

## ENVIRONMENT CONSERVATION AND SUSTAINABLE DEVELOPMENT IN COSTA RICA

Dragos Neculce<sup>1\*</sup>, Oscar Pacheco Urpi<sup>2</sup>

<sup>1</sup> BIO-MANZANILLO DSJ s.a., Costa Rica

<sup>2</sup> ESTACIÓN NACIONAL DE CIENCIAS MARINO-COSTERAS—ECMAR, Costa Rica

### Abstract

*The article presents the specific environmental situation of Costa Rica, a country that went through a period of environmental disaster and that can now be taken as an example of environmental recovery, to a point that today it can be considered one of the forerunners in environmental protection. On top of that, as of 2015, it is successfully on track to become the first fully carbon-neutral nation by 2022, drawing all of its energy needs from renewable sources.*

*Keywords: biodiversity, environmental recovery, environment-friendly policies, sustainable development.*

### 1. INTRODUCTION

Costa Rica is a tropical country approximately 5 times smaller than Romania. It is bordered in the East by the Atlantic Ocean and in the West by the Pacific Ocean. Costa Rica has an extremely varied landscape and approximately 50 different microclimates. The American Cordillera goes through the country from North to South, with heights of 3900 m in some parts and numerous volcanoes, 6 of which are still active. It ensures the evolution of numerous ecosystems, the coastal ecosystem, mangroves, dry tropical rainforest, humid tropical rainforest, plains, rivers, lakes, thermal waters, just to name a few. Costa Rica is the country with the largest biodiversity in the world. Even though it only covers 0.03% of the world's surface, Costa Rica is the home of 6% of all of the world's animal and plant species; it is the home of 12000 species of plants, 1600 species of fish, 850 species of birds, 230 species of mammals, thousands of species of invertebrates and the Instituto Nacional de Biodiversidad estimates that 160 new species are discovered every year (Sterling, 1999; INBIO, 2014).

### 2. RESULTS AND DISCUSSIONS

Nicknamed the “Switzerland of Central America”, “the Garden of the Americas” (New York Times) or “The Green Republic”, Costa Rica didn't benefit of an environmentally friendly attitude from the beginning. After World War II, it experimented with communism for a short period and in 1948, the Costa Rican Civil War brought back democracy. In 1949, the army is abolished and the entire military budget is redistributed to health, social causes and education. Educating the population gradually created a national consciousness. 1960 is considered the pivotal year for the Costa Rican environment. That year, big international agro-alimentary companies offered major grants pushing for monocultures (especially coffee and banana) and for cattle farming. These grants

