**Reducing Greenhouse Gas Emissions from Deforestation: the United Nations Framework Convention on Climate Change and Policy-making in Panama**

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## Sommaire Exécutif

La Convention Cadre des Nations Unies sur les Changements Climatiques ne s'attaque toujours pas à la déforestation dans les tropiques, une importante source d'émission de gaz à effet de serre. En décembre 2005, les négociations sur un possible régime pour réduire les émissions liées à la déforestation ont repris sous l'impulsion de propositions de mécanismes de réductions compensées pour déforestation évitée. Au cours de l'année 2006 les décideurs panaméens œuvrant au sein de l'Autorité Nationale de l'Environnement (ANAM) établissent qu'un régime de déforestation évitée est dans l'intérêt national dans la mesure où ce régime ne compromet pas l'existence du mécanisme de développement propre du Protocole de Kyoto. Cependant il est n'est pas possible pour le Panama de réduire son taux de déforestation du au fait que l'ANAM ne dispose que d'une capacité institutionnelle limitée d'agir sur le terrain ainsi que d'une capacité politique limitée d'influencer l'agenda politique national. Un apport important de financement des pays développés livré a priori combiné à l'adoption d'un mécanisme progressif basée sur des projets pourraient contribuer à renverser cette tendance.



## Abstract

The Framework Convention on Climate Change has yet to deal with tropical deforestation although it represents an important source of greenhouse gas emissions. In December 2005 negotiations on a possible regime to reduce emissions from deforestation resume under the impulse of a regime proposal based on the concept of compensated reduction. Over the course of 2006 Panamanian policy-makers working within the National Environmental Authority (ANAM) determine that such a regime is in the interest of Panama given that the integrity of the Kyoto Protocol's existing flexibility mechanisms is protected. However reducing its deforestation rate is not currently possible for Panama due to ANAM's limited institutional capacity to act on the field and limited political capacity to influence the national agenda. Important up-front flows of funds from developed countries combined with the adoption of a progressive project based compensation mechanism could contribute to reverse this trend.

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## List of Acronyms

**ACP:** Panama Canal Authority
**AD :** Avoided Deforestation
**ANAM :** National Environmental Authority of Panama
**CATIE:** Center for Tropical Agronomy Reasearch and Teaching
**CDM**: Clean Development Mechanism
**CER** Certified Emission Reduction Units **$CO_2$** : Carbon Dioxyde
**CFC** : chlorofluorocarbons
**COP** : Conference of the Parties
**CR:** compensated reductions
**FSC** Forest Stewardship Council
**FONAFIFO:** National Forestry Fiduciary Fund
**FAO:** Food and Agriculture Organisation
**GDP:** Gross Domestic Product **PA:** Protected Areas
**GHG** : Greenhouse Gas
**G77:** Group of Seventy-Seven
**ha :** hectare
**INPE**: National Institute for Environmental Research
**INRENARE**: National Natural Resource Institute
**IUCN:** International Union for the Conservation of Nature
**ITTO:** International Tropical Timber Organisation
**IGO:** international governmental organisation
**KP** :Kyoto Protocol
**LULUCF** Land Use, Land Use Change and Forestry
**MEF:** Ministry of Ecnomy and Finance
**MIDA:** Ministry of Agricultural Development
**MOP:** members of the Protocol
**NGO:** non governmental organisation
**ODA**: Official Development Assistance
**OLAFO:** Conservation for Sustainable Development in Central America Project
**PES**: payment for environmental services
**PRONAT**: National Land Titling Program
**SBSTA** : Subsidiary Body for Scientific and Technological Advice
**SFM:** sustainable forest management
**SINAP:** National System of Protected Areas
**tC** : tons of carbon
**$tCO_2$:** tons of carbon dioxyde
**UNFCCC**:United Nations framework Convention on Climate Change
**USAID**-AED

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## Introduction

Taking action to fight climate change involves adopting a wide range of measures pertaining to all sectors of human activity. The creation of an international regime to mitigate climate change is thus certainly an all encompassing endeavour. In order for the climate change regime to fulfill its purpose of preventing dangerous human interference with the climate, it is very likely that it will need to become more complete and integrated. From a scientific standpoint this means considering all human activities that impact climate; it is to say not solely greenhouse gas emissions from industrial processes and the burning of fossil fuels, but also those stemming from many other activities such as land use change and agriculture. From a political standpoint, this means concretely involving all countries in the regime. Indeed, as economic development reaches many developing countries, it is pivotal that greenhouse gas emissions also be controlled in these countries.

Because it is an important source of emissions and because it occurs primarily in tropical developing countries, deforestation is a central issue to be addressed in the expansion of the Climate Change Regime. Yet to date, the United Nations Framework Convention on Climate Change (UNFCCC) does not include any provisions to concretely address tropical deforestation. The effects of deforestation go beyond greenhouse gas emissions; deforestation is the main cause of global biodiversity loss and is also the source of local problems such as flooding, erosion and water resource depletion amongst others.

Because it is primarily driven by the expansion of the agricultural frontier in the tropics, deforestation is also a very complex issue from a socio-economic standpoint. Indeed deforestation is linked with issues of poverty, marginalisation, population growth and economic development, all important challenges faced by tropical countries.

Past negotiations on the issue of reducing deforestation have failed for a number of technical, political as well as conjectural reasons. Despite this, discussions on deforestation have resumed following the initiative of Papua New Guinea and Costa Rica at COP 11 in Montréal in December 2005. As measures to stimulate actions to avoid deforestation are being discussed within the UNFCCC and proposals to create a global forest regime based on the valuation of forest for their carbon content are being put forward, it seems pertinent to learn more about the challenges that tropical countries face when entering into these negotiations and participating in this global initiative. Tropical countries share many concerns with regards to the development of a global forest regime, concerns for their development prospects and their national sovereignty, but they also share hopes that such a regime could contribute to alleviate poverty and provide an alternative development path. Decision makers often face complex domestic political environments in which land use policy is developed. All of these factors influence the stance that developing countries will take on the issue of reducing emissions from deforestation. This is a study of the factors that influence policy making on

the issue of deforestation in the context of international negotiations to create a global forest regime within UNFCCC. Using Panama as a case study, I will explore the question of who makes policy in the case of "Avoided Deforestation" at an early stage in these negotiations.

As a small tropical country with an important rural population engaged in deforestation as well as a relatively important area of primary tropical forest rich in biodiversity, Panama is quite representative of the many small tropical countries. However with the existence of a disproportionate service sector of the economy based on the operations of the Panama Canal which in turn depends on forest cover for its well functioning. Panama may be one of the World's most favourable places for efforts to curb deforestation to succeed.

# Part 1: The Context

## 1.1 Tropical Deforestation and Climate Change

There are many reasons why one should preserve tropical rainforests. Locally, tropical rainforests provide a number of services for local communities: they protect against flooding, soil erosion, and desertification, help regulate rainfall patterns, increase water quality and provide numerous resources such as raw materials, medicine, and food.

It can also be argued that rainforests play an important role in providing global common goods. Rainforests are home to most of the world's terrestrial species, making them an extensive library of biological and genetic resources. The issue of biodiversity has historically been at the center of the international discussion on tropical forests. Loss of habitat is leading to massive species extinction as the forests disappear. Because they are currently being destroyed at a growing rate, tropical forest have been attracting much international attention from environmental groups and others concerned with the protection of the Earth's biodiversity.

Tropical forests have another important global function: the regulation of the Earth's climate. Growing trees remove carbon dioxide ($CO_2$) from the atmosphere and release oxygen through the process of photosynthesis. A living tree acts as a

"*carbon sink*" removing $CO_2$ from the atmosphere as it grows. In this process, trees sequester important quantities of carbon in their biomass. When a tree dies and biodegrades or is burned, $CO_2$ is released back into the atmosphere and the dead tree becomes a "source" of green house gases (GHGs). The quantities of carbon exchanged between the Earth's vegetation and the atmosphere through this carbon cycle are extremely important and far outweigh human induced effects in the total carbon cycle.

However humans have managed to significantly alter the balance of this natural carbon cycle over the last one hundred and fifty years. Although there remains much uncertainty as to the role of deforestation in the global carbon balance it has been estimated that currently, deforestation could be responsible for anywhere between 15 and 35% of human induced GHG emissions (Houghton 2005, Stocker *et al.* 2001, Achard *et al.* 2002, DeFries *et al.* 2002, Silva-Chavez & Petsonk 2005). Nearly all of these emissions are related to forest conversion in tropical countries[1]. In most cases tropical forests are permanently cleared to give way to the expansion of land under agricultural use. Through deforestation, a carbon rich ecosystem or *carbon reservoir* such as a mature tropical forest is replaced by a

[1] Particular attention must be given to the definition of deforestation. In theory a forest from which timber or fuelwood is extracted but is not converted to another land use will eventually recover most if not all of its previous carbon content over the long run. As far as GHGs are concerned it is the enduring destruction of forests being replaced by other land uses (mainly agriculture and livestock grazing) that is responsible for the vats majority of net emissions on the long run. In this context a good definition is that of the FAO which defines deforestation as a change in land cover with depletion of tree crown cover to less than 10 percent (FRA 2000). In this case the contribution of agricultural expansion to deforestation is overwhelmingly dominant and other sources such as timber extraction become marginal (Jepma, 1995). It is this definition of forest that we will use for the purposes of this thesis.

carbon poor ecosystem such as pasture land or land under food cropping. In the case of Panama a tropical moist forest contains approximately 181.1 tons of carbon (tC) per hectare (ha) in the above ground biomass (Kirby 2005), whereas in the case of pasture, this content is reduced to around 4.2 tC/ha. The net result of the conversion of one hectare of such a forest to pasture is thus an emission in the range of 175 tC or 640t $CO_2$ into the atmosphere. It is however important to note that there is important spatial variability in carbon concentrations and that these are approximations rather than exact figures.

Furthermore, by reducing the area of land under forest cover, the expansion of the agricultural frontier is reducing the amount of carbon that can be stored in the Earth's above ground vegetation. This land use change reduces the capacity of the Earth's vegetation to act as a *carbon sink.*

Today, deforestation is the main source of GHG emissions in developing countries. Indeed, although the trend is towards an increase in fossil fuel emissions in the developing world, currently in tropical countries, emissions from deforestation still far surpass emissions from fossil fuel burning.

**Table 1**

| Emission Source | Developed (US, Can, Aus, NZ, Jap, EU, economies in transition) (%) | Developing (%) | Total (%) |
|---|---|---|---|
| Deforestation | 2 | 23 | 25 |
| Fossil Fuel and other sectors | 61 | 14 | 75 |
| Total | 63 | 37 | 100 |

Fig. 1 shows the relative contribution of developed and developing countries to total anthropogenic GHG emissions according the sector in 2005. Developed countries (listed in Annex I of UNFCCC) are responsible for approximately 63% of emissions most of which stem from fossil fuel burning and other sectors. The developing more populated developing world only emits around 37% of GHGs. However the vast majority of emissions from deforestation occur in the developing world and deforestation is also the primary source of emissions for developing countries. Adapted from UNFCCC (2006a p.62).

## 1.2 Deforestation in Panama

A national forest inventory was conducted by INRENARE-ANAM[2] with the help of the FAO in 1992 and in 2000 (FRA 2005). Data on land use change relying on field surveys and satellite imagery indicates that Panama's forest cover in 2000 was 33,645 $km^2$ accounting for 45% of the country's total area. The national system of protected areas (PA) consists of 65 legally recognized areas covering 10,801 $km^2$ of forest area. Therefore, 29.1% of the forests are under

[2]ANAM is the National Environmental Authority of Panama, it is the Panamanian agency responsible for environmental matters. The Instituto de Recursos Naturales (INRENARE) is ANAM's predecessor; it was a department of the Ministry of Agriculture (MIDA) until the creation of ANAM in 1998 .

governmental protection. This is a substantial area making Panama one of the world's countries with the greatest proportion of forest under official protection. Outside PAs, Panama was experiencing a rapid rate of deforestation estimated at 1.12% annually for the period 1992-2000 (see Annex A). Analysis of changes in forest cover per province highlighted important differences between them with three main zones of deforestation located eastward in the provinces of Panama (-1.53%) and Darien (-1.74%) and in the indigenous territory of the Ngobe-Bugle (-2.72%). For the period 1990-2000, annual deforestation was estimated to be 41,321 ha (FRA: 2005). This rate has not significantly changed over the last few years (FRA: 2005). Panama's deforestation rate compares rather favourably with that of other Central American countries which average around 1.7%. Costa Rica marks an exception however having reduced its deforestation rate to only 8000 ha per year or 0.3% for the period going from 2000 to 2005 (FRA: 2005).

Although Panama does not possess data on the relative contribution of each driver to deforestation and although deforestation is a complex process, Panamanian officials believed that it is safe to say that deforestation is mainly driven by the expansion of livestock grazing and agriculture in Panama (Brown Salazar[3]: pers.comm: Panama City: January 11th 2006)[4]. It was estimated that more than 70% of deforestation in Panama was driven by livestock and agricultural expansion. The remaining 30% was caused by fires, infrastructure expansion and

[3] Ricardo Brown-Salazar is a Panamanian forestry engineer that contributed to Panama's submission of views on the agenda item "measures to stimulate action to avoid deforestation" in January of 2006. See Methodology Annex for details on the process through which information was gathered.
[4] See methodology Annex for information on how information was gathered.

logging activities mainly along the Chepo-Yaviza extension of the Pan-American road in the eastern part of the province of Panamá and the province of Darién (see map 1 in Annex A). Agricultural expansion was perceived to be undertaken mainly by indigenous and poor and/or landless "colonos" moving or expanding their activities into the forest (Brown Salazar; Melgarejo[5]: pers.comm. Panama City January 11th 2006). The "deforesters" or stakeholders are perceived to be numerous, living in often remote areas and forest was mainly giving way to subsistence activities or small scale ranching. As one Panamanian official stated "*Deforestation is the work of many doing their little bits everywhere*"[6] (Brown Salazar: pers.comm. Panama City January 11th 2006)."

These direct drivers of deforestation are in turn caused by a complex interlinkage of underlying demographic, social, economic, technological, policy and institutional factors which we will now examine[7].

From the demographic side, rural population which represented 38 percent of the total population in 2000 is experiencing absolute growth in Panama (Contraloria 2000). This is due to the high birth rates prevailing especially amongst the rural

[5] Carlos Melgarejo is head of the forestry department at Panama's National Environmental Authority. He was an integral part of Panama's policy making team on the issue of Avoided Deforestation. See Methodology Annex for details.

[6] "La deforestación es un trabajo de arrieros un poco en todas partes"

[7] There are many ways to analyse deforestation, this depiction of the deforestation dynamic in Panama follows the theoretical framework based on immediate drivers and underlying causes of deforestation developed by Geist and Lambin (2002). The identification of the various drivers and underlying causes stems from the information and interpretation of the deforestation dynamic made by Panamanian officials in charge of this dossier and contained in official documents presented to the FAO for the Global Forest Resource Assessment conducted in 2000 and 2005 (FRA 2000 and 2005).

poor[8]. In the absence of economic alternatives to agriculture or ranching in rural areas which we will discuss later, population growth understandably causes pressures for access to land. Most of the population "excess" of rural Panama is absorbed by the city, where many find employment in Panama City's service sector (Contraloria 2000), however a small part of this landless population moves to the forest frontier in search of land. Migration patterns at the internal level in Panama seem to corroborate this hypothesis. The rate of population growth in Darién was 5.15% annually in the 1980's, the second highest of any province and about twice the national growth rate, the annual deforestation rate in Darién has since then been the highest of any Panamanian province (see Annex B).

