Costa Rica

Tropical forests: A Motor for Green Growth

Río +20 The future we want
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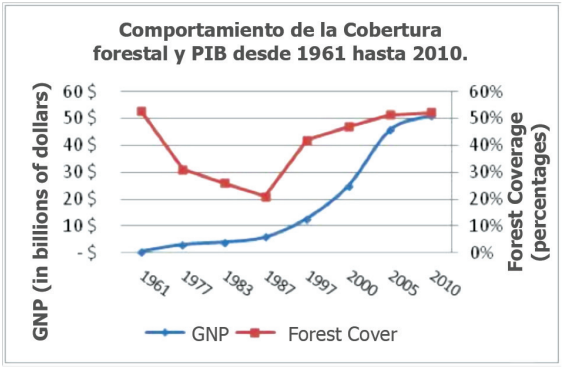
GDP BEHAVIOR AND THE INCREASE IN FOREST COVERAGE

For many years, discussions have waged over the effects of natural resource protection on GDP growth. Traditional developers have insisted that the only way to obtained growth in the GDP is through the unlimited use of forests and natural resources. Countries following this pattern improve their GDP, however they do it at the cost of their forest coverage resulting in a reduction of protected areas.

Other countries, such as Costa Rica, have a different approach maintaining that GDP growth is not necessarily linked to the decrease or depredation of natural resources and protected areas.

Within the countries themselves, exponents of these opposed policies have continued to argue: local developers- with a traditional point of view- insist that GDP-growth forcibly depletes natural resources while proponents of sustainable development maintain that GDP growth should improve social conditions and natural resource should be the basis of development through it's rational and intelligent use.

The following graphic shows how Costa Rica attained GDP growth and simultaneously increased the forest coverage extension. Since 1997, new forestry conservation laws subsidizing payment for environmental services have substantially enhanced forest coverage while revitalizing GDP growth.



Source: Index Mundi, Nation Master; G. Aguilar FONAFIFO, MINAET. 2011

GDP growth has been strong due to: dynamism in the tourism and service industry and export of hi-tech and value added products. Focusing on sustainable environmental practices and the increase in the forest coverage and protected areas had shown a positive effect in these industries.

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INTRODUCTION

A series of reports on Costa Rica's tropical rainforest, published in the early 1980's predicted the total loss of all unprotected woodlands before the end of the century, and that, in consequence, local wood product availability would depend largely upon import. Many of us may recall the set of maps showing the national forest coverage. (Figure Nº 1), dramatically revealing our cumulative losses in forest area during the period 1940-87.

Alarmed at the possibility of these predictions coming true, private enterprise, the NGO community and the government decided jointly upon a series of political measures to revert this tendency, entrusting primary responsibility for their implementation to the Ministry of Agriculture and Cattle Raising (MAG), and from 1986 onward, to the Ministry of Natural Resources, Energy and Mining (MIRENEM).

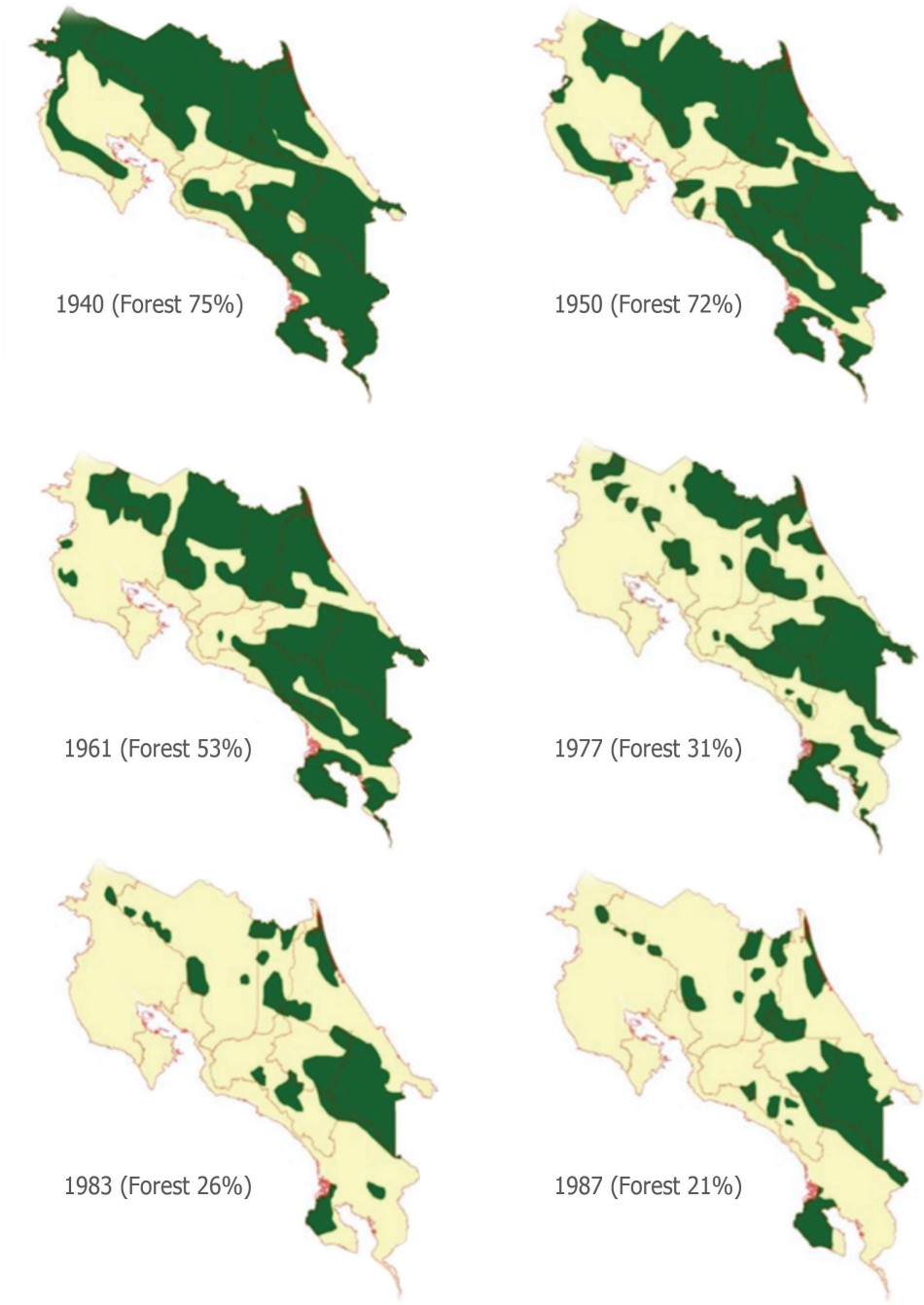
In 1997 when MIRENEM's change it's name to Ministry of Environment and Energy (MINAE) an evaluation of the situation was made. A decade of effort and learning showed the world that Costa Rica had avoided the catastrophe, reflecting continuous decrease in deforestation rates, a promising natural regeneration process, and systematic reforestation efforts supported by the government.

In March of 1998 Costa Rica published the "First National Forestry Statement" reported by the Tropical Sciences Center, in collaboration with specialists from the University of Costa Rica's Research Center for Sustainable Development, and the NGO "International Conservation". The report compared satellite images from 1986 to those of '97, verifying the country's progress from net deforestation to forest conservation, including reversion to woodland area of many virgin forest areas used for agriculture and/or cattle activities.

A new analysis in 2005 showed cumulative forest coverage advanced to 51.4% nationwide. Recently, Spot images taken in 2010 showed that forest coverage was of 52.4% (Figure Nº2).

The passage of time has allowed us to take risks, from which we have learned and strengthen. We have progressed from a nation gazing at its mountains, to become aware and focus on the protection of our vast sea dominions. We have broadened our conservation culture to one of sustainable production, endeavoring the development of management systems and enterprises that comply with the highest environmental standards and are committed to execute strong corporate social responsibility programs, while aspiring to a climatically intelligent production.

