

**THE REVERSAL OF TROPICAL DEFORESTATION IN COSTA RICA**  
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Tropical deforestation is an issue of global concern due to its impact on land-based greenhouse gas emissions, on biodiversity due to habitat loss, on soil degradation, productivity loss and rural poverty in general.

Costa Rica experienced significant forest loss starting in the 1940's, with some of the highest reported deforestation rates in the world, near to 1% of the land area per year. This process, known popularly as the "strip-tease" of Costa Rica is shown in this slide (#1). The second slide (#2) shows the forest cover in 2010, reaching 52.4% of the country's land area.

In the next few minutes I would like to share with you the story of how we turned this process around. It has taken over thirty years and there is no silver bullet, but a number of coordinated policies, institutional and financial innovations, some command-and-control, but also widespread use of economic incentives to pay to ecosystem services.

When I came back from Stanford with a Phd. in water chemistry in 1979, I started my career at the University of Costa Rica working on water pollution in one of the main and most polluted watersheds, where there was no wastewater treatment at all. I wrote several proposals and met with regional development banks, but there was little interest at the time. The issue that was very hot in the political arena was forest loss and deforestation.

Addressing the issue of forest management required a number of legal and institutional innovations, including the creation of a Cabinet level position and the consolidation of a system of national parks and protected areas. A number of financial innovations were also critical, such as payment for ecosystem services (PES), the creation of a national fund for forestry financing to run the program. A number of debt-for-nature swaps, both commercial and bilateral also played a key role. Given the limited time, I will briefly go through some of them.

### **The Ministry of Energy and Natural Resources**

When President Oscar Arias was elected in early 1986, he offered me to become Energy minister and I was able to persuade them to create a Ministry of Energy and Natural Resources, which later became Energy and Environment. This was critical because it gave environment much needed political standing and clear leadership.

National Parks and protected areas, which had started to be created since the early 1970's, were transferred from the Ministry of Agriculture to the new ministry. The National Parks and system of protected areas, which represent over 25% of the land area are the keystone of the conservation network, but there are many important private reserves, totaling over 600. I am the proud owner of one of these reserves, which I have managed for 30 years to compensate for all the air travel that I have done.

The new ministry also was given the mandate to spearhead forest policy. Previously, the government had designed a program to promote reforestation through fiscal incentives. This turned out to be a mistake because it was directed only to people who paid taxes and they were more interested in the tax deduction than the trees. In addition, the Finance Ministry would not know how much as the cost of the program until after the people had claimed their deductions. I must say that the Finance Ministry has been the basic support of this turnaround, primarily through a 3.5% tax on fuels, whose revenues are used to pay for ecosystem services.

### **Debt-for-nature swaps and other financial mechanisms**

Debt-for-nature swaps were an important financial innovation to support conservation. This mechanism started to be implemented in 1988 and involved purchases of Costa Rica's commercial debt by outside donors at a discount in the secondary market. The Central Bank of Costa Rica would then issue local currency bonds for this debt. If debt could be bought at 33 cents on the dollar and exchanged for 66 cents of local currency bonds, everybody was better off. The donor multiplied its impact and Costa Rica supported conservation and lowered its foreign debt.

Debt-swaps started small but grew considerably when bilateral donors like Sweden and Holland got into the game and used their resources to purchase Costa Rica's commercial debt in a similar scheme as described above. Sweden created a trust fund for Guanacaste National Park, while the Dutch resources were used to jumpstart a new mechanism to support forestry with small landowners. Donations and grant totaling approximately \$12 million cash were used to purchase about \$75 million in commercial debt through the National Parks Foundation and the Central Bank issued approximately \$35 million in local currency bonds with high interest and short maturation rates.

Debt-for-nature swaps grew much more when donors started to use their own bilateral debt for swaps, a trend initiated by the Bush Administration in the Enterprise for the Americas Initiative in the 1990 and later in the Tropical Forestry Conservation Act. Costa Rica has carried out two transactions with the US under this act, totaling \$56 million and is the country that has benefitted the most from this legislation.

### **Changes in Forestry Law and Payment for Ecosystem Services**

Costa Rica had experimented with a variety of financial incentives to promote reforestation, including soft-loans and the fiscal incentive program mentioned earlier. The resources from the Dutch debt-swap allowed us to experiment with a new program focused both on management of existing forest as well as reforestation, but also focusing on small property holders.

