"GOOD PRACTICES" IN POLICIES AND MEASURES: THE CASE OF COSTA RICA

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Abstract: *Costa Rica, as a small country heavily dependent on natural resources for economic development, is very concerning about climate change and choices for development. In view of "good practices", giving national circumstances and respective capability, this report examines Costa Rica's experience to address climate change and national sustainable development. Costa Rica's sustainable development goals are broad based. Among others, conservation of forest lands and surrounding buffer zones with the goal of 25% of the territory, regeneration of abandoned crop and pasture lands, protection and sustainable use of biodiversity, agrochemical management and sustainable agriculture practices, control of waste from industrial sources, improvement of the quality of fuels, control of vehicle emissions, energy efficiency and production with renewable sources, etc. Criteria for identifying domestic "policies and measures" on climate change has relied on: compatibility with sustainable development priorities, environmental and cost effectiveness, market potential for trading, affordability, sustainability, and social and environmental impacts. A "two-pronged" approach, promoting the Convention and its Kyoto Protocol (KP) mechanisms while creating domestic non- regret measures has enabled Costa Rica to revert a process as complex as deforestation and inflect its emissions curve relative to 1990. Sustainability of this approach will heavily depends on Annex I countries commitments evolved in the Convention and the KP.*

BACKGROUND

Costa Rica has developed a National Program on Climate Change (see Figure 1) aiming at identifying and implementing policies and measures to adapt to the impacts and mitigate the effects of climate change.

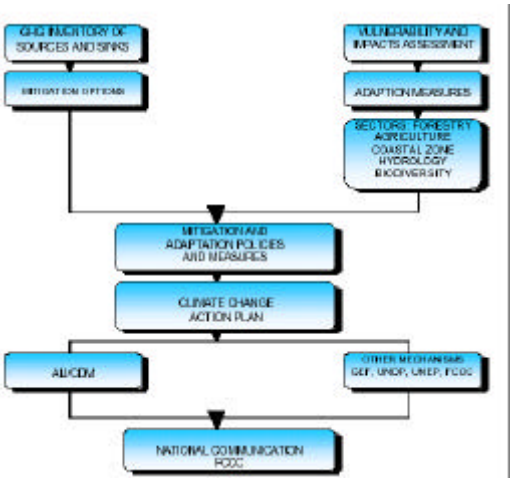

Figure: National Program on Climate Change

COSTA RICA GREENHOUSE GAS EMISSIONS INVENTORY

Net emissions of CO_2 in 1990 were estimated at 3,843,500 ton (see Table 1), of which approximately 61% was from fossil fuel combustion and 39% from changes in land use. Emissions from deforestation are estimated at more than 3,000,000 ton, while absorption by abandoned lands is estimated at 1,330,000 ton and 883,000 metric ton by plantations. This scenario represents CO_2 emission per capita of approximately 1.26 ton.

In 1996, net emissions of CO_2 were estimated in 3,583,500 ton, representing a relative decline from 1990. Estimated emissions from fossil fuel combustion during 1996 were 4,137,600 ton, representing a significant increase (74%) relative to 1990. However, increased emissions from mobile sources were compensated by net emissions from the entire land use sector. Emissions from deforestation were estimated at 3,366,500 ton, while absorption was estimated at 2,019,100 ton by abandoned land and at 2,318,000 ton by plantations.

Table 1

Greenhouse gas emissions in Costa Rica (thousand ton)
1990

Sector	*Total emissions (Gg)*						
	CO_2	**CO**	**CH_4**	**N_2O**	**NO_X**	**NMVOC**	**TOTAL**
Energy	2,381.4	215.4	5.32	0.12	30.05	33.33	2,665.6
Industrial Proceses	367.9	-	-	-	-	-	367.9
Agriculture	--	14.26	124.52	0.48	0.55	-	139.81
Land use change	1,094.2	101.75	11.63	0.08	2.89	-	1,210.6
Waste	--	-	20,5	-	-	-	20.5
Total	3,843.5	331.41	161.97	0.68	33.49	33.33	**4,404.4**
CO_2E (20 year)	3,843.5	-	10,204	183.6	-	-	**14,231.2**

Table 2

Greenhouse gas emissions in Costa Rica (thousand ton)
1996

Sector	***Total emissions (Gg)***								
	CO_2	CO	CH_4	N_2O	NO_x	NMVOC	SO_x	Halocarbons	Total
Energy	4,137.6	101.3	0.5	0.1	24.7	21.6	1.8	0	4,287.5
Industrial Proceses	417.1	0	0	0.49	0.05	12.32	0.27	0.72	431
Agriculture	0	11.96	133.2	6.73	0.48	0	0	0	152.4
Land use change	-971.2	93.2	10.65	0.07	2.65	0	0	0	-864.6
Waste	0	0	41,44	0	0	0	0	0	41,4
Total	3,583.5	206.4	185	7.4	27.9	33.9	2.1	0.72	**4,047.7**
CO2E (20 year)	3,583.5	-	10,404	2,072	-	-	-	540.1	**16,600**