Landlessness must also be considered as a social or distributive issue. Indeed land ownership concentration is extreme in Panama: in 1990 seventy one percent of farmers owned less then five percent of the land (see Annex B). Although numbers are missing, nothing could lead us to challenge the fact that the bulk of the rural land owners are still concentrated on a very small fraction of the land. This extreme inequality in land endowment contributes to greatly increase the pressure for access to land caused by rural population growth.

From the economic side, migrants to the forest frontier will usually get involved in a mixed economy combining subsistence and market production (Tschakert et al. 2007). In many cases it is the national demand that is driving deforestation as

[8] The fecundity rate was of 3.5 children per women in rural Panama for 2000-2005 the corresponding fecundity rate was of 2.3 in urban areas (Contraloria 2000). See Annex B for a comparison of population growth and deforestation rates.

Panama is experiencing rapid economic growth (FRA 2000 p.5.). Panama has seen an 8.1 percent GDP growth in 2006 and 8.5 percent growth is forecasted for 2007[9]. Market growth and commercialization are having a great impact on the supply and demand of timber, fuel wood or charcoal, food and beef meat.

The impact of demand growth on deforestation is especially important with regards to beef meat since the expansion of cattle ranching had been identified as the main drivers of deforestation in Panama (ANAM 1999a; FRA 2000). Indeed we can observe a positive relationship between per capita GDP and beef meat consumption in Central America[10]. The impacts of timber extraction on deforestation are very different. Timber extraction is practiced on a selective basis in Panama, it is not cause for areas to be clear cut. Its direct contribution to deforestation is thus negligible ((Brown Salazar; Melgarejo: pers.comm. Panama City January 11th 2006)). However logging roads are often the pathway into the forest for landless poor peasants (Geist et Lambin 2002; FRA 2000. p.5.). This seems most apparent in the Province of Darien, the most important timber extraction area of Panama which is also experiencing the highest deforestation rates (See Annex A).

These important economic and demographic drivers exert pressure on the remaining forests of Panama. Economic and population growth require an

[9] See http://www.contraloria.gob.pa/

[10] Panama and Costa Rica, the wealthier countries of the region consume a significantly higher amount of beef meat per capita, 20.5 kg/year and 18.5kg/yr respectively compared with the 5 kg/yr. average in the rest of the region. See Perez (2002).

increase in agricultural and beef meat production nationally; this is especially true if we consider that many in the rural world practice subsistence agriculture to feed themselves and cannot afford food imports. Conceptually increasing production can occur either through an increase in the productivity of the land currently under cultivation or an expansion of the agricultural frontier (Chomitz 2006). In Panama just as in the rest of Central America it is overwhelmingly the latter that we are experiencing (Kainmowitz 1996a; FRA 2000; ANAM 1999a). Slow technological change in livestock management and agricultural production has favoured extensive production systems in the region (FRA 2000; ANAM 1999a). Deforestation pressures are thus exacerbated by the use of extensive agricultural practices. These practices typically result in a process through which deforested land is unsustainably used for agricultural or cattle production (ANAM 1999a). As a result, the land rapidly degrades to the point where it is no longer productive. Farmers often looking to fulfill immediate needs then abandon the land and move on further into the forest as the cycle resumes (FRA 2005b: p.5). In the case of heavily weathered lands on steep slopes, the degradation process can occur within a few years (Kainmowitz 1996a. p.1.;ANAM 1999a; FRA 2000). This process of land degradation is particularly acute in the older and more populated rural areas of Panama which are referred to as the "Arco Seco" (Dry Arc) by ANAM officials. (FRA 2000; ANAM 1999a; Interview no.4)

To explain why the expansion of the agricultural frontier and the accompanying unproductive unsustainable practices have predominated over intensification and increased productivity, we must examine policy and institutional factors.

From a conceptual standpoint, it has often been argued that forests constitute an open access resource the management of which must be regulated to avoid wasteful and often unsustainable use (Chomitz 2006. chap 3. p.89). Incentives and constraints can shape forest outcomes in terms of environmental quality and income of local populations (Chomitz 2006: chap.2). Generally, the situation that prevails in Panama's forest as a result of the existing institutional and legal framework is that of a deficiently managed or unmanaged open access resource (ANAM 1999a; FRA2005 p1.). The existing institutional and legal framework does nothing to provide incentives to make a rational use of the land and promote intensification (ANAM 1999a, FRA 2000). Outside the large protected areas where some restrictions exist concerning land use, forests are public lands with no serious constraints on access. Furthermore, some policies and legal provisions have created strong incentives to deforest in Panama as we will now examine.

From a legal standpoint, the literature stresses the perverse incentives created by land tenure policies that promote deforestation to establish property rights in Central America (Jones 1990; FRA 2005; ANAM 1999a). In Panama, the Constitution provides an incentive to deforest given the interpretations that one can make of its article 119 which stipulates that the State does not support the existence of unproductive and unused land[11]. The Agrarian Code of 1962[12] according to its general interpretation stated that land titles or land property rights

[11] "...el Estado no permite la existencia de áreas incultas, improductivas u ociosas" Constitution of Panama.
[12] Ley N° 37, of the 21rst of September 1962.

("derechos posesorios"), can only be granted for lands without forests. This law has generally been interpreted to mean that one must deforest land before it can be granted any rights (Brown Salazar: pers. Comm. Panama City January 2006; ANAM 1999a). Certainly this is a strong incentive to deforest for medium and larger land owners looking to gain rights to the land. This is further accentuated by the fact that land titles or land-use rights are a prerequisite to access government agricultural loans. It is easy to understand how this legal framework strongly compromises the legal status of non-deforesting privates uses of the land (Brown Salazar, Melgarejo: pers. comm.. Panama City January 2006; ANAM 1999a).

However, most farmers in Panama do not have land titles or recognized "derechos possesorios" (ANAM 1999a). This is due to the fact that small farmers cannot afford the legal process required to gain a title to the land[13] (ANAM 1999a). From a sociological perspective, uncertainty about property rights coupled with the forest being an open access resource leads farmers who do not formally own the land and who do not possess the certainty that they eventually will, to view their stay on the land as rather transitory[14]. Rather than promoting long term investments to increase productivity, this situation promotes unsustainable use of the land based on short term maximization of benefits with the expectation of later

[13] The PRONAT program enacted by the Ministry of Economy and Finance of Panama is currently aiming to hand out land titles on all of the private Panamanian territory. For more information on PRONAT see the Ministry's website at http://www.mef.gob.pa/pronat/inicio/default.asp.

[14] The relevance of this issue to Panama was brought to my attention through discussions with Camilo Montoya, USAID-AED consultant. For a more general discussion on land property uncertainty, see Helmut J.Geist and Eric Lambin. What Drives Tropical Deforestation? LUCC International Project Office Report.

moving on into the forest. At a macro scale this understandably leads to a "tragedy of the commons" where resources are being degraded[15]

From a policy standpoint, rural development policies have played a major role in promoting extensive and unsustainable uses of the land.

Historically government colonization schemes have deliberately promoted deforestation. In the 60's and beginning of the 70's there was an extraordinary change in Panama at the landscape level. The so called government projects "La Conquista del Atlántico" and "la Conquista del Darién" looked to convert extensive forested areas into agriculture and cattle ranching lands (ANAM 1999a).

The literature on deforestation in Latin America emphasizes the role that government subsidies for livestock credit have had in promoting deforestation (Mahar 1988; Binswanger 1991). The case of Panama is a good example of this[16]. Credit policies enacted by the Ministry of agricultural development (MIDA) and its financial arm, the Banco Agropecuario where designed to promote cattle ranching and are still in force today (ANAM 1999a; FRA 2000; Interviews: 2,3). Indeed cattle ranching is the most land extensive and least productive agricultural activity practiced on a wide scale in Panama. It is generally practiced in a

[15] See Chomitz 2006 chapter 2 p.60-78 for the conceptual basis for this argument.
[16] The observations contained in this paragraph are based on my collaboration with Panama's National Environmental Authority in January and February of 2006 and on interviews conducted with Panamanian officials in December 2006 in Panama City. See Methodology Annex for details.

completely unsustainable way, destroying organic soil content through rapid erosion and depleting soil productivity to the point of abandonment (ANAM 1999a; Kainmowitz 1996. p.1; Coomes et al. *In press*). In the older settled areas of Panama, such abandoned fields now represent an important feature of the landscape (pers. observation). The ratio of cattle per hectare has fallen below one in Panama (See Annex B). Notwithstanding unsustainability and low productivity, loans for cattle ranchers are very easy to access. This is because of the low risk associated with such loans for banks: in the event of default, financial institutions can always seize the cattle to recover part of their investment (ANAM 1999a).

It has been argued that such a low ratio of cattle per hectare involves negative returns (Coomes et al. In Press), however ranching activities are quite popular amongst small farmers. The literature emphasizes that characteristics of cattle such as their low labour and supervision requirements, transportability, limited risk, prestige value, limited use of purchased inputs, and biological and economic flexibility are responsible for this reality (Hecht 1992). Coomes (In Press) corroborates this hypothesis when examining small scale ranching in Eastern Panama. The Zebu cattle of Panama although they produce low quality meat are very resilient and display low mortality rates. They thus represent a reliable source of inflation free liquidity for poor farmers without cash savings in the event of unexpected expenses (Coomes et al. In Press).

On the opposite, crops and forest plantations present much higher returns and are much more intensive practices (Coomes et al. In Press). However, most intensive crops present high risks of failure because of pests or drought and flooding related to variable climatic conditions especially during the ENSO climatic variation years of El Niño and La Niña. Forest plantations required heavy up-front investments concentrated in the first few years of the project and can only provide long term yields. This made it impossible for small peasants in need to fulfill their immediate needs to engage in those activities without significant access to credit. Risks of fire or pest and the absence of qualifications for these ventures in the peasant population make such investments unattractive to financial institutions (FRA 2000; ANAM 1999a). Banks are thus much keener on lending to ranchers than to peasants looking to develop intensive practices. This not only made it difficult to develop intensive practices, but also created a serious incentive to engage in extensive, unsustainable and unproductive practices (ANAM 1999a).

To sum up, a complex interlinkage of underlying factors pertaining to many different realities of rural Panama converged to create the deforestation dynamic. Economic and demographic pressures as well as socio-distributive issues are exerting pressure on forests. The existing legal and institutional framework has proven inadequate to promote a rational use of the forest commons. This framework has combined with agricultural policies completely insensitive to the issue of deforestation to exacerbate the deforestation problem in Panama. This

dynamic has been in place for decades, it is well embedded in the political economy of rural Panama and shows no sign of significantly slowing down

## 1.3 UNFCCC: The Climate Change Regime

With the signing of the United Nations framework Convention on Climate Change (UNFCCC) in 1992, nearly all of the world's states (189) have entered a new international regime. The Convention on Climate Change sets an overall framework for intergovernmental efforts to tackle the challenge posed by climate change. It recognizes that the climate system is a shared resource whose stability can be affected by industrial and other emissions of carbon dioxide and other greenhouse gases. It's ultimate objective is "the stabilisation of greenhouse gas concentration in the atmosphere at level that would prevent dangerous anthropogenic interference[17] with the climate system..."(UNFCCC article 2).

From a scientific standpoint, there are two complementary ways to tackle anthropogenic interference with climate: reducing emissions by *sources* and enhancing *sinks*. *Sources* are mainly fossil fuel combustion for industry and transportation; use of chlorofluorocarbons (CFCs) in refrigeration systems, and use of CFCs and halons in fire suppression systems and manufacturing processes; waste and waste water treatment; agriculture and livestock; and deforestation. Sinks are carbon reservoirs increasing in size as they remove CO2 out of the atmosphere to store it in organic matter. The main terrestrial carbon reservoirs are

[17]The term "anthropogenic interference" refers to human induced climatic disturbances. The threshold for dangerous anthropogenic interferences as been set at 2* Celsius ( see IPCC).

the soils and forests. In the Kyoto Protocol activities aimed at increasing removal by sinks are categorized as pertaining to the *Land Use, Land Use Change and Forestry* (LULUCF) sector. Increasing terrestrial vegetation and soil organic matter through changes in agricultural practices such as practicing no-till agriculture, reforestation through assisted natural regeneration or forest plantations are all ways to improve *removal by sinks*. Decreasing the use of flooding agricultural techniques, improving fertilizer use or reducing deforestation are ways to reduce emissions by sources. LULUCF concerns thus both *sources* and *sinks*, forests are both a *source* through deforestation and a *sink* through forest growth[18]. In the framework of the Convention and its Protocol however, LULUCF issues have been treated in the discussion surrounding sinks[19].

### 1.3.1 Sources

To concretely address emissions from sources, Parties to the UNFCCC adopted the Kyoto Protocol in 1997: industrialized countries (Annex1) have taken binding commitments to reduce their GHG emissions in absolute terms[20]. In order to meet their objectives Annex 1 countries have adopted hard caps on GHG emissions at

[18] Mature forests which have long been considered at equilibrium are now considered to be net sinks because of CO2 fertilization, however uncertainties linked to important feedback effects remain (Potvin: pers.comm.)

[19] It is beyond the scope of this thesis to give a detailed description of the evolution of negotiations on LULUCF within UNFCCC. See Jung (2004) for details.

[20] The goal of Kyoto is to reduce GHG emissions by 5.2% under the 1990 levels in industrialized countries. The focus is on emissions of six greenhouse gases - carbon dioxide, methane, nitrous oxide, sulfur hexafluoride, HFCs, and PFCs. Emissions are calculated as an average over the five-year period of 2008-12. National limitations range from 8% reductions for the European Union and some others to 7% for the US, 6% for Japan, 0% for Russia, and permitted increases of 8% for Australia and 10% for Iceland. See kyoto protocol art.3. and Annex A and B.

national level and have introduced a number of mechanisms (KP art.6) that allow for flexibility in the respect of caps. These flexibility mechanisms concern mainly the exchange of "carbon allowances" also called "carbon credits" between the different emitters bound by the Kyoto Protocol. This mechanism is referred to as "cap and trade".

On the other hand, it was agreed that because of their limited historical contribution to climate change developing countries shared a *Common but Differentiated Responsibility* to take action (UNFCCC art.3 par.1). It was also agreed that developing countries had a *Right to Sustainable Development* (UNFCCC art.3 par.4) and therefore a right to increase GHG emissions to fulfill their legitimate development needs. Consequently, developing countries (Non-Annex 1) would not make binding commitments to reduce GHG emissions under the Kyoto Protocol. The Protocol entered into force in 2005[21].