Figure 1. Evolution in the dense forest cover of Costa Rica .
Period of 1940-1987



Source: MINAET, The National Foundation for Forestry Financing (FONAFIFO) www.FONAFIFO.go.cr, may 2012

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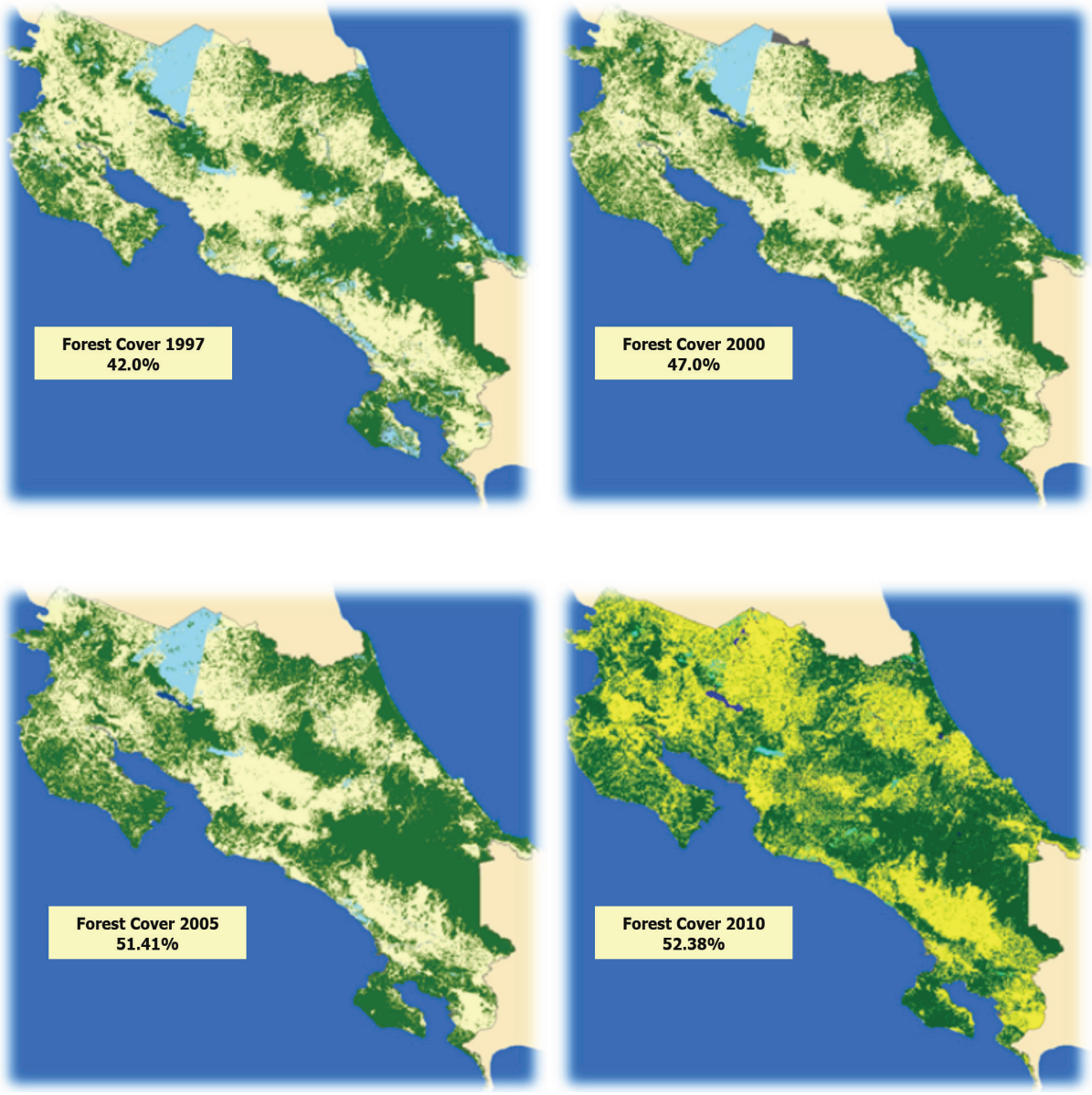
Figure 2. Evolution in the dense forest cover of Costa Rica .
Period of 1997 a 2010.



Source: MINAET, The National Foundation for Forestry Financing (FONAFIFO) www.FONAFIFO.go.cr, may 2012

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Aspiration towards a new model of development has obliged institutions to make internal changes and modify their operational practices. Since 2008, MINAET's included in his structure new divisions such as: Environmental Management, Coastal Waters, and Climatic Change. All these goals have been integrated into a series of overlapping agendas for short and long-term interests known as: The green agenda, the blue agenda, and the gray agenda.

Efforts done in terms of recovery, management and sustainable production allows Costa Rica to remain as one of the richest countries in biodiversity per unit of area. Within the applied development scheme, state owned protected areas have become one of the country's greatest efforts in conservation over the past four decades.

Costa Rica is one of the fourteen countries in the world having over 20% of its territory under protection: 26.2% of land area and 0.19% of its coastal waters. Investment for maintenance and improvement of protected areas is of enormous proportions and the challenges are significant, especially in the protection of the coastal waters.

We have tirelessly re-committed ourselves to promote and maintain a legal framework of inter-sectorial policies fostering conservation and sustainable use of our biodiversity, developing innovative mechanisms towards these ends. Some of these are the Payment of Environmental Services Program (PES), the Tourist Sustainability Certificates (CST), the Ecology Blue Banner Program, the corporate Environmental Recognition System, the norm created by the government for the implementation of systems that demonstrates the country C-Neutrality and a platform that supports it, as well as the various means and instruments promoting civic participation and education to empower these diverse groups and make them socially proactive.

René Castro Salazar

Minister of the Environment, Energy,
and Telecommunications

THE FORECAST OF FOREST DEVASTATION WAS NEVER MATERIALIZED

A diverse number of surveys described progressive deforestation from 1960 to the present. They are two relevant periods, the first period was from1960 to 1985 when the strategy for economic development promoted agricultural and cattle-farming activities, resulting in a decreased in forest coverage from 53% to 21% of the total national territory.

During the second period, from 1985 onward, the country stopped deforestation and by 2005 the forest coverage was of 51.4%. Recovery continued and in 2010 the coverage was of 52.4% (Figure 1), including 900,000 hectares of secondary forest with various stages of growth.

As noted in the MINAE-FONAFIFO maps in the periods of 1997-2000 and 2000-2005 gross deforestation was of 9,100 hectares and 23,700 hectares respectively. However during that same period other zones such as Guanacaste experienced natural regeneration compensating and exceeding the overall forest coverage loss. The deforestation had two main causes: Illegal logging due to lack of enforcement of the current forestry laws and changes in the use of land from secondary forests or plantations to food crop farming (pineapple, sugar cane, yucca, among others).

Simultaneously national parks received political support throughout the several administrations during the '70's, reason why they continue to grow in the following decades (Figure 3), garnering prizes and world acclaim. Our forests are currently a beauty to behold, a heaven for our rich biodiversity and a source of economic benefits. By 2011, over 1½ million visitors arrived to our national parks, 54% are foreign tourists, constituting an important source of revenue for the country and the System of National Parks.

The strategy followed in national parks and other protected areas in the period of 1969-2000 focused on: direct purchases, armed park rangers protecting against trespassers, forest fires and poachers. Without the actions and support of these pioneers, neither our present awareness of the environment nor the current network of country Reserves and National Parks would have come about. However this strategy was not sustainable over a long period of time from a social and economic perspective.