A new Forestry Law 7575 was approved in 1995 and introduced new mechanisms and instruments. First it banned conversion of forested lands to pastures punishable by prison sentences rather than fines, effectively lowering the opportunity cost of converting forests to

pastures or agriculture. Second and even more important, it introduced payments for forest conservation reforestation and sustainable forest management, effectively creating the basis for payment for “environmental services”.

Law 7575 defines four categories of environmental or ecosystem services:

- Carbon sequestration, capture and long term storage of carbon dioxide.
- Hydrological services, water and protection of water catchment areas..
- Biodiversity conservation and sustainable use
- Scenic beauty and aesthetic values.

The National Forestry Financing Fund (FONAFIFO) was also created by this law to administer this program that works entirely on private lands or indigenous reserves. The program started formally in 1997 with a land-based system and five year contracts with forest owners to either undertake reforestation, conservation or sustainable use of forests. This latter component was phased out and the program now includes payment for carbon storage and a premium for areas of high hydrologic importance. Forest engineers monitor compliance on a yearly basis.

In exchange for the payment, which range from \$65-90 per hectare per year, forest owners transfer the “rights” for the ecosystem services to FONAFIFO who acts as an intermediary in the sale of these credits. Initially it was expected that an international carbon market would develop quickly, and that these credits could be sold on international markets. In reality, these markets have failed to develop and internal carbon prices in Costa Rica (\$ 8/ton of carbon dioxide equivalent) have always been higher than the international market.

Another important component of the innovation process were two World Bank loans to support development of the PES system, as well as GEF grants associated with the loans. Costa Rica is the only country that has taken World Bank loans to develop a national system of PES. The counterpart contribution for these loans from the GOCR was the 3.5% tax on fuels administered by the Finance Ministry. About 80% of the program has gone to forest protection and 20% to reforestation.

Between the years 2005 and 2015 Costa Rica sequestered nearly ninety six million tons of carbon dioxide at a cost of approximately \$8/ton, equivalent to a total of over \$760 million. Since these measures were voluntary and ahead of international agreements, Costa Rica will not receive international credit for this effort, however, since we paid for this carbon sequestration, we can use it in our accounting system for a the goal of carbon neutrality by 2021, which was part of our pledge in COP15 in Copenhagen.

Overall the program has purchased environmental services of more than one million hectares from about 16.000 private landowners. About 10% of the program has gone to indigenous communities, which own the land communally and also use the resources for community projects. The impact of this effort is comparable to governmental and private conservation efforts, which have been essential complementary efforts.

## Summary and lessons learned

An important conclusion is that there was **no single policy** that could be effective by itself, what was required was a combination of policies that would add value to the standing trees. Today, trees are valued only when they are dead and only by the value of the wood. In the tropical world trees are not capital goods like a tractor or a cow. You can go to the bank and get a loan based on these, but not based on your trees, only the land. So we need to develop new approaches and policies to promote this transformation, and they involve both command-and-control measures, as well as economic incentives.

A second very important conclusion is that these new policies based on valuation of ecosystem services have to be **financed**, that is why support from the Finance Ministry is key. In Costa Rica the program has been mostly financed by the government but also private users, and eventually an international market. Through its PES system, Costa Rica put a price on carbon long before the international community did.

A third major conclusion is that these policies have to be **coherent**, for example the prohibition of conversion of forests to other uses is an essential complementary command and control measures. Because these efforts take a long-time to show impact, they also have to be maintained through different governmental transitions and acquire the level of state policies that have widespread support.

We need to adapt these policies to that add value to living trees because it is still one of the most cost effective ways to remove carbon dioxide from the atmosphere and has the added benefits of water, biodiversity and scenic beauty. By investing in ecosystem services we get a number of important **co-benefits** because forests store carbon, generate water and keep biodiversity in a single bundle.

What we see today is the product of decades of investment and we have very much paid the price of innovation. More than 80 countries have come to Costa Rica to look at this program. Our forests provide hydro energy for about 70% of our electricity needs and with wind and geothermal, we have achieved almost 100% renewable generation. Costa Rica is known worldwide as a top ecotourism destination and the tourism industry contributes to a diversified economy and is only second to business services as a generator of foreign exchange. We are a water rich country, but now with climate change there are many droughts and we need to learn a lot about water management from Singapore. Thank you very much.