EMISSIONS TREND AND OVERVIEW

Despite Costa Rica inflected its emissions curve during the last decade and its land use change and forestry sector became a net sink, it is expected that during the next two decades its emissions in carbon dioxide equivalent unit could double (see Figure 2). In this regard, emissions from the energy sector, mainly the use of fossil fuels in transportation, will become the main source of emissions during the present decade, surmounting emissions from agriculture (including methane emissions from livestock) by the year 2008 (see Figure 3)

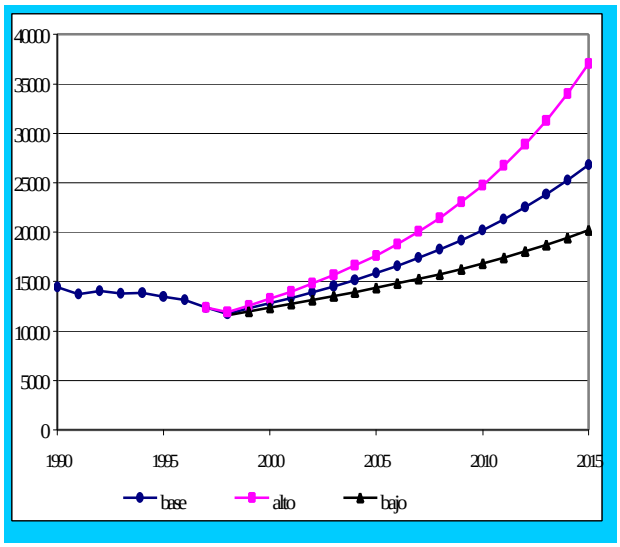

Figure 2: Carbon dioxide emissions (in equivalent unit) per income scenarios.

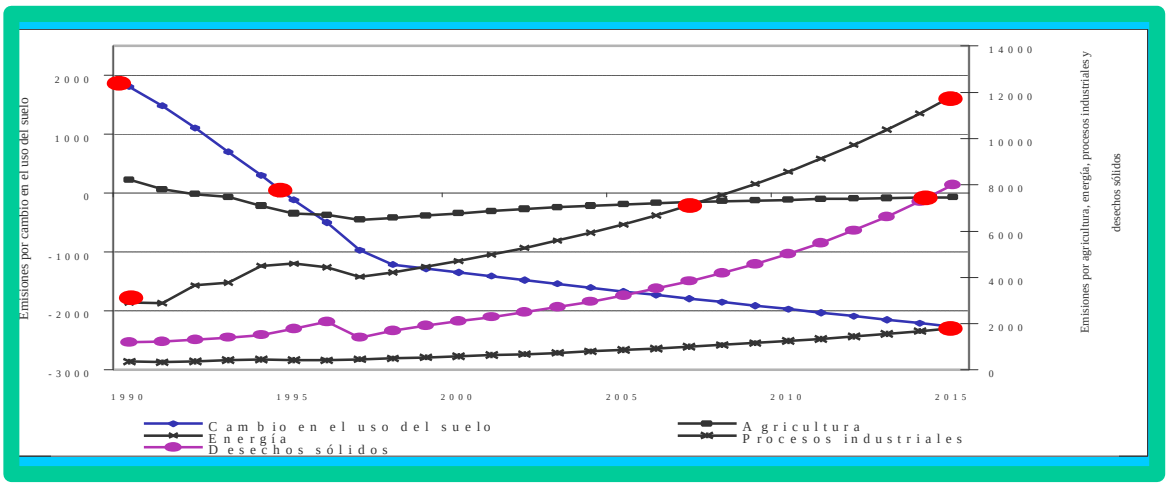

Figure 3: Emissions trend per sector (according IPCC) 1990-2015 (Gg CO_2E)

POLICIES AND MEASURES
TRANSPORTATION

Is the target sector for mitigation. Population growth and concentration in urban areas, massive importation of used cars and increasingly number, elimination of railroad transportation system, inadequate planning and lack of resources originate most of emissions. The policy is to reduce emissions and air pollution in urban areas according to the international regulations on human health by an adequate transportation planning and emissions control.

The following options has been identified and some already implemented: optimization of the transportation network in the Metropolitan Area (routes, schedules, infrastructure, technology, etc.), incentives to use public transport, emissions control, improved vehicular efficiency standards, railroad re-opening, clean fuels, etc.

RENEWABLE ENERGY

Costa Rica has one of the best hydraulic potential per unit of area. According to preliminary inventories, this potential could cover demand for the following five decades. Others renewable sources commercially exploited have potential for expansion allowing an attractive supply in a technical, economical and environmental basis[1].

Electricity use in Costa Rica is rising. In 2000, 80% of the power was supplied from renewable sources, mostly hydro (9% geothermal and 4% wind) and 18% from thermal plants. During the present decade, demand is forecast to grow 6% annually, requiring additional 100 MW per year and an estimated $3 billion of investment by 2011.