Since then, various national efforts allowed the country to control deforestation and replace coverage, following an opposite trend to other countries in the region. The National System of Natural Areas of Conservation (SINAC) was conceived in 1998, and three stages were defined in this process:

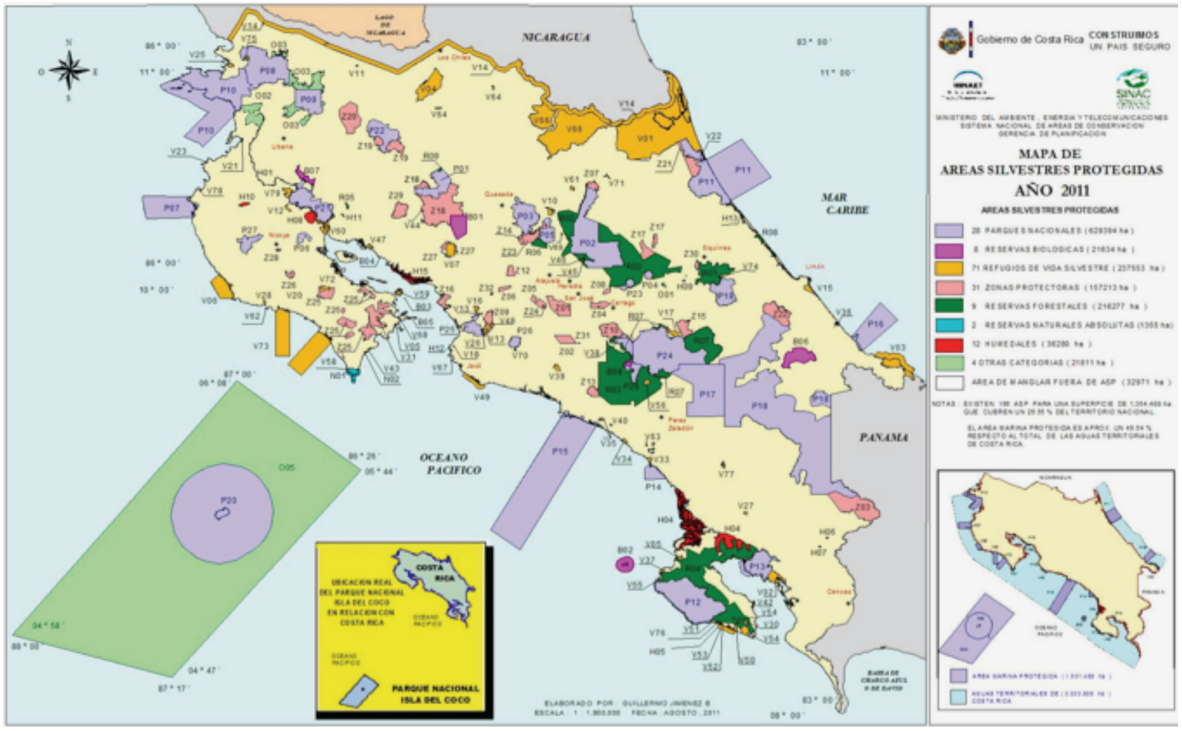
The first stage: How to address the issue of managing over a hundred protected areas dispersed over the entire national territory and managed from a centralized general directorship. Each of these areas reported directly to the head office of the national parks, and relations with their neighboring communities were tense.

The second stage: The regional management scheme was maintained, while the relationship with the neighboring communities improved. The theory that the parks could not survive if when isolated was analyzed and as result it was agreed to work closely with neighboring communities. During this stage the concept of national park or biological reserve was enriched, increasing the area of influence known as the "buffer zone".

The third stage: This stage main objective was to modify the concept of the System of Natural Areas of Conservation (SINAC) from an institution that follows a conservation strategy and which main role is administrative, to an institution with a systematic approach in which it is understood that the environment has to be grasped with an integral approach, incorporating neighboring communities in the projects, management, and conservation initiatives, which is vital to assure sustainability over the long term.

Since the 70's, Costa Rica had protected its resources through an ambitious program know as The Protected Areas System. As a guarantee to future generations the chosen territory has been designated for perpetual conservation. This decision represented a high investment in economic and human resources, as well as a strong rejection against a non-sustainable use of the resources.

Figure 3. Map of protected woodland areas of Costa Rica Figure 5. Year 2011.



Source: SINAC- MINAET- Planning Management, Guillermo Jiménez B. August 2011.

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In summary, the first response to the threat of forest devastation was to place endangered wild areas under the protection of the State. In 2011 these areas represented 27% of the national territory, divided in 166 operating units (Table 1).

Table 1. Number of protected areas (ASP) by management category

Quantity ASP	Management Category	Continental Protected Area in Thousands of acres	Percentage of National Territory (51,100 Km²)	Coastal Waters Protected Thousands of acres	Total Area Protected Both Land and Sea in Thousands of acres
28	National Parks	629.3	12	477.1	**1106**
8	Biological Reserves	21.6	0.4	5.2	**26.8**
31	Protecting Zones	157.2	3.1	0	**157**
9	Forest Reserves	216.2	4.2	0	**216**
71	National Wildlife Refuges	237.5	4.6	54.6	**292**
2	Absolute National Reserves	1.3	0.03	1.6	**2.9**
12	Humid Areas	36.2	0.7	1.3	**37.6**
1	Mangrove (outside protected area)	32.9	0.6	0	**33**
4	Other categories	21.8	0.4	961	**983**
166	**TOTALS**	**1 354**	**27**	**1 500**	**2855**

Source: SINAC- MINAET- Planning Management, Guillermo Jiménez B. August 2011 Geographic Information System.

The second response was the creation of technical, institutional and financial structures to develop a system of incentives and payment for environmental services managed by FONAFIFO since 1997. Up to the year 2011 the Payment for environmental service program has grant over ten thousand contracts covering over 865,684 hectares (Table Nº 2) and four million trees planted through the SAF (Sistema Agro Forestal as its name in spanish) program.

Table 2. Areas in Hectares and trees subjected to FONAFIFO's Payment for Environmental Services (PES) within the period 1997-2011

Year	Forest Protection (hectares)	Forest management (hectares)	Reforestation: (hectares)	Established Plantations (Hectares)	Natural regeneration (Hectares)	Total (hectares)	Agroforestry systems (SAF trees)
1997	88,830	9,325	4,629	-	-	102,784	-
1998	47,804	7,620	4,173	319	-	59,916	-
1999	55,776	5,125	3,156	724	-	64,781	-
2000	26,583	-	2,457	-	-	29,040	-
2001	20,629	3,997	3,281	-	-	27,907	-
2002	21,819	1,999	1,086	-	-	24,904	-
2003	65,405	-	3,155	205	-	68,765	97,381
2004	71,081	-	1,557	-	-	72,638	412,558
2005	53,493	-	3,602	-	-	57,095	513,684
2006*	19,972	-	4,586	-	279	24,838	380,398
2007*	60,567	-	5,070	-	755	65,638	541,531
2008	66,474	-	4,083	-	1,660	72,217	656,295
2009	52,017	-	4,017	-	1,500	57,535	370,187
2010	59,644	309	4,185	-	1,274	65,414	536,839
2011**	65,527	478	3,895	-	2,309	72,211	594,883
Total	**775,623**	**28,854**	**52,935.40**	**1,248**	**7,779**	**865,684**	**4,103,756**

Source: MINAET, The National Foundation for Forestry Financing (FONAFIFO) www.FONAFIFO.go.cr, may 2012

Additionally multiple initiatives –presented below- were promoted within the private sector and NGO's

1. The development of a sustainable tourism program
2. The development of a program for the biological monitoring (PROMEC-CR)
3. The establishment of robust biological corridors and the set of ambitious conservation goals
4. The creation of private reserves and the launch of diverse civic participation programs
5. The creation of an agro-environmental and health agenda

6. The implementation of a National Conservation Strategy and Sustainable Use Of Biodiversity, the ENB and its action plan (a planning system within the framework of the Biological Diversity Covenant CDB).