resulted in major deforestation to make space for pastures and plantation fields; over 60% of the country was deforested, with a yearly destruction rate of 4% (Gonzales-Flores, 1976; Martinez-Castillo, 1999). The fragmentation of the ecosystems resulted in 17% of the land that wasn't protected by the government having soil heavily degraded and eroded, rendering it unusable for both agriculture and reforestation (Sterling, 1999). The situation was on the verge of becoming catastrophic. At that time, Costa Rica had a few nature reserves but it was powerless in front of this catastrophe. Renowned Costa Rican naturalists, like the botanist Luis Fournier, professor at the Universidad de Costa Rica, remark that the population started to worry about this issue in 1970, when an environmental awareness campaign began. Gradually, the Costa Rican environmental awareness effort attracted the attention of the international scientific community and the press. One of its key elements, the *LEY FORESTAL*, introduced by the government in 1969, is a law that began to regulate deforestation and set the basis for the creation of the Costa Rican National Parks (Fournier, 1981, 1985; Lizzaraga, 1991). The Costa Rican universities were fighting hard in favour of environmental protection and opposing them were the major organizations that were pushing for increased production without any regard for the effect it might have on the local resources. Biology students were at the forefront of this environmental battle. Biology student organizations are recognized as the first environmental organizations that, as early as 1968, managed to make it all the way to the National Assembly and the Ministry of Justice, even managing to block some law projects that were considered "ecocides", like the projects proposed by the gold prospectors (Sterling, 1999). Professor Fournier didn't give up the fight: in 1991 he publishes "Desarrollo y perspectiva del movimiento conservacionista costarricense" (Fournier, 1991). Around that time, the period of intensive development of national parks begins. In line with the United Nations Development Programme and the *Biocoenosis* journal, some local environmental journals made their appearance. Journals like *Brenesia*, *Agronomia costarricense*, *Tecnologia en Marcha*, *Zurqui*, *Turrialba Neotropica*, just to name a few. The period also marks the appearance of an ecology TV channel: *Canal 6*, *Canal ecológico*. In parallel with these, numerous guides, maps, pamphlets, even bumper stickers promoting environmental awareness with slogans like "Naturaleza, Belleza y Paz – Todo en Uno – Costa Rica" appeared. Also, at the same time, many public and private campaigns in favour of recycling and limiting pollution surfaced (Campbell, 2002). After 1990, biological corridors were created at the initiative of the Wildlife Conservation Society and the Caribbean Conservation Corp; the objective of these corridors was to re-establish a link between the patches of forest affected by fragmentation ((Schelhas & Pfeffer, 2005; Laurence, 2008; 2009). The July 2007 declaration of then president Oscar Arias "*Paz con la Naturaleza*" marked the transition from the aggressive national park creation policy to a national environmental ethic. Costa Rica transitioned from developing national parks (which already cover more than 25% of the country) to developing ecotourism, environmentally-friendly tourism (Romero & Peñas-Claros, 2009). In the span of a few months, in 2015, the rational management of the hydroelectric plants along with the development of volcanic geothermal plants have proven the goal to be achievable

In the marine domain, Costa Rica has had some major advances in environmental resource conservation. Isla del Coco National Park was created in 1978. It includes, under a total protection category, a portion of land, but also 12 nautical miles of territorial waters. By creating this national park, Costa Rica reaffirmed its rights to an exclusive economic zone of 200 miles, according to the Convention of Maritime Rights, an area more than 10 times that of terrestrial Costa Rica. The declaration of San Jose was signed in 2004, creating the Marine Corridor (CMAR). This corridor includes 5 protected areas, it is a part of the marine corridor of the most important species of the

east-tropical Pacific Ocean and it reflects the abundance and health level of the ecosystems. The goal of this project was to establish a common management system between governments for the conservation of biodiversity and durable use of the marine and coastal resources of the east-tropical Pacific region. This marine corridor includes Costa Rica's Coco Island, Ceiba Island of Panama, the islands Malpelo and Gorgona of Columbia and the Galapagos Islands of Ecuador. In 2011 through the executive decree 36452-MINAET, Costa Rica created the Marine Area Manejo which includes underwater mountains that serve as a buffer region around Isla del Coco National Park, covering 11,629 km<sup>2</sup> of protected marine life.

Through the years, Costa Rica has created more than 20 protected marine areas, going around its coast and its islands, totalling 5,398 km<sup>2</sup>. Since November 5<sup>th</sup> 2014, through the 38681-MAG-MINAE decree, the exploitation of tuna and its related species is regulated and normalized in all of the Costa Rican exclusive economic zone of the Pacific Ocean, defining fishing zones exclusive for Costa Rican artisanal fishing, fishing by international ships which also falls under the regulation of the Inter-American tropical tuna committee, and protected areas.

With all the efforts the government put to regulate coastal and at-large fishing, marine biodiversity and the Costa Rican fish resources are deteriorating, with some species more affected than others. This seems to show that the political measures put forward by the government have failed. The deterioration of the fish resources is usually followed by social and economic deterioration of the fishing communities, getting drawn deeper and deeper in a vicious cycle of over-fishing. Non-protected areas, much bigger than the protected ones, become more and more over-exploited. Awareness of the socio-economic problems, conservation of biodiversity and of the marine resources is only possible through environmental education programs, the creation of new work and production places, alternative consolidation, organization of and ease of access to education and professional formation, together with a series of parallel and simultaneous components. In this perspective, some institutions, especially the Universidad Nacional, through awareness-raising programs and projects at the Estación Nacional de Ciencias Marino-Costeras, in collaboration with the Estación de Biología Marina, tried to plan their actions so as to find a better way to serve their community, in a combined construction effort. Similarly, the Universidad Nacional, using its biological expertise, has begun testing a new development strategy which could be a viable alternative to fishing. This offers the government new tools to start a new economic activity in the coastal Pacific region, with emphasis on the Gulf of Nicoya.