The regional integration of electricity markets in Central America brings the opportunity to put power in any region of the isthmus. However, in a competitive market and with favorable prices of fossil fuels, regional thermal generators threaten the

[1] The timing between hydro and wind power is a strong incentive for substitution of thermal generation during the dry season.

renewable energy from Costa Rica. Therefore, additional financial support from carbon credits would favor the competitiveness and the export of renewable energy from Costa Rica. This is especially important considering that more than 50% of the region does not have access to electricity and that it is mostly produced from thermal sources.

This is an important sector to be target, particularly through energy efficiency and demand-side management in residential cooking and lighting, where consumption is highest and are responsible for most of peak demand times, when thermal generation is used to meet demand. Regulations on energy use by energy intensive industry and electricity pricing reform to promote rational use are also options.

LAND USE CHANGE

More than half of the country was covered by forest in 1950. During the 1960s and 1970s, Costa Rica had one of the highest deforestation rates in the world. Deforestation reached highs of 50 to 60 thousand hectares per year, but has now declined. Forest cover declined rapidly over the 1980s reaching 29% by 1986.

During the1990s, thanks to strong incentives to forest conservation, including protection of primary forest and natural regeneration of secondary forest, deforestation lower to its minimum expression. Furthermore, in 1997 the gross area of deforestation was counterbalanced by plantation and natural regeneration of pasturelands and secondary forests.

In 1996, as part of the new forestry law, the Forestry Environment Services Payment (FESP) program was created. It goal is to provide payment for the environmental services provided by private forest efforts (reforestation, forest management and conservation) undertaken by small property owners. This program takes a proposition from theoretical economics that forests would be better maintained if owners are compensated for all services they provide. It encourages the protection of watersheds, biodiversity for its conservation and sustainable use, scenic beauty for ecotourism and carbon fixation and emissions reductions.

Even though the country has created the National System of Conservation Area and has implemented the FESP program, it has not been possible to ensure its sustainability in the long term. The Government is still facing difficulties to meet those compromises, particularly the purchase of areas declared national parks.

INDUSTRIAL

Since the industrial sector uses the environment to discharge untreated pollutants (solid wastes dumping and agricultural runoff), it constitutes one of the main sources of emissions and highly contributes to environmental degradation. The high cost of technological solution to prevent and diminish air and water pollution related to production processes is the main obstacle to implement policies and measures within this sector.

The sectoral policy is to encourage solid waste and wastewater management from industrial sources and promote the clean production program (e.g. an integral and preventive environmental strategy in production processes, products and services to

reduce hazards to the population and the environment). Landfills and open dumps, including landfill biogas recovery for electricity generation, recycling programs, as well as wastewater treatment plants, including techniques of anaerobic treatment (bio digesters) to capture and use methane as a fuel (e.g. wastewater treatment plant from coffee mills) are options identified and under implementation.

AGRICULTURE

Livestock constitutes over 80% of domestic methane emissions. However, an improved handling in aspects such as diet quality and an adequate grazing management constitute feasible mitigation options.

In Costa Rica, the intake of agrochemicals per cultivated hectare is one of the highest among developing countries, and the agriculture sector constitutes the main source of nitrous oxide emissions. An improved land management (e.g. tilling and drainage optimization) and an adequate use of fertilizers would enhance agricultural production with environmental and climate change positive impacts. The policy is to encourage the adoption of agricultural and livestock practices to respectively reduce the use of agrochemicals and methane emissions.

AIJ NATIONAL PROGRAM

Costa Rica has taken proactive stance on Activities Implemented Jointly (AIJ). Because creates efficient mitigation options while transferring cutting edge technology, represents a cost-effective market-based approach of meeting the objective of the Convention and provides new economical sources to assist Costa Rica in meeting its national sustainable goals.

Costa Rican AIJ projects range from clean technology to reduce greenhouse gas emissions, such as wind farms to environmentally effective land management designed to reduce emissions in national parks threatened by deforestation and private forests conservation.

It will be extremely pertinent for the future of the KP mechanisms framed on a project basis, to benefit from the AIJ learning curve and to overcome the barriers that hindered its effective progress (e.g. inadequate institutional capacities, high transaction costs, lack of economic compensation in exchange of credits and real commitments from Annex I countries).

CONCLUSIONS

Costa Rica has been successful in addressing the climate change. Far better institutional and political conditions make the country an appropriate testing ground for the viability of the mechanism of the Convention and its Protocol. From experience, the key factor for the Costa Rican “policies and measures” to successfully address the climate change is that the process is host country driven, compatible with environmental priorities, maximize economic efficiency and environmental protection both in terms of climate change and acillary environmental issues and market oriented. However, the sustainability of this initiative will heavily depends on Annex I Parties commitments evolved in the Convention and the KP.

Developing countries have made different policy choices with respect to instruments used to reduce emissions. In addition, developing countries, such as Costa Rica have demonstrated a growing commitment to undertake aggressive policies. However, the future trends in emissions leaves little doubt that more needs to be done. In this vain, the use of the Clean Development Mechanism has the potential to boost best practices in developing countries by providing financing, technology and capacity through credit and trade.