An indicator that demonstrates the success of the measures taken is the increased on public awareness towards the tree species available: The total number of species described is close to 95 thousand, less than 4 ¾% of the world biodiversity (nearly two million species). Furthermore, an estimated of 6,778 marine species have been identified (3½% of global marine species) 96 of which are endemic to the Isla Del Coco and its national marine park. The Pacific Coast contains the greater quantity (4,754 species), while the Caribbean hosts about 2,321 species (Ref. Whertman & Cortés, 2008, cited in SINAC 2009). In Costa Rica, every two days a new specie is discovered, since November of 2009 we have the Costa Rican Information System on Biodiversity (CRBio) (SINAC, 2009).

There is vast diversity of marine ecosystems in Costa Rican waters: coral reefs, mangroves, mud bottoms, rocky zones, escarpments, undersea pastures, tropical fjord, springs, a thermal dome, an ocean deep of over 2½ miles, an oceanic ridge such as Cocos, coastal islands, an ocean island and hydrothermal vents (SINAC-MINAET, 2008).

PERSISTENT EFFORTS BRINGS SUCCESS

Costa Rican efforts had been through ups and downs, however the country has been persistent in focusing on continued improvement, concentrating on a constant research and evaluation, facilitating decision-making and reorientation. With a clear strategy the country has kept a firm position towards pursuing its objectives, surpassing weaknesses and menaces, leveraging upon their multiple internal fortitudes and geopolitical opportunities.

According to studies by the World Wildlife Fund (WWF), the FAO and other organizations, nearly 50,000 hectares were deforested annually during the 70's.

Private woodlands in Costa Rica were subjected to a process of intervention during the 70's and 80's, and the forest sector went through a reform during the 90's. Market-oriented deforestation control measures were selected over methods presented by reformists calling for more a stronger role of the government in the sector.

Forest conservation funding began with a tax credit called "First Generation Financing". Subsequently, during the 1988 and 1992 period, "The Forestry Aid Certificates" were created to fund plantations. In 1992 this mode was extended to forest management (CAFMA), then in 1995 to forest protection (CPB). This became known as the "Second Generation Financing".

From 1994 to 1998, efforts were made by private entities and several NGO's to correct those distortions still in effect, obtaining approval for a revised and modern forestry law wherein subsidies and incentives were superseded by payment for "environmental services", defining forest plantations as crops, allowing free commercialization, and focusing governmental efforts to protect natural woodlands, providing incentives and sanctions.

The Forestry Law Nº 7575 that stipulates the right of participation of third parties in the forestry legislation and management of subsidies for coverage and protection was included as a result of the events mentioned above.

From 1997 on, "Forestry Aid Certificates" were replaced by the Payment for Environmental Services, considered "Third Generation Financing", where in funding was derived from tax on gas and other fuels, from internal payment for Environmental Services, and from international (bound) carbon sales. This legislation included the procedure for future purchase of standing timber, as applied by the Central Volcanic Range Development Fund (FUNDECOR), to finance small woodland owner associates.

Management plan requisites were simplified; from the general to the operative, while seasonal restrictions were eliminated from the usage plan.

The National Forestry Office (ONF) came into being, formed by representatives of the woodland owners, wood processors, merchandisers and environmental organizations. The ONF is a political advisor to the MINAET. On the other hand, this law permitted timber felling, transport, industry use and export from the forest plantations.

When the Payment for Environmental Services (PES) was inaugurated (1997-2003), a pattern of illicit deforestation was encountered, related to timber for lumber[1]. This arose from excessive regulation of the natural forests, implementing an unwritten policy by MINAE prohibiting natural forest management and eliminating the PES in woodlands under such management.

These measures were based upon conservationist opinions, whose sympathizers customarily blamed the government for deforestation and woodland degradation. Until the mid-90's, natural forests had been the primary source of supply for industry. However, this restrictive policy on natural forest management caused undesired effects such as tree felling on farmlands, degraded woodlands and deforestation.

From 2002, MINAE enforced its controls on illegal felling, more strictly regulating felling permits on farmlands, and in consequence, the forest plantations became the principal source of wood for local use.

Two important elements enter into consideration when estimating volume of illegal felling. One of these is related to the cumulative value of the illegally extracted wood; over a third (34%) of all wood used in the country was of illegal origin. The creation of an institutional monitoring system to quantify these illegal volumes was therefore justified. The second element was the basis for the design of the monitoring system based upon past experiences (Campos, J., 2007).

Due to these conditions, wood sources were radically affected:

Two-thirds of the local wood was now supplied from forest plantations and the remainder from woodlands and farmlands. To correct this situation, the National Forestry Administration took legal and political steps promoting sustainable production of legally-produced wood, to avoid the consequences of massive illegal tree felling:

1. Implement inventory control on agricultural terrain, verifying that land use has remained unchanged, using GPS (Decree Nº 31332-MINAE-MP).

2. De-regulation of virgin forest management, simplifying principles, criteria and sustainability indicators. (See the new manual on procedures and a practical code oriented to fostering natural forest management. Decree Nº 34559-MINAE).

3. Foster natural forest management through training and development, modify forestry institutional arrangements, especially involving small landowners in sustainable woodland management. Aim to assure sustainability in forest product availability and its provision, that the forest may serve the society. This is part of a strategic plan developed by AFE with support and cooperation of the FAO (2008).

4. Salary raise for environmental services in establishing forest plantations (from $819 to $980) and PES quota increase for reforestation (Decree Nº 35133-MP).

5. PES-reactivation for natural forest management.

By 2005, nearly 525 thousand acres have been recruited by the PES. Citing Tattenbach et al. 2007, 64% of the total PES

[1] *See article by the National Comptroller (Contraloría General de la República, 2008)*

was to be found in high-profit forest areas, and 65% of the PES paid for high-value biological diversity conservation in 2005.

The PES attained 30% coverage in high-rate value forests, 24% in mid-rate, and 13% in low. In other words, highest adhesion was obtained where, in theory, resistance is greatest. PES services are ideally concentrated in forests of high rate of value (greater deforestation risk) and high value of biological diversity conservation.

PES's 1999-2005 program is estimated to have averted the deforestation of 417 square miles, of which nearly 280 square miles (67%) are of high-value biodiversity conservation, and 142 square miles (34%) of high value for water. A scenario comparison with and without the PES program shows increased forest protection of about 10% for carbon, 11% for biodiversity, 12% for hydroelectric water use, and 13% for potable water.

By 2012, concerted efforts had accumulated a CAF/PES budget assignment of $254 million, and FONAFIFO surveys indicate a 52.38% forest coverage, demonstrating the effectiveness of the diverse mechanisms and policies adopted throughout past decades. This incremental forest coverage recuperation has been systematically documented since 1997.

Over a five-year period 2005-2010, continuous increases in reforestation were registered, although the growth was modest (0.9%) compared with earlier achievements, but even though this value may seem small, the main effort is directed to maintaining 50% of the country covered. Costa Rica has chosen to be an example, showing the world that environmental equity is possible. Next (table 3) is a detail of the increase of forest coverage in the last 15 years:

Table 3. Forest Cover Survey for Costa Rica, 1997-2010

Survey	Authors	Year	Percent Coverage	Area (millions hectares)
Forest Cover Survey Costa Rica	National Forestry Fund, Tropical Sciences Center, CIEDES University of Costa Rica, International Conservation	1997	42%	2.07
Forest Cover Survey Costa Rica	National Forestry Fund, Tropical Sciences Center, Terrestrial Observation Systems Laboratory (EOSL), Department of the Atmosphere of the University of Alberta, Canada	2000	47%	2.32
Forest Cover Survey Costa Rica	National Forestry Fund, Tropical Sciences Center, Terrestrial Observation Systems Laboratory (EOSL), Department of the Atmosphere of the University of Alberta	2005	51.4%	2.62
Forest Cover Survey Costa Rica	National Forestry Fund, Tropical Sciences Center, Terrestrial Observation Systems Laboratory (EOSL), Department of the Atmosphere of the University of Alberta	2010	52.3%	2.67

Source: FONAFIFO, May 2012.