The Kyoto Protocol does however involve developing countries in concrete ways through the Clean Development Mechanism (CDM) (KP art.12), a flexibility mechanism that allows Annex 1 countries to fulfill part of their commitments by investing in sustainable development in Non-Annex 1 countries. CDM is a project based mechanism that allows for investment in many sectors including energy, industry, waste treatment and forestry. If the mechanism's strict requirements are met, projects are approved by the CDM executive board and they can generate

[21] After Russia's ratification in late 2004, the Protocol met the requirements for entry into force,a sufficient amount of countries representing more than 55% of the total carbon dioxide emissions for 1990.

tradable "carbon credits". This requires that benefits for the climate be measured[22] and that monitoring be made following approved methodologies to ensure delivery of those benefits. The fact that CDM is project based is of importance since it allows for most CDM activities to be carried out by the private sector. While it involves a minimum level of governmental oversight from Non Annex 1 countries, it does not require significant financial involvement but can potentially generate important benefits in the form of technology transfer and foreign direct investment (Interview: no.1).

### 1.3.2 Sinks and the CDM: LULUCF

It was only a few months before the third Conference of the Parties to the Convention (COP 3) in 1997 where Kyoto was negotiated that negotiators became aware of the importance of sinks for the negotiations of quantified targets (Jung 2004). In front of the complexity of the issue from a technical, methodological and political standpoint the issue of removal by sinks was left out by the initial protocol, it was to be discussed at the subsequent annual Conventions of the Parties to the UNFCCC and Kyoto Protocol[23]. It has since been a very contentious issue.

The draft text on Clean Development Mechanism (KP art.12) contained a note that sinks might be included in the CDM depending on the resolution of the issue

[22] In the CDM, benefits for the Climate are termed Certified Emissions Reductions and are measured in tons of C02 a ton of carbon is equivalent to 3.6 tons of C02).
[23] The acronym for this meeting is COP/MOP

under Article 3[24] (Depledge, cited in Jung 2004). However, in the final version coming out of Kyoto, this footnote had been erased. Thus, the text on Article 12 only refers to emission reductions. It remained unclear if this wording meant that sinks were to be excluded from the CDM or not (Fry, cited in Jung 2004). It was not only contentious whether to include LULUCF at all, but also which activities would be eligible in the case of such an inclusion. Some countries were aiming at an even wider inclusion of LULUCF than stipulated under Article 3[25]. It was only after a substantial negotiation effort at COP 7 in Marrakech in 2001 that it was agreed that only reforestation and afforestation activities[26] would be allowed under CDM (A/R CDM). The use of LULUCF credits for complying with the reduction targets was limited to 1% of base year emissions of each Annex 1 Parties per year.

To this date, although deforestation is responsible for anywhere between 15 and 35% of human induced GHG emissions, neither the UNFCCC nor its Kyoto Protocol include any provisions to stimulate action to avoid deforestation. Various

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[24] Article 3 Kyoto Protocol discusses the issue of sinks. Under Article 3.3 and 3.4, Annex I countries are allowed to meet their emissions reduction commitments by using net changes in greenhouse gas emissions by sources and removals by sinks resulting from direct human-induced land-use change and forestry activities. This is limited to afforestation, reforestation and deforestation since 1990 (Article 3.3) and four management activities (forest management, cropland management, grassland management and revegetation) (Article 3.4).

[25] It is not necessary for the goals of this thesis to review the whole discussion on sinks within the UNFCCC and the Kyoto Protocol. For an analysis of country positions on the issue of sinks, see Jung 2004.

[26] The Marrakesh Accords define afforestation as the conversion of land that has not been forested land for a period of at least 50 years to forested land. Reforestation is the conversion of non-forested land to forested land where, for the first commitment period, activities are limited to land that did not contain forest on 31 December 1989. In the Clean Development Mechanism these activities are referred to as A/R CDM.

reasons have been brought up to explain why *avoided deforestation* as well as other LULUCF activities were excluded from the CDM[27]. For the purposes of this thesis it is not necessary to make an in depth review of the context which led to this specific outcome since it involves many aspects of UNFCCC and KP negotiations not directly related to Avoided Deforestation and tropical countries. Focusing on issues of concern to tropical countries we can point out three main reasons for exclusion which still bear importance today as we will discuss. First an important reason seems to be that Kyoto emission targets had already been negotiated and that in the absence of such restrictions, forestry activities would divert resources from other fossil fuel mitigation efforts (Karousakis 2007. p.11). Second, technical concerns remained with regards to the issues of leakage, permanence, additionality of effort, monitoring and measurement uncertainties (Ebeling, 2006; Jung 2004)[28]. Third, core political issues relating to the fundamental principles of sovereignty, right to sustainable development, additionality of funding and conditionality in the transfer of funds plagued North-South relations regarding environmental issues (Parks 2001; Najam 2002).

## 1.4 Avoided Deforestation

Essentially, *avoided deforestation* (AD) refers to emission avoidance through forest protection. The simple idea is that by reducing their deforestation rates, Tropical Countries would be contributing in a significant way to reducing

[27]See Jung (2004) for the history of sink negotiations within UNFCCC.
[28] We discuss these concepts below.

anthropogenic GHG emissions. Integrating measures to stimulate action to avoid deforestation in the framework of UNFCCC raises many issues both from a technical standpoint as well as from a political one.

Three concepts have been central to the discussion on the Clean Development Mechanism (CDM) for the Land use, land use changes and forestry (LULUCF) sector. These are *additionality of action* (KP art12. par5(c)), *permanence and leakage*. These concepts have been largely promoted during the Kyoto negotiations in order to ensure that any mechanism to be developed would entail a *real benefit for the climate* (KP art12. par5(b)) (Yamin and Depledge 2004). Respecting these concepts is not only essential to ensure the "carbon integrity" of the CDM, but also that of any mechanism aimed at fighting climate change in the LULUCF sector.

*Additionality of action* is an economic concept which attempts to make a clear distinction between reductions attributable to voluntary efforts by governments and contingent phenomena. This is a central concept of the Kyoto Protocol (KP. art.12. par.5 (c) art.6 par1(b)). This implies that to be acceptable in term of carbon trading, actions should be undertaken above and beyond the normal course of actions. Determining the extent to which an action may be considered additional involves the difficult task of establishing a counterfactual scenario often called *baseline* or *business as usual*.

*Leakage* refers to the displacement of activities partially cancelling the climate benefits generated by project activities. For example under CDM, project proponents need to prove that the stakeholders promoting a reforestation CDM would not cause the displacement of emission in other regions of the country. In the case of avoided deforestation, it has been shown that if some areas are "closed" to agricultural expansion, at least some of the agents involved in deforestation in these areas will relocate their activities and invade an "open" forest frontier causing leakages that cancel part of the climate benefits generated (Chomitz 2006. p.201; Brown et al. In press).

Finally, *permanence* refers to the risk that GHG emissions reductions may not be permanent since land uses are susceptible of changing over time. If a sink for which carbon credits have been sold was to be destroyed through a change in land use or a disturbance (fire, hurricanes, illegal activities, etc.), then these credits would no longer represent real benefits for the climate.

Furthermore, it is essential that deforestation be effectively monitored at a scale sufficient to make precise estimates of the GHG emissions it caused. Precision in carbon measurement is pivotal to assess the *additionality of action*, to calculate the extent of *leakages* and verify *permanence*. Hence the capacity to precisely monitor forest cover and measure deforestation in terms of CO2 emissions is a necessary requirement to set-up a fair and credible compensation mechanism.

It is commonly received that preserving the remaining tropical forests is in the better interest of humanity as a whole. Contrary to most other LULUCF activities which can be carried out on a project basis, curbing deforestation involves profound changes in a society's land use pattern.

The creation of this regime raises important and intricately linked socio-economic and political concerns because of its possible implications for the *sovereignty* and *right to sustainable development* of the developing world. Let us understand these concerns both in the broad context of "North-South" relations in international environmental negotiations as well as in the particular context of UNFCCC.

Because developed countries have already deforested the bulk of their forests, most of the forests that we can "avoid" to cut down are in the developing world. Certainly developed countries looking to fight climate change or preserve biodiversity would like to see deforestation rates drop in tropical countries and have exerted pressure for this to happen through the various international fora on forests. Tropical countries have made some efforts to protect pristine rainforests but have resisted legally binding commitments to a global forest regime in the past, arguing that imposing restrictions on their land use planning practices would constitute an infringement upon their national *sovereignty*. The *sovereignty* principle[29] has often been used to argue that action to curb deforestation should not be imposed on countries but should take place on a voluntary basis and it should be left to the sovereign states to determine the strategies to be used.

[29] UNFCCC preamble

This stance reflects the political concern that binding commitments to reduce deforestation could impede economic development and impose an unjustly heavy burden on tropical countries. This fear is legitimized by the fact that the division of economic power and production schemes in the world shadows that of deforestation. Since the first international environmental conference in Stockholm, Sweden (1972), it has been agreed that Southern countries have a *right to sustainable development* which environmental measures should not compromise[30]. From a socio-economic standpoint, this argument is supported by the fact that poor nations many times face large opportunity costs when choosing to implement environmental reforms. The tradeoffs often seem clear–cut. Populations living in poverty will understandably value the fulfillment of immediate needs such as food, shelter and water over sustainable resource management. In the case of forests, this is even clearer since most of the forest frontier population of the tropics lives in poverty (Chomitz 2006, chap 3. p.81-104). It follows that Southern countries should receive considerable funds from industrialized nations to implement environmental reforms. It has thus been agreed that the costs of important reforms such as reducing deforestation should be bourn in a substantial part by developed countries. Hence, the principle of *additionality of funding* was born.[31]

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[30] Stockholm Declaration. Principle 11. UNFCCC art.4.

[31] See Najam (2002). It is important to distinguish the principle of *additionality of funding* from the principle of *additionality of efforts* in the generation real benefits for the climate.

This formulation of the problem has often been attributed to Maurice Strong, who led international environmental negotiations for nearly three decades as the head of the Canadian International Development Agency (Parks 2003). The Bruntland Report (Agenda 21) also stated that "[t]he implementation of the huge sustainable development programs of Agenda 21 will require the provision to developing countries of substantial new and additional financial resources.[32] It was agreed by all parties that this would require a much stricter adherence to the .7% of GDP target for Official Development Assistance and the developed bloc did in fact affirm their intention to take the necessary action.[33] While private investment would be encouraged, aid for sustainable development was conceptualized from the very beginning as absolutely indispensable to inducing Southern cooperation on environmental issues. This vision of the problem predominated as we got to the Rio Earth Summit in 1992 (Parks 2003). Obviously the problem is more complex; there exist tremendous inequalities in rights and income distribution stemming from the marginalization of many of the poorest citizens of the tropics. This is especially true in forest areas (Chomitz 2006. chap.3 p.81-104). However, regardless of whether the South's developmental needs were perceived or real, rich nations agreed (at least "in word") at Rio that any future demands for Southern environmental compliance would be seen as unreasonable without external financial assistance (Parks 2003).

[32] Agenda 21 document. Chapter 33

[33] The .7% of GNP target for international aid was established by the 1969 Pearson Report and has been religiously violated by most donors for over thirty years. In 2000, bilateral donors on average channelled .22% of GNP to development assistance. (Martens 2001).

In the specific context of UNFCCC, this formulation of the problem is embodied in Article 4 which states that "the extent to which developing countries will effectively implement their commitments under the Convention will depend on the effective implementation by developed country Parties of their commitments under the Convention related to financial resources and technology transfer taking fully into account that economic and social development and poverty eradication are the firs and overriding priorities of the developing country parties." (UNFCCC Art.4 par.7)

This framing of the issue has proved deeply problematic because developed countries have not showed the domestic political will to raise aid flows to the required levels. In recent years the North's focus has shifted towards *efficiency* in the use of existing funds and *conditionality* in the delivery of aid (Parks 2003; Najam 2002;Wunder 2002). One of the invoked explanations for this lack of will is based on a critique of the use of existing funds: waste and corruption, but also the use of "green aid" for purposes other than environmental betterment (Parks 2003). It follows that donors who are looking to forward their green agenda will withhold funds until they receive satisfactory signals that these funds will in effect be used to the purposes they were destined for.

Historically, forest negotiations have been at the core of the North–South divide over the principle of *additionality of funding*. It is beyond the scope of this thesis to make a detailed analysis of the history of negotiations under the different fora

and the reasons for their failure[34]. However it is important to keep in mind that alternative fora exist and that negotiations did not start with *avoided deforestation*. Past negotiations have not allowed reaching an agreement on the key issues of *additionality of funding* and *conditionality in the transfer of funding*. The G77 has generally sought to link an issue of high salience to the North but of relatively low salience to the South (forest conservation) with issues of high salience to the South but which threatened key domestic interests in the North (namely the reallocation of resources from North to South) (Susskind, 1994, pp. 82–98). The North has generally sought to make any transfer of funding to the South conditional to the delivery of effective and quantifiable environmental benefits for which the funds are dedicated (Parks 2003; Wunder 2005).

To sum up, much of the disagreement on the issue of curbing deforestation relates to the South asking for more money and the North asking for more accountability. The South argues that in order to respect developing countries' *sovereignty,* participation in environmental initiatives must not be legally binding but *voluntary* and in order to respect the *right to pursue sustainable development, new and additional funding* is a prerequisite to participation. The South's insistence on

[34] The global deforestation problem, because of its relevance for many important sectors of activity and many contentious issues in international affairs such as timber trade, agriculture and biodiversity protection has led to the creation of a global forest regime of which provisions exist under a variety of covers: apart from UNFCCC, forest provisions exist in the Convention on Biological Diversity (CBD); the International Tropical Timber Agreement which led to the International Timber Trade Organisation (ITTO); the Convention to Combat Desertification (CCD); the RAMSAR Convention on Wetlands of International Importance; the World Heritage Convention; the World Trade Organisation; the Convention Concerning Indigenous and Tribal People; and the International Forum on Forest (IFF) which was followed by the International Panel on Forest (IPF) which in turn led to the permanent United Nations Forum on Forest (UNFF). Thus, international negotiations on forests must be considered in the broader context of global environmental negotiations.

these principles often enters in conflict with the North's insistence on *efficiency in use* and *conditionality in the transfer of funds*. The South's refusal to take on legally binding commitments to which they can be held accountable arguing that such commitments would infringe upon their national sovereignty to manage land use has been answered by the North's refusal to provide additional financial resources. The past decade has not witnessed any significant change in the deforestation trend in the South and even witnessed a reduction in Overseas Development Assistance (ODA) directed to the forestry sector as a proportion of the North's total ODA. Funding reached an all time low in 2004. ODA to the forestry sector amounted to only 0.3% of total ODA, compared with past averages of 0.6% to 1.2% since 1990 (OECD CRS Database 2005).

It is in this context that we can appreciate the importance of the technical issues of *additionality of action, leakage, permanence and monitoring* for an avoided deforestation mechanism. A mechanism that brings solution to these critical issues would insure that actions taken generate quantifiable *real benefits for the climate* allowing for *new and additional funding* to become conditional to the delivery of environmental benefits. This would offer a serious potential to bridge the gap between North and South on the issue of deforestation. On the contrary, it seems unlikely that any system that would involve transfer payments between countries with few strings attached (e.g. traditional ODA) would generate the necessary funds to significantly reduce deforestation (Karousakis 2007. p.11). The following section examines in detail a mechanism proposed to bridge this gap.