It all started with a research project that aimed to develop the technological package regarding the production of seed and culture of the Pacific oyster (*Crassostrea rhizophoe* and *C. gigas*) through the integration of the fishing communities. Once the goals were reached, the required measures were taken to obtain funding and set up the infrastructure needed to organize the coastal communities. The message was understood by the government and a laboratory to be used as an oyster seed production center was built with government funding at the Estación Nacional de Ciencias Marino-Costeras. Its mission is to create at least 15 oyster lines. 6 lines have already been created. This constitutes a model for a financing strategy for new producers and a follow up platform for the consolidation of the activity (Aguilar-Gonzales & Moulaert, 2011).

### 3. CONCLUSIONS

Nowadays, not only is Costa Rica among the top five countries in the world for environmental protection, but it has also successfully completed the first steps towards energy independence (using renewable sources of energy, without the use of fossil fuels) as promised for 2022 by the United Nations Environment.

This paper demonstrates as well that, even in Costa Rica, the results of experiments developed in academia are analyzed and taken up by the government to be then used for the socio-economic development of local communities.

#### 4. REFERENCES

- Aguilar-Gonzales, B., Moulaert, A. (2011). A Summary of Actual and Potential Environmental Service Losses Due to the Current Ecological Conflict in the Portillas/Calero Island Region in the Caribe Noreste Wetland in Northeastern Costa Rica. *Fundación Neotropica*. 1-36. Retrieved January 21, 2018, from <http://neotropica.org/wp-content/uploads/2015/08/APreliminaryESVofHCNinNortheasternCostaRica156137.pdf>
- Campbell, L. (2002). Conservation Narratives in Costa Rica: Conflict and Co-existence. *Development and Change*, 33 (1), 29-56.
- Fournier, L.O. (1981). *Ecología y desarrollo*, Ed. Univ. Costa Rica, Costa Rica, 195 pp.
- Fournier L.O. (1985). El sector forestal de Costa Rica - antecedentes y perspectivas. *Agronomía costarricense*, 9, 253-260.
- Fournier, L.O. (1991). Desarrollo y perspectivas del movimiento conservacionista costarricense., Ed. Univ. de Costa Rica, Costa Rica, 113 pp.
- González-Flores, L.F. (1976). Historia de la influencia extranjera en el desenvolvimiento educacional y científico de Costa Rica. *Editorial Costa Rica*, Biblioteca Patria, 3-16.
- INBIO (Instituto Nacional de Biodiversidad), 2014. Biodiversity of Costa Rica. Retrieved August 10, 2015, from <http://atta2.inbio.ac.cr/neoportal-web>
- Laurence, W.F. (2008). Adopt a forest. *Biotropica*, 40 (1), 3-6.
- Laurence, W.F. (2009). How should the ATBC approach conservation? *Biotropica*, 41 (6), 139-141.
- Lizzaraga, J. (1991). La política ambiental es la vía para el desarrollo y la integración regional. *Medio Ambiente*, 43, 13-16.
- Martinez-Castillo, R. (1999). Sistemas de producción agrícola sostenible. *Tecnología en Marcha*, 22 (2), 23-39.
- Romero, C., Peñas-Claros, M. (2009). Beyond Tropical Forests Adoption: contextualizing Conservation Strategies. Commentary. *Biotropica*, 41 (6), 653-655.
- Schelhas, J., Pfeffer, M. (2005). Forest Values of Natural Park Neighbours in Costa Rica. *Human Organization*, 64 (4), 386-398.
- Sterling, E. (1999). *The Green Republic :A Conservation History of Costa Rica*. Austin University of Texas Press, Austin, 317 pp.