The foregoing achievements in forest conservation and the country's goal for Carbon Neutrality have led Costa Rica to a structural and process reorganization towards creating a platform for a growing economy with a green future. An integrated perception that transcends land and sea, embracing all sectors and activities, joined by common challenges –climatic change and a growing demand for eco-competitive products– awakens a dynamic attitude that will continue to carry our nation forward.

TOWARDS A NEW MODEL FOR DEVELOPMENT

At present, the country has an institutional and judicial platform, on national, regional, and international levels, developed over the past twenty years. An entire network of international organizations, conventions and protocols strive towards galvanizing an apathetic world to act in concert to adapt and mitigate the climatic change. Quoted from Ugalde et al. Climatic change tops the list of national political priorities (See National Development Plan, Council of State of August 1st 2007, National Strategy for Climate Change). The major challenge is to assure economic stability over the entire system for the long run. We shall discuss some of the ideas in this section.

Payment for Environmental Services, in Costa Rica, is provided as retribution to landowners and owners of wooded terrain, who desire to establish forest plantations, recuperate the forest cover by natural regeneration and, focus on environmental services to society. The following are acknowledged in forestry law 7575:

1. Mitigation of greenhouse gas emissions (reduction, absorption, bonding and storage of carbon dioxide). It is recognized that forests and woodlands effectively mitigate the effects of greenhouses gases that cause climatic change, providing the country an option for the recognition these services, through the Clean Development Mechanism of the Kioto Protocol and the voluntary market for trapping greenhouse gasses.
2. Water protection for urban, rural, or hydroelectric use This service is of supreme importance for Costa Rica given the various uses given to water: Energy generation (In 2011 hydroelectric energy accounted for 80% of the sources of electric power in the country), irrigation of seasonally dry zones, and domestic consumption.
3. Biodiversity protection rests upon water supply and sustainable use, scientific, pharmaceutical, genetic research and improvement, ecosystem protection, life forms. We must produce conservatively and conserve productively. Thus we come to recognize how private woodlands protect a biodiversity, which may be a source of inspiration or of pharmaceuticals, genes and research, another option for income for its owners.
4. Natural scenic beauty for tourism and research recognition of the importance of this sector for tourism becomes relevant upon reflecting that some 75% of these visitors seek the attractions of natural woodlands, both public and private, and that tourist activity has brought increasing income.

As mentioned, the basis of Payment for Environmental Services is recognition of the benefits produced by the efforts of the forest and plantation owners.

The foregoing is possible since the country has: a) Financing, b) a regulatory framework, civic governance,

social sector participation and effective monitoring, all crucial elements for a successful program.

The PES anti-deforestation program is integral to the National Strategy on Climatic Change:

1. Adaptation: GFA-FUNDECOR, consultants, in 2010 identified the PES as a means of adaptation for biodiversity conservation and provides ecological goods and services with regard to the climatic change. According to the National Weather Bureau[2] (IMN) in 2000, climatic change will seriously affect both extremes of humid and dry tropical ecosystems.

2. The PES's relevance is particularly appreciable as a vehicle for adaptation of the network of biological corridors, the connectivity between protected areas permitting species and ecosystem mobility during climatic changes entailing abrupt temperature and pluvial fluctuations.

3. The country's "Carbon-Neutral" goal closely relates to national development plans and policies, wherein forest sector participation is fundamental to attain "Carbon-Neutral Country" status in 2021. At the Conference of the Parties[3], COP XVII, held in Durban, South Africa in November of 2011, it was agreed that all participating countries submit their reduction goals and policies by 2015, to begin implementation by 2020.

It is quite evident that Forestry Protection Law Nº 7575 has proven an effective instrument in provoking public awareness of the threats to our environment as well as an awareness of our challenges in a global market.

But it also represents a step towards a new strategy.

Since 1994, it was generally sensed that Costa Rica should take the lead in the Environmental Services Market, as perceived within the framework of the Climatic Change Convention. There was a definite consensus that the woodlands had been decimated in the belief that tree cultivation was less competitive than conventional crops, such as pineapple, melon and others destined for export. As an introductory strategy for evaluating our forest resources, a pilot project for services of binding the equivalent of 200 thousand tons of CO_2 was sold to public and private sectors of Norway at $10/ton for a gross total of $2 million, thus opening a new market within the framework of the Climatic Change Convention.

Currently, market demand for carbon has diminished (it had dropped to $9/ton in May), and only the European Union evinced a continued interest in the Kioto Protocol mechanisms, so it is unlikely that this market could recover. Notwithstanding, an increasing number of tropical countries around the globe now apply the ideas proven in Costa Rica, in a new program: REDD+.

Strategy Globalization: The REDD+ Proposal

The REDD+ Partnership Plan for reduction of emissions caused by deforestation and the conservation, sustainable management and forest-derived carbon stock arises as an opportunity for developing countries

[2] Costa Rica's weather bureau is denominated the Instituto Meteorológico Nacional.
[3] UN Convention on Climate Change (UNFCCC),COP 17/CMP 7,Durban,South Africa, Nov/Dec 2011

to offset the volume of emissions from industrialized countries.

REDD+ is a voluntary mechanism to which Costa Rica has subscribed in view of over fifteen years of successful incentive implementation to avoid deforestation and increase its carbon reserves; however, fair compensation for these services has not been received.

The country's expectations regarding REDD+ are many, and not necessarily all of these are related to carrying out the policies defined by REDD+ strategy. REDD+ recognizes forest value beyond lumber and carbon, appreciating additional benefits such as biodiversity, water protection and social benefits.

Through the development of REDD+ strategy, Costa Rica could show commitment to REDD+ partnership, highlighting transparency in preparation activities and demonstrating verifiable mitigation of social and environmental risks, thus inspiring greater confidence on the part of national and international agents.

REDD+ Strategy introduces a new concept integrating carbon binding, high footprint product displacement, increased wood consumption, sustainable forest management and improved provision of raw forest products for industry. REED+ strategy is very relevant for the national challenges towards the development of an economy low in carbon in the short, medium, and long term.

Institutional Evolution

One of the most important lessons in the country is the considerable investment in a network of specialized institutions, both public and NGO, such as FONAFIFO, SINAC, the National Forestry Office, FUNDECOR, CODEFORSA, foundations and other NGO's responsibles for the implementation and/or support of the Payment for Environmental Services Program. To continue their effectiveness, these institutions must be kept up to date and carry out important investments in training and technical support.

The development of these institutions has allowed them to lower transaction costs, thus benefitting woodland and forest plantation owners while assuring governance mechanisms and safeguarding international Purchasing Power Parity (PPP).

By law, the PES Program is intended to benefit small and medium woodland and forest owners, and this has enabled over ten thousand beneficiaries of the program. Indigenous communities also participate in the PES through Integral Development Associations (ADI's), which legally protect the interests of these communities.

To dispose of a variety of financial interests such as forestry credit for diverse activities and the PES has been possible thanks to the institutional structure, whose principal objective is Payment for Environmental Services, and to add value to forest and plantation products.

Executive Decree Nº 30762 MINAE designates FONAFIFO to manage the PES Program. SINAC bore responsibility of management for the program until 2003, selecting beneficiaries and verifying their fulfillment of contracts, as well as carrying out the legal aspects, until FONAFIFO assumed those functions. SINAC currently concentrates on control and follow-up, for which FONAFIFO has assigned 1.33% of the annual budget dedicated to the PES Program.

PES's policies are established in the National Development Plan and the National Forestry Development Plan.

FONAFIFO's board of directors also revises and proposes pertinent changes, annually validating a manual on procedures wherein norms and requisites for project presentation are established, as well as terms for their resolution and other related matters.