### 1.4.1 Compensated Reductions

The idea of creating an international mechanism to reduce emissions from deforestation was brought back to life in recent years. Two Brazilian scientists, Santilli and Moutinho from the National Institute for Environmental Research (INPE) wrote an article in *Climate Change* in 2005[35] and also presented an important document with the American NGO Environmental Defence that same year[36]. Their work proposed a way to solve the contentious issues between North and South in the case of forests: they proposed an international market based mechanism for AD based on the concept of "*compensated reductions*".

*Compensated reduction* (see figure 1) proposes that tropical countries capable of lowering their national deforestation rates below a *baseline* deforestation rate be allowed to sell carbon allowances equivalent to the reduction in CO2 emissions generated by having *avoided deforestation.* Baselines are developed at the national level to prevent the *leakage* that could result from the displacement of deforesting activities inside a country (Brown *et al.*: in press). Baselines would be set either according to historical trends (see figure 1). A country that would lower

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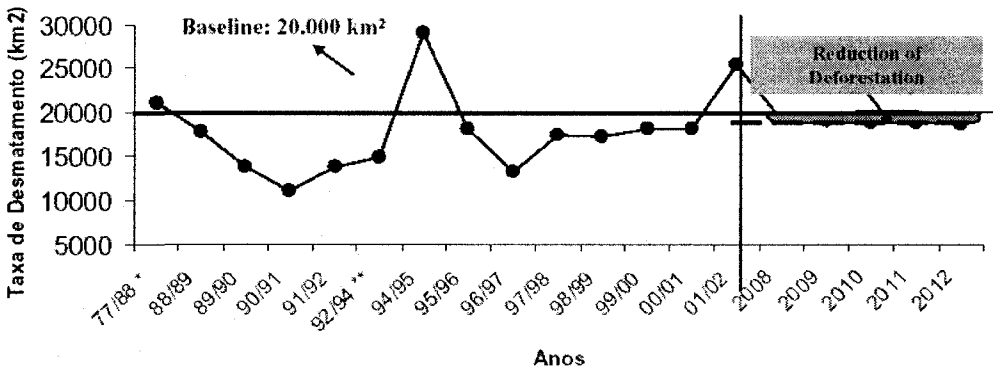
[35] Santilli, M., Moutinho P., Schwartzman, S., Nepstad, D., Curran, L., and Nobre, C. 2005.In: 'Tropical deforestation and the Kyoto protocol'. *Climatic Change,* 71, 267-276.

[36] Moutinho, Paulo and Steven Schwartzman eds. Tropical Deforestation and Climate Change, *Insituto de Pesquisa Ambiental de Amazonia, www.environmentaldefense.org/documents/4930_TropicalDeforestation_and_ClimateChange.pdf*

its deforestation rate below this established baseline by developing a national strategy would thus be demonstrating *additionality of action* in generating real benefits for the climate (turquoise area in fig 1). Countries would take on a national voluntary commitment to reduce their deforestation rates in the form of a reduction target vis-à-vis this national baseline. Developing countries meeting their target would be allowed to trade the achieved emission reductions, coined compensated reduction (CR), through a carbon market. This market could either be specific to AD or be fully fungible with the international carbon market created by Kyoto.

To deal with *permanence* the mechanism would only allow countries to sell part of the carbon credits generated through AD, banking the remainder in case of non-permanence. This way a country that sold carbon credits for AD in a first period but later saw an increase in its deforestation rate in a second period would dispose of some breading room before a serious permanence issue arises.

**Figure 1**




Source: INPE 2003

* Decade mean

** Biennium mean

**% reduction of deforestation = ~ 5%**

**Mean of Avoided Emission: 12 Million Tons C/yr**

Fig.1 Illustrates how compensated reduction would work based on deforestation baselines set according to historical trends. In this case baselines would be set according to the mean deforestation rate over the last 20 years. In this fictitious case a country managed to reduce its deforestation rate by 5% below the historic baseline. It has thus avoided deforesting an equivalent of 12 millions tons of carbon per year (turquoise area) and could be compensated for this additional benefit generated for the climate.

The novelty in INPE's proposal was that it proposed a way through which recent developments in satellite imagery could contribute to making the AD initiative possible by considerably reducing the costs of precise *monitoring* of tropical forest cover at a national scale. Land use change and fluxes in carbon stocks in forests could be monitored from space via satellite imagery and quantified in

terms of carbon; this new possibility for *monitoring* coupled with the proposed solutions to address *additionality of action, leakage and permanence* now made it possible to envision a market instrument based on the sale of carbon credits for *avoided deforestation* providing incentives to reduce deforestation rates. These new possibilities opened the path to the design of a financial mechanism that could provide *new and additional funding* for tropical countries to reduce deforestation while assuring that transfer payments be *conditional* to effective reductions in emissions from deforestation. *Compensated reductions* seemed to offer a solution to the debate over *additionality of funding* and *conditionality in the transfer of funds* which had plagued forest negotiations in the past.

However most developing countries lack the institutional capacity to control land use change at present and would need significant start-up funds to develop such a capacity in order to participate in AD (Santilli and Moutinho 2005). Acknowledging this, INPE proposed the sale of options on future markets for carbon credits generated through AD as a means to gather the necessary *a priori funding* to jump-start the initiative. It is in order for this sale of carbon futures to work that countries wishing to participate should voluntarily make quantified *commitments* to reduce their deforestation rates in the form of a target. This represented a novelty for developing countries since they have yet to take on any commitments in the form of emission targets through UNFCCC or Kyoto.

Compensated reductions thus proposed a first way to concretely involve developing countries in the fight against climate change by envisioning a mechanism providing compensation funding through the carbon market. The envisioned market for AD would resemble the Annex 1 market for emission trading in the sense that it relies on country commitments to guarantee the value of credits, but it is obviously different since funding for the initiative would come from Annex 1 countries. In many ways by proposing a first comprehensive solution Santilli and Moutinho framed the discussion on AD (Interview: 2).

### 1.4.2 COP 11 Montréal

*Avoided deforestation* reappeared as an agenda item at the 11th Conference of the Parties (COP11) to the UNFCCC in December 2005. Costa Rica and Papua New Guinea initiated discussion on the topic by presenting the submission: "Reducing emissions from deforestation in developing countries: approaches to stimulate action". The COP tasked the Subsidiary Body for Scientific and Technological Advice (SBSTA) with considering the topic over a period of two years, reporting back to COP13/MOP3 at the end of 2007. Whilst many, if not most, of the Parties viewed the proposal favourably, it was generally agreed that this was a complex endeavour and that it raised many contentious issues from a political as well as technical standpoint as we have seen.

The process was to start by the collection and publication of a submission of views. In decision FCCC/CP/2005/L.2, the COP encouraged all Parties to the Convention to submit their views on this agenda item. The call of Papua New Guinea and Costa Rica was not only answered by many countries, but also by many accredited observers of the UNFCCC. In the case of negotiations in the Land Use, Land Use Change and Forestry (LULUCF) sector various IGOs and NGOs are officially allowed to contribute to the debate by expressing their views and bringing scientific or technical inputs. Views were submitted by many developing countries and were first analyzed at the 25th meeting of the Subsidiary Body for Scientific and Technological Advice (SBSTA) in Bonn (May, 2006). By the end of the period under study, the agenda item would also be discussed at a UNFCCC workshop in Rome, August-September 2006 and at COP 12 in Nairobi in November 2007. Panama engaged in these negotiations by making a submission of views[37] and later kept up to date with the international process and explored the possibilities such an *avoided deforestation* regime could offer for Panama[38].

## 1.5 Panama's Position on the Issue of Avoided Deforestation

At the end of 2006, Panama's position on a possible regime to Avoid Deforestation in the framework of UNFCCC was that such a regime was in

[37] See Annex D for Panama's submission of views to SBSTA 25 in May of 2006.
[38] I came to Panama in January of 2006 and was part of the team that drafted Panama's submission of views on the agenda item of reducing emissions from deforestation for the SBSTA meeting in Bonn in May of 2006. See Methodology Annex for details on my involvement in this process.

Panama's interest as long as it did not compromise the integrity of existing mechanism. However, it was considered improbable that Panama would be able to significantly alter the deforestation process at a national scale in the near future unless certain requirements that went beyond INPE's *compensated reductions* proposal were met.

Those requirements concerned mainly the provisions for access to *a priori funding*. Significant up-front investments would need to be made available to build capacity to devise and implement strategies to avoid deforestation. In accordance with the principle of *additionality of funding*, Panama's position was that such *a priori funding* should come from Annex 1 countries. It was considered improbable to attract such funding through the sale of futures on the carbon market as suggested by INPE because of the difficulty to make a credible commitment to reduce the national deforestation rate; it was also considered undesirable to do so because of the high risks involved with making such a commitment prior to developing the required capacity to control deforestation. On the other hand it was considered desirable but difficult to attract sufficient a priori funding from official development assistance (ODA) given the North's limited willingness to pay.

In this context the most feasible option for Panama was to promote a project based avoided deforestation initiative. An approach based on pilot projects would limit risks allowing for funding to come through smaller market transactions and

could progressively build capacity to devise and implement strategies to curb deforestation thus having important demonstration effects. By clearly demonstrating the economic viability of curbing deforestation, a successful project at the sub national level could give a strong impetus to the harmonization of policies and the inter-institutional coordination of land use practices towards the new goal of avoiding deforestation (Interview:4).

At the end of 2006, the development of watershed based payment for environmental services schemes in the Canal Watershed, in Rio La Villa watershed and in Bocas Del Toro was moving forward as well as a 100,000ha avoided deforestation project in the Palo Seco forest reserve in between the Ngobe Bugle Comarca and the Provinces of Veraguas and Bocas Del Toro in Western Panama.

From a technical standpoint Panama's position is problematic since it is questionable whether these geographically focused approaches will be able to deal with leakages and generate real additional benefits for the climate. One can therefore question the prospects such a position holds to bridge the North-South gap on the issue of deforestation. We must point out however that at the time of writing, new developments in this dossier and especially the World Bank's creation of a Forest Carbon Partnership Facility[39], a project based pilot phase of

[39] For More Details see:
http://carbonfinance.org/Router.cfm?Page=FCPF&FID=34267&ItemID=34267&ft=DocLib

avoided deforestation finance suggests that a project based mechanism may be a viable way forward to deal with this pressing issue.

## Part 2: Policy Making

### 2.1 The Policymaking Process: Theoretical Framework

As we have seen, the initiative to create an international regime for deforestation avoidance came from outside Panama. Taking a stance in negotiations required acquiring an understanding of the stakes. From the decision maker's perspective, this meant understanding: (1) if participating in this regime is in Panama's interest ( i.e. how the regime could function and what would be the potential benefits of participation in such a regime Panama); (2) whether or not and under what conditions Panama can meet the requirements of the proposed regime (i.e. reduce deforestation) (Interview:1)

I suggest that the answer to these questions evolves as knowledge and understanding of the problem grows, and is an assessment that decision makers make (1) according to their values, interests, objectives, (2) considering what they deem feasible in the national and international political context.

**"What is the national interest?"**

The first question Panamanian officials are looking to answer when engaging in negotiations with the other UNFCCC members on AD is: "Is participation in a deforestation avoidance regime in Panama's interest?"(Interview:1). Under what conditions is this so? What sort of monitoring methodologies for deforestation and more importantly what kind of financial mechanism best serves the country?

Studying the process through which Panamanian officials identified the national interest sheds light on a) whose interests the agency most valued and whose interests were considered secondary or not valued at all, and b) what factors had the greatest influence on policy makers.

**"Can reductions in deforestation be achieved nationally?"**

Before it could make the commitment to reduce its deforestation rate, decision makers believed that it was important to know whether or not Panama could achieve the reductions in deforestation that the regime required. Policymakers perceived that the capacity to implement international commitments at the national and local level depended in part a) on ANAM's ***institutional capacity*** (the human and financial resources available to ANAM); b) on ANAM's ***political capacity*** to influence the national agenda (the relationship and relative power vis-à-vis other institutions and society in general). The process through which ANAM

officials assessed these independent variables was the other central aspect of policymaking.

## 2.2 The Decision Makers

In the case of avoided deforestation, the National Environmental Authority (ANAM) took full responsibility and acted alone in the policy making process. ANAM was created in July 1998 in order to deal with Panama's growing environmental problems. Its mission is to foster the development of *(1) an environmental zoning system of the national territory, (2) the use of environmental impact studies, (3) environmental quality standards, (4) scientific research as well as educational programs, (5) a national inventory of Panama's natural heritage and (6) inter-institutional coordination of environmental management (www.anam.gob.pa).*

As the only government agency responsible for environmental matters, ANAM is responsible for international environmental policymaking and for managing Panama's compliance with international conventions concerning the environment such as the Convention on Biodiversity, the RAMSAR Convention on wetlands, and the subject of this thesis, the Framework Convention on Climate Change (UNFCCC). ANAM is the focal point of the Climate Change Convention and the Designated National Authority for Panama[40] with regards to the Clean

[40] Broadly speaking, the focal point of the Convention is in charge of communication and exchange of information with the Convention's secretariat. The designated national authorities are

Development Mechanism. It is ANAM's responsibility to make it possible for Panama to participate in the carbon market through CDM by setting up the required capacity to assist project developers in fulfilling the requirements of the mechanism and to promote Panamanian CDM projects around the world. It is also ANAM's responsibility to represent Panama's interests in other negotiations surrounding LULUCF within UNFCCC such as *avoided deforestation.*

ANAM is also in charge of managing the National System of Protected Areas (SINAP) which includes 65 protected areas under different management categories, covering a surface of about 2,547,550.76 hectares, and representing 34% (33.6%) of Panama's national territory (ANAM, 2006). Around 60% of this surface is covered by forests; the rest is altered or covers marine areas (ANAM, 2005).

ANAM receives approximately 27 million USD yearly from the central government (Contralaria 2006). As we will later discuss, however, a central feature of ANAM's funding is that it receives an amount comparable to that of government funding through bilateral and multilateral aid dedicated to environmental matters.

Four officials from the Climate Change and Forestry departments under the authority of ANAM's General Sub-Administrator, constituted the policy making

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responsible for their respective country's participation in the CDM, they have the power to refuse to approve projects. For details see the UNFCCC website at http://cdm.unfccc.int/Reference/Guidclarif/glossary_of_CDM_terms.pdf

nucleus on avoided deforestation during 2006. These included the head of the climate change department, two officials from this same department, as well as the head of the forestry department. These officials would participate in the drafting of Panama's submission of views to SBSTA in May of 2006 as well as to the Rome Workshop in August and the Nairobi COP/MOP meeting in November of that same year[41].

## 2.3 Identifying the National Interest

Within ANAM it was generally perceived that, setting aside concerns for climate change and the loss of Panama's biodiversity heritage, there were more immediate and practical reasons why deforestation has become a problem in Panama. On the medium to long run, Panama could benefit from controlling this problem. However, in the short term, there are potentially serious trade-offs involved in attempting to curb deforestation. These trade-offs have made it impossible to control deforestation as of yet.

