-of-the-art study about scrutiny and technical monitoring of existing systems of forest management, to improve their performance levels.

c) Multi-disciplinary investigations in traditional forms of forest management and biodiversity uses by rural populations in Costa Rica. These management styles are inherently more sustainable than current commercial practices.

d) Continuous research in regional space and natural resource endowment in Costa Rica is also necessary to assess vegetation macrotypes and the extent they will be under protection, assuming the implementation of SINAC.

e) Investigation on the applicability of environmental accounting and valuation methods, as well as environmental cost-benefit analyses (CBA) for quantification in monetary terms of the full value of Costa Rican forests and biological diversity.

As a final remark, this research has discussed the feasibility of the SINAC proposal for future implementation in Costa Rica. The research has brought to light, time and again, the chasm that so often exists between the formulation of policies and their implementation and enforcement. The achievement of sound forestry management and biodiversity conservation policies in Costa Rica is not only a technical question. It will involve cooperation between public and private sectors of the economy, shared responsibilities with international actors, and active participation on the part of the population at large. An informed citizenry and administrative processes open to public review will have a critical importance for its success.

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