This same manual establishes responsibilities for administrators of all levels involved in the process of approval and payment of projects.

International Credibility

The country has surely made a continued effort at high cost for its economic capacity.

A country decided to protect its land and take the first steps to protect its coastal waters, assigning over $254-million for payment of environmental services, shows the priority it has assigned the forestry sector as a provider of goods and services. Fortunately, world recognition has opened friendly doors with governments and financial institutions such as the World Bank, the German KfW Cooperative, the Global Environment Fund (GEF), Conservation International (CI), and others.

Having a National System of Protected Areas rates the country at the summit. Additionally, a nationwide network of private reserves has been established for conservation and ecological tourist hospitality and support organizations have further strengthened the national protected area system.

Regulatory framework

Throughout the nineties, Costa Rica experienced an environmental change, with legislation favoring conservation and protection of natural resources, supporting institutions and a significant change in popular concept of their management, conservation and sustainable development.

World initiatives in this decade such as the Rio Summit Declaration on Environment and Development, Agenda 21, the international conventions on climate change and the United Nations Decade for Deserts and Fight Against Desertification (UNDDD), the Kyoto Protocol, Forestry Principles and most recently the Millennium Goals and Johannesburg Summit, have indicated the path, but our primary goal is to become a Carbon-Neutral Country by 2021, thus fulfilling the obligations subscribed in the Climatic Change Convention, holding a promise of longevity for Costa Rican woodlands. This is our pending task.

The Environmental Services Division of FONAFIFO is in charge of the successful function of the PES Program, coordinating all of the activities related to decrees, PES procedures manuals, technical and statistic procedures, payment disbursals to beneficiaries of PES contracts and monitoring the PES Program.

Sustainable Financing: The Challenge of the Future

In Costa Rica, a financial plan was designed to allow fund transfer from recipients to providers of services (woodland and forest plantation owners).

Thus, payments for environmental services are made possible by the recipients of those services, some of whom are:

- Hydrocarbon consumers who pay sales taxes on their consumption, these funds are necessary to mitigate locally-produced greenhouse gas emissions, and for which they are quite willing to continue paying this tax to assure the protection and recuperation of the forest coverage. This is also the principal source of funds of the PES Program.

- Generators of hydroelectric energy, for whom protection of their watersheds is vital, since standing forests lowers the levels of suspended sediments, protecting against machinery damage and regulating flow volumes. Producers of melon, sugar cane and other crops also recognize these benefits, as do owners of tourist hotels for whom landscape beauty is an attraction to be protected.

- Large-scale water users: The water tax has recently been implemented, principally for agriculture and industrial activities. During 2011 revenues were of approximately $4 million, being equitably distributed for forest maintenance of public and private woodlands. Domestic consumers in some regions of the Heredia Province pay a surtax of 2% on their monthly water bill, which goes to protect some environmentally abused zones through forest protection and reforestation.

Recently some new market values have been recognized for valuing environmental services, the option value is probably one of the closest ones to real value market.

To estimate payment amounts for environmental services, external costs must be quantified and this is known as environmental economic evaluation. Economic evaluation entails comparison of preferences based upon purchasing capacity of the buyer. Continuing that definition, one of the first evaluations —value of option— was made through field research in the Sarapiquí zone, and defined which agricultural activity the inhabitants were wiling to exchange for forest. It was found that owners of terrains rented for cattle pastureland were most readily amenable to convert to forest; an average of one head of cattle for every five acres was estimated. An estimated 20% (almost 3 million acres) of land used extensively for cattle —of low cost— part of which could more profitably be substituted by forest activities, including lumber for both domestic and export consumption. (Page 85, Castro 1999). On June 1st of 2012, the governments of Costa Rican and Korea sponsored an agreement to explore productive forest use in both countries to include both commercial lumber and energy production.

In the process of assuring Costa Rica's financial resources, various international participants such as the World Bank, which latter entity financed the Ecommerce I & II, for $50- and $90-million respectively, as well as the North Huetar Forestry Project, financed by Germany's KfW Financial Corporation to an amount of €10.2 million.

Several international NGO's have also provided financing for lesser amounts (Pax Natura, ECODES, Gev Modena), attracted by environmental services acquired by FONAFIFO from woodland and plantation owners who subscribe contracts, donating their PES revenues to the fund.

Local financing has incremented international revenues, similarly purchasing FONAFIFO's environmental services to assure continued quantity and quality of forest-produced benefits.

PES payments in Costa Rica are scaled, being higher in areas with important hydrological resources as well as those in high priority for their biodiversity.

The origin of resources allows Costa Rica's PES to easily combine the funds to develop higher payments in those areas that may increase the synergies of multiple services.

Monitoring, verification and reporting

The program has been evaluated primarily by international funding agencies such as the World Bank, GEF, Germany's KfW, Modena Italia's Life Gate, the Bio Carbon Fund, etc., although local evaluations such as project monitoring, fund application and administration are also practiced.

FONAFIFO contracts local consultants who base their evaluation on samples of the general performance of the program.

However, FONAFIFO supervises the program directly, with the assistance of specialized agents reviewing performance of PES-related regional entities.

But the REDD+ commitments: monitoring, verification, and reporting land use change, have been resisted by countries having extensive areas for protection, regeneration or reforestation.

Models from Costa Rica and Mexico suggest that correct procedures for monitoring, verification and report are indispensable for transparency, international credibility and environmental integrity of forestry projects around the world. Estimates from different sources cite an annual cost of $5-6 billion to replicate Costa Rica's PES system over the tropical belt and realize an increase in forest coverage in those countries. This possibility is one of the developed world's incentives to promote REDD+ and probably the net result would be salvation of tropical forests from virtual extinction.

Strengthening Governance: Distributive Justice

As seen in Table Nº4, primary forests generates various benefits, very few of which reflect profit for the owners; notwithstanding, they must pay the costs to maintain the forests. The country receives benefits without having to pay for them, and to correct this anomaly; the Forestry Law 7575 was approved in 1996. The intervention of the Public Sector is determinant to maintain optimum woodland extension throughout the country.

Tabla 4. Recipients of Natural Forest Benefits in Costa Rica, 1998

Type of benefit	Internalized Benefits by		
	Owner	Country	World
Sustainable wood harvesting	X		
Hydroelectric production potential		X	
Watershed protection		X	
Water supply		X	
Scenic beauty	X	X	X
Carbon binding			X
Biodiversity			X

Source: Castro R, June, 1999.

PES Program participation is highest within Indian territories where their cumulative 865,000 acres (7% of the national area) is covered by forests to an approximate 70%.

For these environmental services during the period 2007-2011, they have received about $3 million annually, some 12% of FONAFIFO's $25 million annual budget. This was payment for incorporating over a hundred thousand acres in forest protection. This represents 21% of the total protected area for the period. This is one of the principal direct economic contributions perceived by the inhabitants of these Indian reserves.

A study was made with the Cabécar Talamanca Indian Territory to evaluate the economic effects of PES activity from 2007-11 (when forestry protection contracts were in force), to analyze environmental, social, and economic effects of the PES within this segment of the population. This project incorporates almost 9,000 acres of woodland into the program, receiving about a million dollars over the five-year period. These funds were managed by The Local Integral Development Association of the Cabécar Indian Reserve of Talamanca (ADITICA), whose competence is legally established.

The question at hand was whether present capacities developed by the community leaders are attributable to income generated by the PES Program or proceeding from other sources. The analysis revealed that 80% of the local government's income proceeded directly from the PES, 15 % from specific NGO-supervised projects, and the remaining 5% from forestry permits and temporary credit recuperation.