As explained, unsustainable land use practices have led to serious land degradation, the abandonment of productive lands and the pollution of water resources. This unsustainable pattern was viewed as a sub optimal outcome by Panamanian decision makers. Panama could greatly benefit socio-economically

[41] This is with the exception of one official from the Climate Change department who did not attend international meetings beyond SBSTA 24.

and environmentally from more sustainable land use practices (Interviews: 1,2,3,4).

From an economic standpoint, this sub optimal land use led to important losses in the agricultural and forestry sector in the medium run. In the agricultural sector, unsustainable practices of small deforesting farmers are very extensive and not very productive: they provide very low returns or even negative long term returns in the case of small scale cattle ranching. Such practices thus perpetuated a cycle of poverty and marginalisation of frontier communities. It was perceived at ANAM that Panama's agriculture could gain from adopting more productive, intensive, agricultural practice[42]. It was also perceived that the forestry sector could be greatly developed as a result of better land use management. Indeed, about 40% of Panama's land area is used for agriculture and ranching although only 25% is really suitable for these activities the remaining 75% being better suited for forestry (ANAM 1999a; Interview: 2). It is important to note that selective timber extraction does not result in deforestation and is thus compatible with Avoided Deforestation. A sustainable exploitation of forest resources is thus a way to maintain forest cover while generating revenues. In the medium to long run, sustainable forest management geared towards the exploitation of timber resources is thus viewed as a far better land use alternative than forest conversion to low productivity agricultural lands (Interview: 2). ANAM officials considered

[42] Feeding cattle with grain and keeping them in stables or improving pasture quality through planting instead of letting cattle roam on poor pastures are examples of investments in intensive practices.

that such changes would benefit frontier communities by providing them with more productive alternatives to deforestation (Interviews:1,2)

From an environmental standpoint, many large watersheds of the Arco Seco were on the verge of collapse due to severe erosion. This compromised not only agriculture but human health in these areas. It was thus perceived that Panama could obtain better water quality and increased dry season flows by preserving forest cover in critical areas of watersheds (Interview: 4).

The Panama Canal Watershed is understandably the country's most important from a geographic, political, and economic standpoint. The Canal requires immense amounts of freshwater to operate. This water comes from the canal reservoir which is fed by the various rivers and streams of the watershed. In the Panama Canal Watershed it is commonly accepted that deforestation is threatening both the optimal functioning of the Canal and Panama City's water supply because of the increased silt content of the Canal reservoirs, which is the result of increased sedimentation caused by deforestation. Silt accumulation reduces the canal reservoir's water storage capacity and reduces drinking water quality. Furthermore it is commonly accepted that forest cover increases dry season water flows and thus canal water levels during this period[43]. The Canal can

[43] This view is now being challenged by hydrologists however. See Ian Calder's presentation at www.cluwrr.ncl.ac.uk/related_documents/Ian%20**Calder**%20BeijingAugust2006v4%20(2).pdf .For an in depth analysis of hydrological ser vices see: Bruce Aylward. 2005. "Land-Use, Hydrological Function and Economic Valuation." In M. Bonell and L. A. Bruijnzeel, eds., *Forest, Water and People in the Humid Tropics*. Cambridge, U.K.: Cambridge University Press.

currently function at full capacity without risking a shortage of water, but it is common knowledge that reduced dry season flows would pose a serious limitation on Canal operations.

It was thus viewed by ANAM officials that Panama could greatly benefit economically and environmentally from reducing deforestation in the Canal Watershed (Interview:1).

However interesting for Panama on the long run, reducing deforestation in the short run involved important trade offs. The most obvious trade-off of avoiding deforestation stemmed from the fact that restricting access to land without providing an alternative economic activity could cause great harm to the already impoverished landless farmers of the forest frontier (UNFCCC 2006a[44]; Interviews:1,2,3,4). One of the central motivations for ANAM's participation in these negotiations was the desire to provide local deforestation stakeholders with an alternative to deforestation that could improve their livelihoods (Interviews: 1,2,3,4). It was therefore pivotal for Panama to recall *the right to pursue sustainable development*, and state that environmental protection should not involve important trade-offs for the South (Interview: 1,3). Therefore,

> "Activities to be undertaken in achieving the objective of reducing GHG emissions from deforestation should be coordinated with social

[44] See Annex C, Panama's submission of view to SBSTA 24. It is important to note that Peru also made a submission on behalf of Panama. These submissions do not contradict in any way and they both officially represent Panama's position. For Peru's submission on behalf of Panama, See (UNFCCC 2006a pp.110-114)

> and economic development in an integrated manner: (a) bearing in mind that the burden of reducing deforestation falls on stakeholders such as peasants, indigenous and local population, small and medium size farmers and ranchers; and (b) taking into full account the legitimate needs of developing countries to achieve sustained economic growth and eradicate poverty as stated at the September 2005 UN Summit."(UNFCCC 2006a., p.111)

Furthermore, ANAM officials believed that in order to respect the principle of *common but differentiated responsibility* such trade offs should be bourn by Annex 1 countries through the provision of *new and additional funding*(Interview: 1). According to one ANAM official (Salinas[45] pers.comm.:July 10th 2006),

> "The current distribution of power and wealth shadows that of deforestation; if tropical countries are to protect the remainder of the Earth's forests they will have to be compensated. People in tropical countries may want to protect the environment but they cannot do it at the expense of development. There is great inequality in the current distribution of wealth and power in the world. Industrialized countries have engaged in massive deforestation in past centuries and emitted considerable GHGs but also achieved considerable economic development in the process. Global environmental initiatives will not

[45] Edgar Salinas was an Official at the Climate Change Department in 2006. He was instrumental in writing Panama's submission of views as well as in defining subsequent steps for Panama.

be acceptable to Tropical Countries if they reinforce the status quo and crystallize the current distribution of wealth and power."

Although tropical countries are now responsible for most emissions from deforestation, their total contribution to climate change is still far below that of Annex 1 countries, as is their ability to act. Therefore it was up to Annex 1 countries to bear the costs of climate change mitigation (Interviews: 1,2,3,4). It followed that:

> "Reducing GHG emissions from deforestation offers a unique opportunity to enhance the participation of developing countries in the climate regime, on a voluntary basis, and also for industrialized countries to financially participate in assuming their historical emission reduction responsibilities"(UNFCCC 2006a. p.111)...

and that:

> "Additional resources should be made available to developing countries to compensate for any expenses linked to implementing policies aiming to reduce or avoid deforestation. Aid for avoided deforestation should be additional to the current and already planned aid transfers. (UNFCCC2006a., p.105)"

Finally, Panamanian officials were concerned that a future AD regime would involve too important of a trade-off with national sovereignty. It was important that a future AD regime preserve the Tropical countries' sovereignty to implement their own measures to reduce emissions from deforestation and not be forced into adopting specific measures. This was officially expressed as follows:

> "Parties have the sovereign right to define sustainable development concept and strategies, and use their own resources pursuant to their own national priorities. Therefore, not only should the Parties' participation in the efforts to reduce GHG emissions from deforestation be voluntary, they also should decide how to implement measures to that end without any external interference." (UNFCCC 2006a, p.111).

The view of ANAM officials was largely consistent with the formulation of the problem depicted in Part I ("the Context"). This was not problematic in itself since the core idea of an avoided deforestation mechanism is that, in order to cover trade-offs, countries would be compensated for reducing their national deforestation rate. For Panama to participate in AD, it was therefore necessary that compensation for AD be superior to the income that local stakeholders generate through deforestation and the ensuing agricultural activities. To determine if AD was in Panama's interest it was therefore essential to get a grasp of the opportunity costs of avoiding deforestation. This estimate could then be

compared with an estimate of compensation available through diverse international sources in order to measure Panama's economic benefit in participating.

Different sources of information provided indications of the opportunity cost of agricultural land-use in the country. One report on a possible scheme of payment for ecosystem services values land use in the Panama Canal Watershed between US$45.00 and US$69.00 yearly per ha – this represents the income from agriculture and ranching. (The Louis Berger Group: 2006). Regarding land use in Bocas del Torro province, a different study set forth an estimated yearly value of US$60.00 per ha. (Barzev: 2006). Finally, Coomes *et al.* (in press) estimated a non-discounted value of US$61.00 per ha for small-scale cattle ranching in Eastern Panama (US$29.44, 5% discount rate over 25 years).

These three estimates indicated that yearly revenues from agriculture and ranching were relatively low in comparison with the possible revenues from compensation funding for AD. Indeed, using the US$61.00 per ha estimate, the break-even price for Carbon would be US$1.19 per tCO2 (US$4.27 per tC discount rate 5%) over a life time project of 25 years[46]. When looking at global

[46] To estimate revenues from carbon a value of 181.1 tons of carbon per ha of Panamanian forest was used (Kirby: 2005).

carbon markets, it seems most probable that sums significantly superior to this break even price could be obtained through the sale of carbon credits[47].

To grasp what this meant for Panama at the national scale, a hypothetical scenario was used where Panama would reduce its deforestation rate by 5000ha for 20 years. Using this hypothetical scenario and using the break even price calculated by Coomes et.al, Panama would need to sell CERs for US$3,864,350 in order to compensate for the opportunity cost of avoided deforestation over these 5,000 ha (Potvin, Guay and Pedroni. Submitted). Administrative costs for the regime were estimated at around 10% of total costs based on the Costa Rican experience with curbing deforestation. For ANAM officials, these administrative costs were not perceived as high enough to compromise the profitability of AD (Interview:1,2). The use of market tools for compensation therefore seemed to be able cover trade offs incurred by deforestation stakeholders.

Yet ANAM officials expressed concerns with market tools. These concerns were embodied in the principle of *fairness* which aims at assuring participation by smaller countries such as Panama to this regime, avoiding their exclusion by larger countries such as Brazil and Indonesia. These large countries are more attractive to investors given the economies of scale made possible by greater area in relation to transaction costs[48]. Thus Panama's position was that:

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[47] In 2006 the World Bank paid US$4 per tCO2 for five years. It seems quite plausible that investors will be willing to pay more than US$1,19 for an AD credit valid for 20 to 25 years.
[48] Such skewed investment patterns have been observed in foreign direct investment in recent years and in CDM. See trend Global Carbon Market Trends. World Bank. 2006

> "A regime of avoided deforestation should insure a fair distribution of the responsibilities and possible benefits both between and within Countries. As an example of fairness at the international level, the size of Countries needs to be taken into account when developing methodologies. The possibility that large Countries may reap all the benefits or exert unduly influence over the mechanism for avoided deforestation is a concern for the small Central American Countries. (UNFCCC 2006a)"

ANAM officials also expressed concerns for the protection of the *Intergrity of Existing Mechanisms* (UNFCCC 2006a). Protecting the integrity of existing mechanisms was important for two reasons. First, Panama's involvement in the CDM had been successful. CDM had become a vector of modernisation and sustainable development especially in the energy sector. Recalling that the goals of the UNFCCC also included sustainable development (Interview: 1) ANAM officials considered it critical to protect Panama's privileged position in this field by opposing an AD regime that would jeopardise the expansion of CDM. The information available to ANAM officials indicated that AD credits are likely to be relatively cheap. In a study conducted in Eastern Panama Coomes et al. (in press) estimated that the break-even price to off-set opportunity costs for an AD carbon credit would be worth half the value of an A/R CER[49]. ANAM officials were preoccupied by the possibility that, if credits emitted in the context of *avoided*

[49] A/R CERs are the carbon allowance generated by forestry projects approved under the CDM.

*deforestation* were cheap, their entrance in a fully fungible Kyoto market might crowd out CDM credits and compromise the functioning of the existing flexibility mechanisms[50] (Interview: 1,2).

Secondly, as a matter of principle it was important for Non-Annex I countries to insure that reductions in deforestation funded by Annex I countries should not serve to undermine the necessary emissions reduction that industrialised countries needed to achieve domestically (Interview: 1). If AD credits were to help Annex 1 countries fulfill their commitments (as is the case for the CDM), then it was important that the introduction of an AD mechanism be accompanied by increased GHG reduction commitments by Annex 1 countries. For the 2008-2012 Kyoto commitment period, Panama would thus oppose the re-opening of the Marrakech Accords that created CDM (UNFCCC 2006a). Rather, ANAM officials considered that the discussions regarding the inclusion of an avoided deforestation mechanism in the carbon market should be introduced in the Kyoto Protocol's post-2012 discussions (Interview:1).

It was perceived at ANAM that concerns for fairness and integrity in the existing mechanisms were by no means insurmountable and could be addressed by an AD mechanism. Inclusion in the CDM or full fungibility with the current carbon market was out of the question, but linking AD with Annex 1 post Kyoto

[50] Note that the same concern lead to the imposition of the 1% limit on forestry projects in the CDM and was invoked as a reason for the failure to integrate more LULUCF activities including Avoided Deforestation in the Marrakech accords that made the CDM operational. See Part I (Context) pages 17-18.

commitments was certainly an interesting option for integrating AD in the carbon market (Interview:1). It was perceived that specific provisions to protect the interests of tropical countries in the CDM could and would be worked out (Interviews:1,2).

To sum up, because of the benefits it could provide for the long term development of the agricultural and forestry sector as well as to the optimal functioning of the Panama Canal, it was perceived at ANAM that Panama could benefit from controlling deforestation granted that the trade-offs for deforestation stakeholders in the short to medium run and concerns with *fairness* and *integrity of existing mechanisms* could be mitigated through the creation of an appropriate mechanism for compensation from developed countries. Entering an international avoided deforestation regime could provide a unique tool to optimise land use at a national scale. By providing external funding to monetarily appraise the value of forests for their carbon content, the AD regime could provide an alternative to deforestation for frontier communities in the short term as well as a strong incentive for more productive land uses such as sustainable forest management in the long run.

## 2.4 Curbing Deforestation in Panama

Although it was perceived to be in Panama's interest to participate in AD, when it came to implementation however, the situation became much more complex as we will now discuss.

There was more to curbing deforestation than a simple compensation, we must consider things from a sociological/distributive perspective and note that historically deforestation has acted as a "safety valve" for many of the deep social and distributive problems of poverty, marginalisation and land ownership concentration in rural Panama. By shutting this safety valve the State could profoundly alter the livelihoods of many poor Panamanians. Devising and successfully implementing a strategy to curb deforestation involved the provision of alternative economic opportunities for local stakeholders (Interviews:1,2).

In the immediate, the problem with a *compensated reductions* mechanism for ANAM resided in the fact that devising and implementing a successful strategy was beyond ANAM's ***institutional and political capacity*** (Interview: 1) as we will discuss in following sections.

In order to curb deforestation ANAM needed to build ***institutional capacity*** to (1) understand the deforestation process taking place (diagnosis) and devise comprehensive measures capable of generating a change in land use practices while mitigating short to medium term trade-offs; (2) monitor deforestation; and

(3) manage programs geared towards curbing deforestation; and (4) enforce regulation (Potvin, Guay and Pedroni, submitted).