The ADI annually programs its work programs based upon the needs of each of the ten local communities represented in the Communal Support Council before the Territorial Board These plans comprise six work areas:

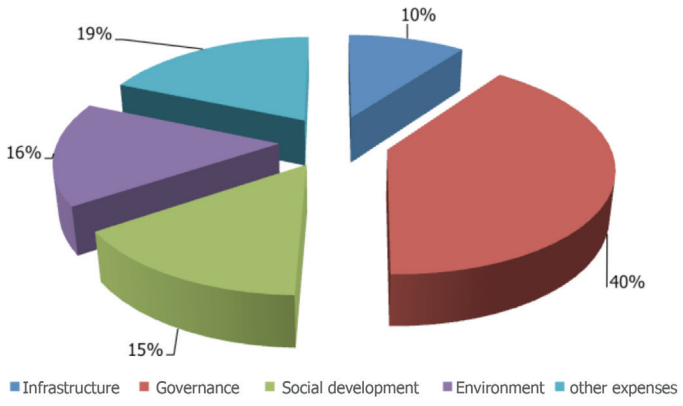
Infrastructure, environment, governance, economic development and security, social recreation and management.

An interesting sidelight is ADI's assignment of 40% of the budget to political management, substantially improving its leaders' negotiation and management capacities. Thus, instruments for negotiation and proposal development have been forged and public health improvements realized with the opening of basic service clinics known as EBAIS, one in the community of Progreso. Also, there are increased numbers of teachers of traditional education as well as bilingual, and improvements made in road and housing construction. These revenues have extended to pay permanent legal assessment in protection of Indian rights and interests, not only for the board members, but for the entire indigenous population in the territory.

Likewise, 18% of invested income is directed to social development; offering training, scholarships, bonds, help for medical appointments, support for the crippled and aged, funerals, among others.

Finally, the survey provides a set of social, economic, and environmental indicators for PES program monitoring in the three aspects of sustainable development, confirming its primary commitment to increase and improve forest coverage while propagating significant social and economic enhancement for the communities.

Figure 4. Percentages derived from financial statements of expenses incurred by the ADITICA community based upon PES revenues (2007-11)



Source: ADITICA 2011

CHALLENGES AND OPPORTUNITIES: THE MODEL

Costa Rica aspires to a new model in development towards a carbon-neutral economy by 2021, a decision that entails profound economical measures. Although an ambitious goal, it is consistent the obligations acquired towards mitigation of global climate change and a preview of the commitments required of each nation by 2020.

We have progressed towards the realization of this new model, optimizing common interests both public and private, encouraged by corporate commitments to greater environmental involvement and heightened entrepreneurial responsibility. Production, regulation, and consumer interests are allied in common dedication to a project beneficial to all, the nation and the planet, trusting in its acceptance and innovation.

Forest production is a catalyzing factor, benefitting the economy with locally-grown wood products of added value, able to compete nationally and internationally, while recycling and neutralizing carbon.

These factors facilitate our transition towards a low-carbon economy. FONAFIFO combined public and private sources to motivate long-term financing, lower production costs, balancing conservation and production to maximize profitability while integrating private interest.

Sustainable Biodiversity Fund (FBS)

The Sustainable Biodiversity Fund (FBS) is a patrimony incorporating financial resources to assure long-term Payment for Environmental services in Areas of high biodiversity. This fund embodies an effort to provide financial instruments for new environmental service projects.

The fund is another of the innovative and diverse financial mechanisms previously implemented in the forestry and environment sector. Income from this fund will be directed to payment for environmental services in areas of high biodiversity. Its current patrimony is of USD$16 million.

FBS funds are received from donations, as well as from acquisition of services by the private and public sectors, from other organizations, and society in general.

The following financial instruments created in joint effort by FONANFIFO and Banco Nacional are additional means of sponsoring the FBS:

- BN-Ecomarchamo[4]: A voluntary emission-mitigating program introduced by the Sustainable Biodiversity Fund, valid for a one-year compensation of average emission per vehicle. The natural process

[4] *A voluntary program for emission mitigation introduced by Banco Nacional de Costa Rica (BNCR)*

of photosynthesis of the forest plantations binds atmospheric carbon and liberates oxygen, compensating toxic emissions from vehicles and other pollution agents, emissions are compensated by small and medium woodland owners.

- Green Debit Card from Servibanca: A Master Card Debit instrument of Banco Nacional that directs 10% of its commission to the FBS.

The Servibanca Card --is a Master Card Debit instrument of Banco Nacional, which latter institution directs 10% of its commission to the FBS.

A new focus on FONAFIFO and the PES Program

Having promoted and reconfirmed their ecology-protective cultural consensus, Costa Rican citizenry addresses sustained forest management of primary and secondary natural forests. These attentions are directed principally to small woodland owners and community forest management within indigenous territories. Likewise, genetic improvement of the forest plantations is promoted jointly by Costa Rica and Korea to increase productivity.

The use of wood in Costa Rican constructions has diminished drastically. The tendency to wooden housing has dropped from 30% in 1984 to 10% in 2000, and has continued in decline. Political tendencies have limited the development of a wood-based architecture, while others have opposed its use as a cause of deforestation and environmental degradation. This is a false concept and it should be corrected.

Continued success of the reforestation program depends heavily upon increased popular use of plantation-grown sustainable wood. REDD+ needs therefore to support National Forestry Office (ONF) efforts in rectifying cultural, legal and technological influences that currently discourage the massive use of wood.

Accordingly, local and international markets must be prepared to receive increasing volumes of sustainable wood if the program is to succeed. Sustainable wood consumption would benefit the country in several ways. On one hand, carbon storage in buildings and furniture would be increased, while ecologically large footprint materials, such as cement, gypsum, steel or aluminum, would be reduced. These latter-mentioned construction

materials deplete 40% of the natural resources mined from the planet, 17% of the world's fresh water, and 40% of global energy. Cement-based enterprises alone emit 5% of the total greenhouse gas; cement factories are intense consumers of energy and petroleum derivatives.

On the other hand, an estimated 1.5 million acres of private farmland could be converted to multi-purpose or forestry use. The induction of regeneration or the promotion of reforestation are possible thanks to incentives such as PES.

Table 5. The price of indifference of carbon in the protection afforded by privately-owned natural forests and competitive farming($/ton of carbon)

Crop or activity	Privately-owned natural forests in buffer zones of protected areas							
	La Amistad	Rincón de la Vieja	Palo Verde	Piedras Blancas	Barra Honda	Guanacaste	Carara	Barbilla
Coffee	386	219	275	168	228	226	211	227
Pineapple	372	458	522	524	502	469	549	487
Watermelon	309	378	432	431	415	389	455	403
A variety of yam	251	305	350	346	335	314	368	327
Avocado	245	298	342	338	327	307	360	320
Plantain	244	297	341	337	326	306	359	319
Malanga	198	240	277	270	263	248	291	258
Taro	189	228	263	256	250	235	276	245
Tomato	170	204	236	228	224	211	248	221
Forest Plantation	124	35	71	14	51	50	54	62
Banana	102	118	140	129	130	124	147	131
Heart of palm	98	114	135	124	125	119	142	126
Yucca	91	106	126	114	116	111	132	118
Coconut	73	82	99	87	91	87	104	93
Cattle	66	74	90	77	81	79	94	84
African Palm	63	70	85	72	77	74	89	80
Orange	63	71	86	74	78	76	90	81
Sugar cane	61	68	83	70	75	73	87	78

Crop or activity	Privately-owned natural forests in buffer zones of protected areas							
	La Amistad	Rincón de la Vieja	Palo Verde	Piedras Blancas	Barra Honda	Guanacaste	Carara	Barbilla
Cattle	51	55	68	55	61	59	71	64
Lemon	35	35	46	32	39	39	48	44
Bean	27	25	35	20	28	29	36	33
Melon	23	20	30	15	23	24	31	28
Potatoes	22	19	29	14	22	23	30	27
Rice	12	6	14	<0	8	10	14	14
Beef Cattle	11	6	13	<0	7	9	13	13
Mango	3	<0	1	<0	<0	<0	<0	1
Forestry	3	<0	2	<0	<0	<0	1	2
* Tiquizque and yucca are tubers similar to bitter cassava.								