Because of deforestation's various drivers and the complex interlinkage between them, implementing a strategy to curb deforestation at a national level required a State wide coordination of land use planning (Interviews: 1, 2). Therefore ANAM also needed to build the ***political capacity*** to influence the national agenda towards this goal and coordinate inter institutional management of land use. In the words of one ANAM official: "We need a State vision for avoided deforestation." (Interview: 2)

To better understand the policy makers' rationale, first I propose to describe the possible implementation strategies to curb deforestation at a national scale and what these strategies entail for Panama. Secondly we shall analyse the implementation constraints imposed by ANAM's (1) ***institutional and (2) political capacity***. Finally I will highlight the conditions under which some implementation strategies become feasible for ANAM officials in the short term focusing on the critical importance of a priori external funding.

### 2.4.1 Possible Strategies to Curb Deforestation

There are many different approaches to effectively protect an area from deforestation. Some strategies use a more direct and geographically focused

approach while others look to tackle underlying drivers of the problem focusing on the broad context in which deforestation takes place. To different extents both types of strategies are in use in Panama but in most if not all cases they need to be expanded or perfected in order to generate a change in the deforestation dynamic. It is important to point out that the scale at which a certain strategy is being used is very important for its impact on deforestation at a national scale which is the central determinant of a strategy's capacity to generate *real benefits for the climate*, a prerequisite to obtain compensations. In this section we review the strategies envisioned by ANAM officials and discuss their strengths and weaknesses in terms of dealing with the key issues of *additionality, leakage* and *permanence*.

We will term as *Command and Control* approaches based on the adoption and enforcement of regulations creating protected areas (PAs). Usually, creating effective protected areas has involved the expropriation and relocation or the compensation of affected populations. Command-and-control regulations aim directly at protecting the forest resource without economic incentives- unless corruption turns regulation into *de facto* unofficial "tax". The National Parks system of Panama is a typical example of command-and control mechanisms geared towards conservation. Panama has had early initiatives in conservation but the bulk of conservation efforts were made in the 1980's and 90's in the wake of the Canal Zone dismantling when the necessity to protect the canal watershed became apparent. With this in mind the National Parks of Soberania, Chagres,

Metropolitano and the Recreational zone of Lago Gatun were established (Tovar, 1996). In the same period, important work in preservation was made in the Azuero region (Sarigua, Cerro Hoya) but also near the border with Costa Rica (La Amistad). These Protected areas would all become parts of the National Protected Areas System of Panama (SINAP), established in 1992. Nowadays, it includes 65 protected areas under different management categories, covering a surface of about 2,547,550.76 hectares, and represents 34% (33.6%) of Panama's national territory (ANAM, 2006). Around 60% of this surface is covered by forests, while the rest is altered or consists of marine ecosystems (ANAM, 2005).

Because of the limited resources and enforcement power granted to ANAM, it can be argued that most of the SINAP is made up of "paper parks"[51]. These areas are protected from deforestation because of their remoteness and the absence of communications infrastructure. Other parts of the SINAP are home to peasant communities whose settlement usually predates the creation of protected areas.[52].In Panama a strict command and control approach has not predominated; cases of expropriation or expulsion from protected areas are non-existent to the best of my knowledge. As a consequence most of these inhabited protected areas did witness a small level of deforestation (Guay et al. unpublished). Nonetheless it can be argued that the SINAP has been relatively successful in halting

[51] This term is commonly used to designate protected areas in developing countries which have none or deficient enforcement capacity.
[52] The La Amistad Park, Cerro Hoya Park and Darien Park are examples of these areas protected by remoteness and limited access. See map of PAs in Annex 1.

deforestation within its boundaries (Guay et al. unpublished). This is consistent with the literature on parks (Bruner et al., 2001).

However the effectiveness of PAs in curbing deforestation should not be overestimated. This is because PAs do not attack the underlying causes of deforestation. It is doubtful that PAs have contributed to alleviate poverty or to the development of economic alternatives to extensive land use practices in Panama despite the expectation that this could occur through the development of ecotourism. Consequently, it remains to be seen whether this approach is capable of dealing with ***leakages*** since the enforcement of park regulation presents the danger of closing an area to colonisation and simply contribute to more serious deforestation problems outside the park's boundaries[53].

Because of its limited potential to alleviate poverty and deal with leakages, strict enforcement of protected areas was not seen as a promising option to curb deforestation (Interview:1,3). Expanding the already important SINAP to include even more forested land was not considered desirable or feasible by ANAM, consolidation and effective enforcement of existing regulation was much more important in the short to medium term as forest colonisation reached deeper into primary forests (Interview 1). It was thus clear that for ANAM officials, protected areas needed to be accompanied by economic alternatives or at least some form of compensation (Interviews: 1,2,4).

[53] There is evidence that the leakage ratio is usually not 1 to 1 and that protecting an area from deforestation does not induce an equivalent area to be deforested (Chomitz 2002). However addressing leakages remain one of the main challenges for the *Command and Control* approach.

Payment for environmental services (PES) is the newest approach to conservation. It is based on giving incentives to conserve forest cover by valuing the services forests provide. In the case of avoiding deforestation, PES would be a use-restricting scheme[54] and would probably need to be a governmental initiative. Such a scheme would aim at directly compensating actors involved in deforestation in exchange for their agreement to stop deforesting activities. PES can act as a complement to a national parks strategy by providing an economic alternative to deforestation. This was seen as a promising avenue to curb deforestation by Panamanian officials (Interview: 2,3,4)

In the case of carbon sequestration, serious concerns for equity and efficiency stem from the difficulty to determine who is entitled to compensations. In a context where most deforestation occurs on public lands, it is indeed difficult to identify exactly who is likely to deforest an area and therefore it becomes difficult to ensure that payments are indeed going to the right people[55] and generating additional benefits for the climate[56]. Furthermore inside protected areas setting up PES schemes can have the perverse incentive of attracting dwellers to an area and threaten to deforest in order to benefit from payments (Wunder 2005). In order to

[54] Use restricting schemes refer to the fact that the buyers of the service are paying sellers to refrain from practising a certain activity.

[55] In order to address concerns for equity, payments should go to the stakeholders more inclined to deforest. These are usually the poor small farmers with no economic alternative to deforestation. Absentee land owners should not get compensated first although they can sometimes accept smaller compensation for avoiding deforestation. See Grieg-Gran et al. (2006) or (Chomitz et al 1999).

[56] Compensating land owners who would not engage in deforestation does not generate additional benefits and is inefficient.

work, a PES scheme thus requires that clear rights to compensation be established. This is problematic since land rights remained unclear on most of the Panamanian forest. The PRONAT a program of the Ministry of Economy and Finance (MEF) which was underway in 2006, aimed to hand out titles to most of the country's lands. Important progress had been made towards the titling of land under agricultural use, but much remained to be done especially in the remote and marginalised areas under heavy deforestation pressure (pers.observ.).

Furthermore as one ANAM official pointed out handing out land titles was a necessary but not sufficient condition for the creation of a large scale PES scheme (Interview:3), institutional capacity to devise and administer such a scheme were also required. Indeed to guarantee that a PES scheme will have a significant impact on the national deforestation rate, it must be implemented on a large scale and in areas that are under strongest deforestation pressure which are remote and marginalised in Panama. Implementing a large scale PES scheme thus not only required a massive land titling campaign but also the creation of institutions capable of administrating day to day operations, monitoring compliance and ensuring conditionality in the delivery of the payments. Institutional design of a PES scheme was still in its infancy in Panama. ANAM officials from the environmental economics department were evaluating possible institutional structures for such a regime however a national PES scheme geared towards carbon sequestration had yet to be devised at ANAM (pers.observ).

In Panama at the end of 2006, there were no functioning PES schemes; there are local pilot initiatives by ANAM to develop such a system to curb deforestation in the Rio La Villa Watershed and in Bocas del Toro province as well as another initiative led by USAID-AED to set-up a PES in Parque Nacional Chagres in the Panama Canal Watershed. However these initiatives were geared towards the delivery of local hydrological services and not carbon sequestration. At the end of 2006 it remained unclear if and when these initiatives would be adopted.

Sustainable forest management (SFM) projects are a way to reduce pressure on forests by generating income from the exploitation of the forest resource without excessively depleting its natural capital. This strategy could allow generating economic revenues while maintaining land under forest cover thus curbing deforestation. SFM projects can take many forms from pure timber extraction in the form of reduced impact logging to mixed systems of agro-forestry and silvopastoral activities. It has been claimed that such activities can provide increased yields while preserving soils and basic properties of an ecosystem (Jepma, 1995). SFM requires technical skills to devise a plan, communicational, organisational, monitoring and administrative skills to insure that the plan is correctly implemented and its provisions respected. In most cases SFM also requires some enforcement capacity to impede illegal activities.

In Panama, sustainable production programs have been implemented largely on a project basis with funding from international aid agencies predominantly in the

Panama Canal Watershed area with the support of USAID. The effectiveness of these initiatives in gearing land use practices towards sustainability and alleviating poverty in the Canal Watershed is questionable[57]. Furthermore it is pertinent to remind that most agricultural activities were unsustainable and that most logging was practiced illegally in Panama (Arancibira[58] pers.comm.: August 20th 2006). Nonetheless a national forestry plan aimed at expanding sustainable forestry was in development in 2006 at ANAM. It was too early to determine whether this effort would be fruitful, but it was considered a very promising option by ANAM officials (Interview: 2).

Certification schemes can help the establishment and diffusion of sustainable forest management. They are based on the idea that buyers will be willing to pay a "green premium" for goods produced in an environmentally friendly manner. In the case of logging in Panama, the Forest Stewardship Council (FSC) is working to certify some 4,500ha of forest in Darién (Interview 2; Arancibira pers.comm: August 20th 2006). FSC certification however had yet to generate significant additional benefits for timber companies and it was therefore doubtful that they could fund the expansion of sustainable forest management. Nonetheless, certification provided proof that logging was practiced legally an issue of importance in the case of Panama as we will see when discussing capacity.

[57] For an in depth analysis of the challenges posed by the implementation of sustainable production and conservation programs in the Panama Canal Watershed see: Elizabeth Dougherty. 2002.The Politics of Environmental Conservation: A Study in civil Society, Scales of Influence, and Corruption in Panama. PhD. Dissertation. University of Pennsylvania.

[58] Daniel Arancibira is head of the Forest Stewardship Council for Panama.

Certification can be considered a first step towards improving practices, gearing them towards sustainability and was therefore strongly supported by ANAM (Interview: 2)

Indirect or macro policies concern the whole institutional and policy framework which creates incentives to undertake a given activity. In the case of deforestation macro policies can reduce deforestation pressures by giving incentives to preserve forest cover, giving incentives to intensify agricultural practices and forest plantation, or by simply abandoning existing policies which give incentives to deforest.

Perverse incentives to deforest were dominant in Panama as explained earlier. Perverse incentives were the result of an inadequate legal framework for land tenure and of loan policies enacted by MIDA. Therefore removing perverse incentives to deforest was likely to be necessary. As we will discuss, some progress had been made in changing the legal framework surrounding land tenure, but no progress had been made towards a removal of perverse subsidies to agricultural expansion.

Agricultural intensification will often require the creation of an appropriate program of incentives and technical support. Implementing this on a national scale requires important up-front investments (Interview:1). Subsidies or

favourable loan policies for local deforestation stakeholders to intensify practices were not in place in Panama.

Subsidies or fiscal incentives for sustainable alternative activities to deforestation are an example of macro policies that can contribute to the goal of curbing deforestation. In Panama a favourable fiscal framework and credit policies was set in place to promote forest plantations[59] which can help alleviate pressure on primary forests by providing an alternative timber supply and generating employment for local stakeholders[60]. However, the heavy initial investments required made it very difficult for small farmers to participate[61].Taxes on profits derived from land clearing activities would be an example of positive macro policy in the case of avoided deforestation. No tax policies were enacted to address forest clearing and given the state of poverty and marginalisation of many deforestation stakeholders, enacting such tax policies would be highly regressive and unlikely to be effective (Interview: 1).

All approaches have their strengths and weaknesses. Direct approaches are often incomplete: the more they are limited in scope, the more they fail to consider the wider context in which deforestation stake-holders evolve. This poses problems for the strategies' capacity to deal with ***additionality of efforts*** and ***leakages***.

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[59] Law No 24 (23rd of November 1992) "For which are established incentives and regulations for reforestation activities in the Republic of Panama."

[60] It is important to recall that forest plantations are already included in the CDM and not part of a future AD mechanism.

[61] See context. p.12

However it is much easier to assess their effectiveness and, because of their geographically limited scope they do not always require the state wide coordination between institutions in order to be effective.

Macro policies are not geographically focused and offer the potential to trigger more profound changes in a society's resource use patterns. They therefore offer a way to deal with ***leakages***, however because of the complexity of the deforestation process it is unclear what the precise additional effect of a set of policies will be. It has been said that macro policies tend to have variable and long term effects that are sometimes hard to predict (Kainmovitz and Angelsen 1998; 2005). Furthermore it is even harder to guarantee that this effect will remain over time as conjuncture evolves. Macro policies alone thus pose a risk for ***permanence***. Furthermore, in order to be effective, macro approaches require effective policy coordination between governing institutions, an issue which we will discuss when treating ANAM's political capacity.

Except for a strict command and control approach, these strategies are not mutually exclusive. In most cases we can expect positive complementarities. In order to curb deforestation, Panama could benefit from using a mixture of these strategies. However as we will now examine, the use of the various strategies was constrained by ANAM's institutional and political capacity.

### 2.4.2 ANAM's institutional capacity

In the view of ANAM officials controlling deforestation at a national scale was not a priority for the Panamanian State (Interview 1). The funds and personnel dedicated to this task were thus very limited and as exposed earlier a significant proportion of these funds came through multilateral or bilateral green aid.

However there was another important factor linked to ANAM's functioning that limited ANAM's institutional capacity. Personnel turnover at ANAM was high. People came and went and investments made in training personnel were lost over very short time spans (Interview 4). This was due in great part to the politicization of ANAM, appointments were highly political and showed "little respect for technical competence"(Interview: 4) Important personnel movements occurred every time governments changed making it impossible for the personnel to develop capacity.

The previously highlighted problems posed serious limitations on ANAM's capacity by creating a lack of capacity to thoroughly understand and devise appropriate policies and a lack of capacity to implement such policies or strategies to curb deforestation on the field.

To make good policy propositions it is important to understand what an avoided deforestation mechanism entailed: what specific provisions were likely to

predominate and what impact this had for Panama. This meant keeping up to date with international negotiations on AD and making detailed analyses of the different propositions coming out of international meetings (COP 11, SBSTA 25, the Rome Workshop and COP 12 in Nairobi).

At the end of 2006, one of the more knowledgeable negotiators for ANAM left office; given the limited amount of personnel assigned to this task and the complexity of these negotiations, this indeed debilitated the Panamanian team reducing its capacity keep up to date with negotiations. Indeed this person could be replaced but this would take time and the precious resources that had been deployed to train him were lost. This type of situation was very common (Interview: 4).

Devising or adapting a strategy to curb deforestation to Panamanian circumstances required considerable knowledge of a variety of domains ranging from agriculture and forestry to law and economics. This process was in its beginning and therefore, gathering and interpreting substantive information was pivotal in identifying Panama's interest and the possibilities to reduce deforestation. However, there were very few people involved directly in this at ANAM. Qualified personnel to carry out these tasks was lacking at ANAM: no one possessed a priori the qualifications to do this, but more importantly no one was working full time on this.