Source: Castro R, June, 1999.

Regeneration and retention should be emphasized in terrains where PES is cost-effective, such as those in different use than forestry, on Indigenous reservations and protected private wild areas. In neighboring terrains of Barra Honda and Rincón de la Vieja National Parks, for example, it is desirable to substitute traditional cattle pasture for forest plantations, thus benefitting Costa Rica both economically and environmentally (Castro 1999).

Forest plantations and primary and secondary forest management are two prime activities conducive to conservation and improvement of carbon inventories. But forest management revenue remains limited by cultural, administrative, technical and legal barriers.

The Country needs to define positive incentives to support responsible management and to minimize risk of soil use change in areas having recuperated forest coverage. Preliminary estimates would require FONAFIFO's incrementing PES in 32,000 acres of older growth forests. Periodic adjustments must be made to this increase to maintain adequate revenue compared to other options competing for the soil, to help diminish deforestation without affecting the area's income-yield capacity for its owners and rural communities.

Consolidation of the Network of Private Reserves and the high-income rated areas, such as lumber forests, should be the focus of the program. Accordingly, FONAFIFO needs to extend PES coverage to natural forests under sustainable (polycyclic) management, avoiding continued PES imbalance towards protection at a cost of worsening deficit of lumber in the national market. This is precisely the situation that brought on plantation tree felling at a rapid a rate for its technical readiness, also escalating land-clearing in meadows.

Through positive incentives, natural regeneration retention may be maintained, by the PES or in combination with secondary forest management for wood production,

especially in high-income terrains. A growing productive potential for Costa Rica is of over 540 thousand acres of fifteen-year old secondary forests on private lands.

Eco-competitive enterprises

FONAFIFO may derive revenue from diverse sources. This flexibility has made possible the design of projects and products that have filled a need or coincided with the interests of communities and organizations.

In combination with both public and private organizations, the institution has been able to produce ecology-friendly goods and services, retaining a high level of social responsibility, within legal provisions.

By 2011, $10 million had been received by the PES, from covenants with organizations for financing the PES in geographic areas of their interest, from contracts with enterprises that wanted to compensate their carbon footprint, from high-interest environmental sustainability certificates issued by social responsibility programs protecting water sources, and compensating their CO_2 emissions. Additional income was forthcoming from donations, sales of carbon through projects like Viaje Limpio, and others (Table 6).

Table 6. Income received through agreements and purchase and sale of environmental services FONAFIFO Period 1997-2011

Year	Nº of Businesses	Amount in $thousands	Average in $thousands per agreement
1997	2	100	50
2000	4	5 442	1 360
2001	1	272	273
2002	1	9	9
2003	9	697	77
2004	2	37	18,5
2005	9	577	64
2006	7	588	84
2007	12	468	39
2008	8	104	13
2009	14	262	18,7
2010	13	368	28,3
2011	9	132	14,6

Source: FONAFIFO. May 2012.

It was decided to create the Joint Costa Rican Implementation Office (OCIC) and the Costa Rican Carbon Fund, to support our decision to achieve leadership in developing the new carbon market. The country needs to proceed rapidly in structuring these institutions. Costa Rica now takes a decisive part in the discussions on the carbon market, as ratified in Kyoto where President Figueres attended and presented the proposals. Three basic objectives were attained in 1997 in Kyoto: 1) create the demand: 2) authorize the proposal: And (3) include the Forestry Sector. Notwithstanding, significance of the protocol was lessened by the abstention of the United States from participation in the market and the emission reduction goals. Countries such as Canada then announced their withdrawal from the second extension of the Protocol, which further limited the effectiveness of the existing mechanisms.

Requisites for entering the carbon market were country guarantees of credibility through adequate inventories, forestry policies, and adequate energy with a transparent institutional framework to manage the program (OCIC – FONAFIFO – SINAC). Costa Rica meets those conditions, for which reason it has negotiated carbon projects internationally.

Based upon its experience in the early negotiations, the country has been able to proceed towards its goal of C-Neutral Country by 2021, its inscription as C-Neutral in public registries and development as a Norm country, establishing its requisites to interested organizations. Additionally, design has begun on legal, technical, and financial platforms for implementation of that norm.

Considering Costa Rica's experience, the Costa Rican Carbon Units (UCC) were included as a compensation mechanism, similar in rank to the international standards certified credits. Mechanisms for UCC project inscription are in the process of design by MINAET´s Climatic Change personnel, to assure rigorous methodology and traceability for these units.

Table 7. Compensation schemes accepted for INTE Norm 12-01-06:2011 Application System for demonstration of C-Neutrality: Requisites, Costa Rica

Compensation schemes for greenhouse gas emissions	Third-party verification	
	National	International
1. CER´s (Certified Emission Reduction)		
Clean Development Mechanisms (Certified Emission Reductions)		X
2. VER´s (Voluntary Emission Reduction)		
2.1 Gold Standard 2.2 Voluntary Carbon Standard		X
3. UCC (Costa Rican Carbon Unit)	X	-
Note: Other compensation schemes may be recognized provided they are approved by competent authority.		

Source: INTECO September 2011.

IN CONCLUSION: THE ROAD TRAVELED AND THE PATH AHEAD

We have described the continued effort wherein all have participated in forming and strengthening the institutional and operative capacity of the National System of Protected Areas and the programs of reforestation, management and protection of private forests. We have also described how the global target for reducing greenhouse gas emissions like CO_2 has motivated Costa Rica to intensify its actions in the forestry sector.

We firmly believe that Costa Rica's success can be replicated in other tropical countries like Kenya, Tanzania, Congo, Indonesia, Vietnam, Colombia, Mexico and all Central American countries, considering their particularities in each case. We have always manifested our permanent disposition to collaborate with all central and Latin-American countries within a triangular framework towards deforestation reduction and to proceed together towards sustainable management of forest resources.

The process of sustainability in Costa Rica depends upon three fundamental aspects:

- That both the people and the government keep forestry as a priority: Continue educating the public on the importance of forest resources as part of their natural heritage and begin the process of sustainable management in the near future. Maintain clear rules of the game for the long run, remain vigilant for any attempts to introduce macro economy or other anti-forestry policies is a government commitment. To achieve this, the forestry sector must have specific influence in political decisions. Another important aspect is the avoidance of degenerative changes in framework of SINAC – FONAFIFO institutions and in the assurance of their permanent financing.

- Transparent and participative process: In this state of globalization we're living, change is the norm, and for that reason our processes must be transparent to correct our course and adapt to new participating scenarios, surpassing the sectarian focus that impedes our integration of the three pillars of sustainable development: The economic, the social, and the environmental. With government assistance, the private sector must consolidate its entrepreneurial capacity, to face the challenges of market globalization. The transparency wherein the process has been so far developed has enabled the participation from several quarters: industry, reforestation, woodland owners, forest guardians, conservationists, academic centers and research institutions all as a result of a climate of confidence, qualified knowledge and commitment to the process. The demands of monitoring, verifying and reporting stipulated by REDD+ agreements constitute a challenge in their implementation to raise our national standards to international quality levels.

- A new market for a new century: Costa Rica has been developing a congruent forestry policy based upon the responsibilities assumed with the ratification of the

Climatic Change and Biodiversity Convention. For the execution of this policy, a series of measures have been applied in diverse fields such as the legal, institutional, technical, financial, and control. These measures have enabled progressive reversal of the process of loss and fragmentation of the forests and of their associated biodiversity occurring in these late decades.

These attainments point out the viability of reverting a process as complex as the change in Earth's covering, but we are not assured of its sustainability over time. For this we require participation by international society through a free market for transactions of compensations for greenhouse gasses, and recognizing the existence of inequity, we must realize the justice in retribution to those whose actions benefit the planet.

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