In the absence of qualified personnel to carry out these tasks, external contributions from academia and consultants allowed Panama to stay up to date and gave ANAM the "brainpower" to remain salient in negotiations (pers.observ). This was viewed extremely positively from all ANAM officials (Interviews: no.1,2,3,4).

The involvement of a number of scientists and experts was indeed a central part of the policy making process. In this process, Dr. Potvin, a plant physiologist from McGill University was the central figure; she brought in many contributors mainly from contacts in academia and was herself instrumental in understanding scientific and methodological aspects as well as their potential social, political and economic consequences for AD. The involvement of McGill students such as myself[62] in this process consisted mainly in providing briefings and insights into relevant aspects of the negotiations, a task called "updating" by ANAM officials.

In the national context and the design and implementation of policies to curb deforestation consultants were contracted by ANAM to advise the agency on these policies. In the same way that academia did for international negotiations, so did consultants provide the "brainpower" in the development of payment for environmental services schemes and the elaboration of the National Forestry Plan (ANAM 2006). Brazilian consultants were being contracted for the elaboration of the National Forestry Plan. Their expertise was to serve as the basis for the establishment of a future zoning system instrumental in developing sustainable

[62] See Methodology Annex for details on my involvement with ANAM in 2006.

forest management schemes. Private consultants were contracted for advice on the design of the different PES schemes in development.

It was considered important to develop capacity within ANAM, but while it was missing, scientists and experts played a pivotal role (Interview: 2). However one must not overestimate the possibilities that these tools offered for ANAM. Collaboration with consultants or with academia was often short lived and very often project based. In my experience, these private consultants were most often paid for by international organisation or AID agencies such as the FAO, USAID, JAICA or AED which made ANAM dependent on these agencies. Therefore it could not really provide long term solutions for the deforestation problem which required the creation of new and stable institutions committed to long term goals such as a national or provincial payment for environmental services scheme as well as the administrative capacity to run such schemes (pers.observ.).

ANAM's deficient institutional capacity also resulted in a deficient capacity to control deforestation in the field. It is difficult to assess what ANAM's capacity to control deforestation was since controlling deforestation at a national scale was not part of ANAM's mandate. However, controlling deforestation within parks certainly was. One way to explore ANAM's deficient capacity to control deforestation on the field is thus by examining the experience with curbing

deforestation in national parks[63]. The experience from protected areas suggests that the task of changing colonos' behaviour could not be achieved suddenly. According to ANAM officials monitoring and enforcement component were necessary for this task but the bulk of the work would be achieved when the colonos would be convinced that the benefits derived from standing forests surpassed those of deforestation (Interview:1,3).

Different protected areas were experiencing different contexts and different results with curbing deforestation. Some of the problems faced in protected areas were considered to need external help to be solved while the rest could be addressed by ANAM. Within ANAM, enforcement of protected area regulation proved problematic because of the lack of resources available for this task and the high personnel turnover on the field due to politicisation. This limited ANAM's ability to maintain minimal enforcement and management capacity including precise park delimitation and zoning (buffer zone & core zone); to establish permanent environmental education programs involving every level of society; to build acceptance and alliances with local communities; to launch a participative management plan, involving local communities; and finally to set up a system of integrated forest management.

[63] The conclusion presented here (p.58 and 1rst par. of p.59) are those of a study conducted in a sample of national parks in Panama in August 2006 (Guay et al. unpublished). See Methodology Annex for details.

In a similar fashion as external contributors were brought in to palliate to deficient intellectual capacity, collaboration with NGOs could help solve these problems by insuring a higher level in continuity in management.

Another category concerned problems beyond ANAM's power to remedy and needed to be worked on in collaboration with other Governmental entities. This concerned the creation of programs to implement economic alternatives in the local communities; an update of the legal framework for forests; technical assistance for sustainable agriculture among the communities living in the park and its surroundings; and finally a clarification of land tenure issues. We will discuss these issues in the next section.

When looking at things from a national perspective, the situation was not so different. As explained it was perceived at ANAM that curbing deforestation necessarily involved providing an alternative to local stakeholders. As we have seen when discussing strategies, there were many ways to go about this but any strategy will involve cooperation and coordination with local stakeholders. ANAM-local stakeholder relationships were thus central to this issue. Given the general lack of knowledge of the global warming phenomena and of the possibilities carbon sequestration offered, convincing local stakeholders that changing activities or even slightly modifying their practices was in their interest required a significant communication effort in the immediate and the establishment of credibility and a trust relationship with the "colonos". Judging by

the experience with protected areas such a relationship could only be established over time granted that resources were made available and participative practices were adopted. However in December of 2006, very few relationships had been established with "colono" communities in the remote areas of Panama (Interview:2). This lack of presence was especially important in the Darien and the Ngobe-Bugle indigenous Comarca the two most important deforestation fronts (Interview: 1,2).

The Canal Area marked an exception to this because years of programs geared towards sustainability often financed by USAID and the Panama Canal Authority. Indeed the latter two agencies have shown a strong interest in preserving forest cover in the Canal Watershed to insure optimal functioning of the Canal. In fact most of the Canal Watershed was part of the SINAP. This had allowed ANAM to develop a significantly greater presence and a more elaborate relationship with those communities (Interview: 1,2). The Panama Canal Watershed was thus foreseen as the only area where successes could be obtained in the short term.

To sum-up, the Agency had not managed to fully control deforestation in protected areas in Panama and it certainly did not have control over land use in the more remote areas of Panama, precisely those areas where most deforestation was taking place. ANAM had yet to establish communication channels with the Darien colonos or indigenous communities about avoided deforestation. In the immediate, the only area of Panama where extensive communications with

"colono" communities existed was the Canal Zone, and therefore this was to be the focus of initial actions to curb deforestation in Panama.

### 2.4.3 ANAM's Political Capacity

There were mixed opinions as to whether or not the deforestation trend could be stopped in Panama in the short term (Interviews: 1,2,3,4). If the course of deforestation was to be altered at a national scale it was clear that inter-institutional coordination and cooperation with large private actors would be necessary (Interview: 2). Many policies and regulations pertaining to the realm of competence of different ministries and agencies affected land use and land use change decisions of the thousands of deforesting agents in Panama. The large private forestry companies also played a role in deforestation.

If we accept the depiction of the Panamanian deforestation dynamic made in the context, the problems with curbing deforestation highlighted in the case of protected areas and consider the strategies to curb deforestation envisioned by ANAM officials, it is reasonable to argue that the Ministry of Agriculture (MIDA), the Ministry of Economy and Finance (MEF), the legislative branch, the foresters, and the Panama Canal Authority (ACP) are the most important agencies and large private actors influencing land use. Examining the activities of these actors and their relationship with ANAM will help understand the policy environment in which decisions were made.

## MIDA

The Ministry of Agricultural Development has for mission to contribute to the growth of productivity of agricultural producer and ranchers through better yields and cost reduction.[64] The MIDA has a budget of about US$115 million annually (Contraloria 2006). It was perceived at ANAM that interests were not necessarily convergent with those of the MIDA in the short term. MIDA was primarily concerned with increasing agricultural productivity. MIDA was indeed concerned with land degradation but only to the extent that it affected productivity, hence it was only indirectly concerned with deforestation (Interview: 4). Joint workshops on the issue of soil conservation had been developed between the agencies, but unlike ANAM, MIDA was not primarily concerned with forest loss and to the extent that more land could be used for agricultural production without this leading to degradation and loss of productivity, we could argue that the MIDA's objectives were compatible with a deforestation dynamic.

Nonetheless it was perceived by ANAM officials that there were no clear incompatibilities between the goals of the two agencies. To increase productivity it was perceived that the MIDA was open to the promotion of more intensive practices such as more lucrative crop production, or grain feeding and improved pastures for livestock. Furthermore, funding from the sale of carbon offsets could

[64] See. http://www.MIDA.gob.pa/

alleviate high early investment constraints and make intensification more feasible (Interview: 2).

By December 2006, few communications channels had been established with the MIDA on the issue of curbing deforestation. This was due in part to the fact that ANAM had only recently developed capacity to understand the issues at stake. The problem thus seemed to reflect a learning curve more than any intrinsic barrier to closer relations. However with no certainty that compensation funding would become available in the near future, ANAM's political capacity to induce a change in the MIDA's practices remained limited at the end of 2006 (Interview 1). It was foreseen that a constructive dialogue would be established in the future if carbon funding materialised as MIDA became aware of the possible synergies between the goals of the two agencies (Interview: 2).

**Ministry of Economy and Finance**

The Ministry of Economy and Finance was in charge of PRONAT, the national land titling program. As we have seen uncertainty regarding land titles and the resulting open access to the forest was a driver of unsustainable land use and deforestation in Panama. Although tilting in itself did not provide guarantees that deforestation would slow (Interview: 3), titling could open the way to the implementation of zoning regulation or incentives such as PES as we have seen. It was foreseen, that such measures would become more and more feasible as

PRONAT progressed, but it was not clear to ANAM officials what the direct effect of titling would be. Conceptually, nothing impeded that land titles be used to obtain loans for land extensive practices (Interview 3). In this context, a whole chain of incentives and an appropriate regulatory framework would need to accompany PRONAT (Interview: 3). Discussion about avoided deforestation had not yet taken place with the Ministry of Economy and Finance but in this case it was clearly the incipient nature of the initiative that was to blame and it was not foreseen that conflicts would arise.

**The Legislative Branch**

With the objective of promoting better land use and improvement of economic opportunities in rural Panama, a reform of legal provisions regarding land tenure was underway. For example, the Ley General del Ambiente of 1998[65] stated that the slashing and burning or the deforestation of natural forests was not a required element to obtain "derechos posesorios" or land titles. The Law further suggested that land-use should be conditioned by the ecological aptitude of the land in accordance with environmental zoning programs of the national territory. The Ley Forestal judicially institutionalized the idea of making sustainable use of forests. However, work remained to be done, the law remained unclear on the process of land titling of forested areas. Furthermore, the relative legal force of the Ley Forestal versus the Agrarian Code remained unclear. ANAM officials had made suggestions of modifications to the agrarian code (Brown Salazar: pers. comm.

[65] Ley 41, del 1 de julio de 1998

January 2006, Panama City) and these where currently being approved by legislator in an effort to terminate the perverse requirement to deforest in order to gain rights to the land[66]. It was perceived that although it had been slow, nothing impeded progress in this direction and that synergies would emerge with PRONAT to contribute to establishing clear criteria for the titling of forested land.

**The Foresters**

With around 20 extractive industries and 1600 reforesting companies, the forestry sector could obviously play an important role in curbing deforestation at a national scale, especially since it has been established that 75% of Panamanian territory is better suited for forestry uses while only 25% is suitable for agriculture. Developing sustainable forest management schemes with extractive logging firms was thus an interesting avenue for the forestry department (Interview 2.). Has acknowledge by ANAM officials, this process was a difficult one, logging firms tend to mine forests in search of precious wood up to the point of exhaustion before moving on to other areas and few are those that concern themselves with sustainability or even the law in Panama. Most logging in the Darien was still practiced illegally[67]. ANAM is responsible for enforcement and collects logging rights. Remoteness, lack of enforcement capacity and even occasional corruption where mentioned as the main hurdles to better control (Interviews:2,3). With regards to political capacity ANAM administrators

[66] See Annex D for modification of the Agrarian Code.
[67] Although no numbers on this are available, I came to this conclusion after discussion with Daniel Arancibira, the head of the Forest Stewardship Council for Panama.

mentioned the difficulty of slowing down a powerful and very lucrative industry that generated much employment in the Darien (Interviews:1,2,3).

In December 2006, the Forestry department had not yet communicated with logging firms to discuss the specific issue of *avoided deforestation.* For now ANAM would focus on promoting sustainable forest management, an activity which as we have seen is compatible with the aim of AD. Considerable headway had been made has many plantations and an extractive concession of 50 000ha was in the process of being certified by the Forest Stewardship Council (FSC). This marked a fivefold expansion of the certified area in the last year.

In brief, it was unlikely that a strategy to curb deforestation would aim to significantly slow timber extraction because of the revenues and employment this industry generated (Interview:1). As we have seen logging roads are often the pathway into the forest and therefore the difficulty that ANAM officials foresaw in slowing this activity suggested bleak prospects for curbing deforestation in Darien. In the short term ANAM officials believed it was more promising to focus on other deforestation fronts such as the Ngobé-Buglé Comarca were timber extraction was not practiced on a large scale (Interview:1). However sustainable forest management was expanding in Panama and it was perceived that important gains towards curbing the deforestation trend could be made in this area on the long run (Interview:2).

**ACP**

As a multi billion dollar state enterprise, the Panama Canal Authority (ACP) was a strong ally of ANAM in promoting the issue of curbing deforestation because of the threats that deforestation posed to Canal operations. The ACP was very interested in preserving forest cover in the Canal Watershed and had already instigated programs to promote sustainable agriculture, reforestation and conservation. ANAM had developed ties with the ACP through various joint programs. It was expected that expanding coordination with the ACP was the most promising avenue to gain experience and develop capacity to curb deforestation. Because of its immense financial resources, it was perceived that the ACP was potentially the most important internal source of funding for ANAM and could act as a catalyst for avoided deforestation. Developing successful initiatives in the Canal Watershed could serve to build institutional capacity and demonstrate the feasibility of Avoided Deforestation thus garnering the political capacity to influence the national agenda.

To conclude on ANAM's political capacity, many large actors had an impact on deforestation rates in Panama either through the policies they enacted in the case of agencies or through direct actions as in the case of foresters. Although not geared towards AD in the case of PRONAT and the reforms in the legislation, important changes were setting the stage for the eventual implementation of a national policy to curb deforestation. In the case of MIDA the situation was more

complex as discussed but it was perceived at ANAM that the carbon incentive could lead to cooperation and convergence on issues such as sustainable practices and agricultural intensification. In the case of the ACP, a strong convergence of interests had already created communication channels and allowed for inter-institutional coordination. This relationship was foreseen to be the cornerstone on which to build capacity. As a general statement, it can be said that interests were not strongly conflictive and that it was expected that much could be done by establishing communication channels. However such formal channels of communication were still in their infancy at the end of 2006 and ANAM did not yet have a concrete solution to short term trade offs involved with curbing deforestation to discuss with those actors.

### 2.4.4 Why is A priori Funding Needed?

Implementing strategies to curb deforestation required considerable institutional and political capacity building (Interview: 1,2,3,4). Although some uncertainty remained with regards to implementation costs, it was not perceived that these costs would be so important as to make AD unattractive for Panama (i.e. incapable of covering economic trade-offs). However it was clear that implementing a strategy to curb deforestation would require important policy changes and initial investments not only on ANAM's part, but also from other agencies and large actors as discussed. It was very doubtful that those reforms and investments could be made a priori by Panama (Interview 1).

This reflected two perceptions held by ANAM officials. First, the lack of a widely held perception amongst government that this should be a national goal or priority and the consequent lack of funds available as explained when discussing capacity. Second, Panama faced perverse incentives not to act in this dossier which stemmed from the very nature of the Climate Change Regime in a context where considerable uncertainty remained as to whether or not, when and how an AD regime was going to be integrated into UNFCCC.

#### 2.4.4.1 Creating a State Vision

There was not a widely held perception in the Panamanian State that controlling deforestation should be a priority for Panama at the end of 2006 (Interview 1). This was attributed to the lack of awareness of the possibilities carbon markets and the UNFCCC offered for the country as well as to doubts that many entertained as to whether or not alternatives to deforestation could really provide a development path for Panama (Interview 2). According to ANAM officials Avoided Deforestation would need to make its mark on the field and prove that it can alleviate poverty to really gain widespread support (Interview: 1,4). In this context, a priori funding was perceived to be the spark plug that would send a clear signal to other agencies that AD was an option worth considering and it was likely that it would initiate an integrated movement towards curbing deforestation (Interview: 1,4). This view must be understood in the context of the political

economy of conservation in Panama and Panama's prior participation in the Climate Change Regime.

Conservation in Panama

ANAM is in charge of managing the SINAP. The Agency provides park personnel and enforces regulation; however, most conservation efforts have been made possible through foreign funding. Indeed, the majority of the resources allocated to financing SINAP come from external contributions to support the management of protected areas. If we look at the 1996 fiscal year for example, around 80% of the SINAP budget was financed through external contribution while the rest came from the national budget (Tovar, 1997). The direct investments towards SINAP for that year totalled US$7, 634,353.00. As explained much of these efforts have been concentrated in the canal watershed. The *Fondo FIDECO* which is the main source of public funding for Parks was created as an arrangement between the government of Panama providing half the funding and the United States Agency for International Development (USAID) providing the remainder through dept swaps and grants. The fund is not however managed by ANAM, but rather by the Natura Foundation, an offshoot of the Nature Conservancy, an international environmental NGO based in the United States.

In 1996 other programs and investments in conservation zones and management of natural resources in Panama summed to US$6,091,847.00 (Tovar, 1997). These investments came from international NGOs such as IUCN's *Management and*

*Conservation of the Eastern Native Forests* project, ITTO's *Management, Conservation and Development of Mangroves of Panama* project, and CATIE/OLAFO's *Program of Conservation for Sustainable Development*. Much of these kinds of investments are aimed at supporting Panama in the implementation of international environmental agreements such as the RAMSAR, the UNESCO World Heritage Convention, the Convention on Biological Diversity, the Mesoamerican Biological Corridor Agreement, etc. (Tovar, 1997).

The considerable funds coming from aid agencies, international environmental NGOs and multilateral agencies for conservation purposes through the years have most likely contributed to create this view that the best way to achieve environmental goals was through developing links with external donors whether they be governments, NGOs, multilateral agencies or international funds created in the mark of international environmental agreements.

The Clean Development Mechanism and Foreign Investment

Taking advantage of the possibilities provided by the CDM was a priority for ANAM. ANAM managed to attract millions of dollars of foreign investment through CDM which has become an important vector of modernization in the energy and waste treatment sectors and is even promoting the development of forestry in Panama. Currently there are over one hundred CDM projects in development in Panama, including three reforestation projects totalling more than

34,796,692 CERs[68]. As the successes of CDM are becoming obvious this priority is now being shared by more elements of the government (pers.observ.). The minister of industry first accompanied ANAM officials at the Buenos Aires CDM meeting in December 2004. In the fall of 2006 the first *Encuentro con la Union Europea sobre Energias Renovables*[69] was held in Panama City, consolidating Panama's involvement in renewable energy and ANAM's leadership role in this domain through its management and promotion of the CDM.

Building on the successes of CDM it was perceived that if ANAM could attract external a priori funds for avoided deforestation, it would garner the political power and influence to instigate significant changes in land use management at the national level (Interview:1).

### 2.4.4.2 Credit for Early Action and the Perverse Incentive not to Act

One of the important features of the policy process at ANAM and one which can help explain the importance of a priori funding relates to the perverse incentives created by a possible interpretation of the principles of ***additionality of funding*** and ***additionality of efforts***.

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[68] CERs are worth anywhere between 4 and 20 USD. For more details on CDM in Panama CDM, see http://www.anam.gob.pa/uccd/cambio_climatico/documentos/Portafolio%20Proyectos%20MDL%20Panama.pdf

[69] Meeting with the European Union on Renewable Energy

It had been agreed at Stockholm and reiterated at Rio that Southern countries needed to access new and additional funding to undertake environmental reforms. In the provisions of the Kyoto Protocol and its flexibility mechanisms it had been agreed that only additional efforts distinguishable from contingent phenomena were to generate carbon allowances. In the case of AD this translated into the concept of "compensated reductions" where countries would be compensated if they managed to reduce future deforestation rates at a national scale below a baseline set according to past deforestation rates. In this context, the principle of *additionality of efforts* meant that the more a country could lower its deforestation rate below past rates, the more it would be rewarded. However since this mechanism was not in place and details had yet to be agreed on, there remained uncertainty as to whether or not AD would reward countries who had taken early action to curb deforestation. In this context it seemed rational not to undertake massive reforms to build capacity and harmonize national land use policies before future AD provisions regarding policy and incentives had been established.

The Costa Rican experience was central in highlighting this lesson for Panama (Interviews: 1,4). Costa Rica has allegedly managed to stop the deforestation trend. The country's initiative is based on the national system of protected areas which covers 25% of the country's area. Costa Rica set a national scheme for payment for environmental services (PES) progressively starting with the forestry law of 1996[70]. Currently around 500,000 ha of forest conservation are under this PES scheme which was financed through a variety of sources but mainly through

[70] For details on Costa Rica's PES scheme, see Chomitz (1999).

a gasoline tax. It is commonly understood that Costa Rica is a global leader in payment for environmental services. Through the creation of FONAFIFO[71] and the independent post of "Forest Supervisor", Costa Rica has developed the institutional capacity to monitor and verify that effective reduction efforts take place. Different schemes focusing on different local services such water quality for consumption, dry season flows for agriculture or hydroelectricity production, flooding and erosion prevention were set-up but the global service of reducing GHG emissions from deforestation was indeed one of the main goals of the initiative. However because there is still no agreement to include AD into the UNFCCC to date, Costa Rica had yet to receive any funding through the sale of carbon credits for having reduced emissions from deforestation (or at least this is what Panamanian officials perceived). Carbon might have been sold but future prospects for compensation had been compromised. The efforts that have been made by Costa Rica in this sector have been financed in great part through national resources and although some external funding had been made available the initiative was not based on access to new and additional funding from Annex 1 countries. This was not an enviable situation according to ANAM officials, as ANAM sub administrator once said: "I would not want to end up in Costa Rica' situation" (Reyes: pers.comm. October 2nd 2006, Panama City).

In this context the provision of a priori funding could send a clear signal that new and additional funding will be made available for AD and greatly lower uncertainty with regards to the prospects for AD in Panama.

[71] The FONAFIFO is a national fund in charge of managing the national PES scheme.

**2.5 What should be done?**

The need for a priori funding was pivotal to creating a state vision and terminating perverse incentives, both prerequisites to instigate a real change in land use practices in Panama. However it was perceived that such funding would be hard to obtain through ODA or carbon markets. This is because the tendency was for Annex 1 to make funding conditional to the delivery of environmental benefits. It was impossible for Panama to commit to reducing deforestation at a national level for as we have seen ANAM did not have control over deforestation because of a lack of institutional and political capacity.

ANAM officials thus perceived that the better way to go forwards with AD was to develop pilot projects at the subnational level. Because of the limited risks and reduced complexity, it was perceived that such projects could obtain funding through ODA and/or voluntary Carbon Markets. These projects could serve to build capacity and demonstrate the possibilities that AD offered for Panama. The success of these pilot projects and the resulting demonstration effects would serve to create a State Vision for curbing deforestation in Panama (Interview: 1,2,4).

The problem with this approach from a carbon standpoint is that we have little guarantees that this approach will allow to control leakages given that geographically focused projects are unlikely to be able to tackle deep rooted

drivers of deforestation such as population growth, land ownership concentration or agricultural policies. In this sense providing compensation on a project basis may not be correct from a carbon standpoint in the sense that we are likely to hand out compensations for project activities although part of the benefits generated are cancelled off by leakages. Such transfer of funds for environmental benefits would not be conditional to a guarantee that real benefits for the climate are indeed delivered. However we must point out that there is evidence from other Latin American cases that the leakage ratio is usually not 1 to 1 and that protecting an area from deforestation does not generally induce an equivalent area to be deforested (Chomitz 2002). Also, project proponents could certainly develop an integrated socio-economic strategy to deal with leakages by developing economic alternatives for local stakeholders. Furthermore, methodological solutions to assess leakages in terms of carbon and deduct them from the calculated benefits of a project have been developed for avoided deforestation pilot projects in the past.[72]

[72] The Noel Kempf Climate Action Project is one example of a large scale avoided deforestation project. For detail see the Nature Conservancy's web site at: http://www.nature.org/initiatives/climatechange/work/art4253.html

# Conclusion

As the international community works to build an ever more complete and integrated Climate Change Regime, it is pivotal to tackle the issue of tropical deforestation. Creating an international financial mechanism to stimulate action to avoid deforestation by valuing the forest for its carbon content is likely to be a very cost effective way to reduce emissions from deforestation. Furthermore such a regime offers the possibility of addressing the tension between the fear of relinquishing national sovereignty expressed by tropical countries and the desire for more accountability voiced by northern donor countries. In the case of Panama, it was perceived that it would be in Panama's interest to participate in such a compensation mechanism. It was deemed very likely that the benefits of participation would easily cover the trade offs involved in curbing deforestation. However, because land use change is a complex and all encompassing phenomena involving a myriad of actors over which Panama's national environmental authority has little control, important capacity building will have to occur before the Panamanian State can claim to control deforestation. Such capacity building will require important a priori investments.

In the absence of a widespread conviction that reducing deforestation should be a national priority, the funds and political support needed to instigate a shift towards sustainability in land use, land use change and forestry practices was impossible to garner domestically. In this context a priori funding from countries of the

Annex 1 of the Kyoto Protocol was deemed essential to "start-up" the reform process and progressively reverse the deforestation trend.

It was deemed unlikely that such a priori funding could be accessed to reduce deforestation on a national scale given the difficulty for the State to take on binding commitments to reduce deforestation. A project based approach starting with pilot experiences resembling the forestry CDM structure was the preferred approach of ANAM officials at the end of 2006. We can be sceptical of the success that this approach will have with controlling leakages given that a project based approach is unlikely to be able to tackle deep rooted drivers of deforestation such as population growth, land ownership concentration or agricultural credit policies. In many ways preferring a project based approach is a way to avoid facing the underlying causes of deforestation head on but rather to promote a patchwork approach. However such an approach could also serve to demonstrate the viability and feasibility of reducing deforestation through the valuation of the forest for its carbon content. Projects could provide a solid basis upon which to build capacity and garner the political support to expand such programs and progressively change the deforestation dynamic in Panama.

Although access to external sources of a priori funding comes through very clearly as a policy determinant in the case of *avoided deforestation* in Panama. One must be cautious before drawing the conclusion that this is solely the result of a lack of funds and the lack of a widely held perception that curbing

deforestation should be a priority. This is because of the existing perverse incentives not to take action that have been created by the framing of North-South cooperation in environmental politics around the principle of *additionality of funding*. Indeed in Panama, past experience with the provision of global environmental goods whether it be through biodiversity conservation or participation in the CDM have reinforced this conception that it may be in a tropical country's interest to wait until incentives are put in place by the international community before taking action. The expectation that the costs of curbing deforestation could eventually be bourn by Annex 1 countries has thus created a perverse incentive not to act in the short term in Panama. Another perverse incentive stems from a common interpretation of the principle of *additionality of action*. The Costa Rican experience shows that a country actively involved in environmental action may be at a disadvantage when attempting to integrate the Climate Regime because of the limited capacity to prove that action are being taken above and beyond the normal course of action, a prerequisite to obtain carbon compensations.

Granting credit for early action to countries that have undertaken efforts to curb deforestation in the past maybe a way to deal with these issues. However in a context where deforestation drivers are many and linked through a complex web of relations, there is little doubt that distinguishing between additional efforts and the normal course of action and rewarding countries for action that they "avoid" in fair manner is a difficult task in the case of deforestation.

The pressing need to address the issue of deforestation should perhaps entice negotiators and policy makers committed to reducing emissions from deforestation to envision a system that is not based on the principle of rewarding *additionality of action* at a national scale. A stock based approach based on a cap and trade mechanism to regulate emissions from deforestation in a similar fashion as emissions under the Kyoto Protocol may be a promising way to remove perverse incentives. Pilot experiences and recent developments at the World Bank in 2007 suggest that a project based mechanism using market tools may soon take hold. Such a mechanism would be very similar to that envisioned by ANAM officials at the end of 2006.

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# Methodology Annex

## Methodology

This thesis work follows a mixed methodology combining participant observer findings and interviews with policy-makers. A literature review on the Climate Change Regime, international environmental negotiations, climate change policy, carbon in forest ecosystems as well as deforestation in Panama is used to put the analysis in context.

This thesis work explores the policy process in Panama over the course of 2006, from the drafting of the submission of views in January to the country's position coming back from COP12 in Kenya in November of that year. As explained, the analysis will be conducted from the perspective of the government; I will attempt to investigate the policymaker's rationale and discover the motivations behind the choices made. I rely on my "participant observer" experience in working with Panama's National Environmental Authority (ANAM) on the avoided deforestation initiative and on interviews conducted with ANAM officials in December of 2006.

I came to Panama in January 2006 and was part of the team that designed and drafted Panama's submission which was later to become Central America's position presented at SBSTA 24 in Bonn in May of 2006. I was involved with ANAM as it tried to refine its position for the next round of international negotiations on a deforestation avoidance regime in August in Rome and later in November in Kenya. My privileged position with ANAM gave me access to documentation and more importantly allowed me to directly witness the progression of policy-making.

## Participant observer research

### Participant observer experience no. 1: -The Draft submission of views (January-February 2006)

The avoided deforestation initiative is a new initiative and negotiations were only beginning in January of 2006. Eduardo Reyes, the sub administrator at ANAM showed much interest in the initiative and delegated the job of writing Panama's country submission of views on "measures to stimulate action to avoid deforestation" to Catherine Potvin, technical advisor to the Panamanian delegation at UNFCCC on the issue of sinks (also McGill University biologist and Panamanian resident). A core team of 6 people was gathered to take-on the task: Edgar Salinas and René Lopez, two officials from ANAM's Climate change department; Carlos Melgarejo, the head of the forestry department at ANAM;

Catherine Potvin, and two students, Maria Carmen del Ruiz Jaenz (PhD ecosystems functions) from Panama and myself, (MA cand. Political Science) from Québec. This group decided to meet every week from January 3rd to February the 14th to organize work to be done and assess the progress that was being made. This group received valuable contributions from forestry engineer Ricardo Brown Salazar (Panama) and Philippe Le Prestre, a French national teaching at Université Laval (Québec City).

A draft submission of views was the result of these two months of work. (This draft is included Annex). I worked full time on this draft submission of views during these two months, attending every meeting, making summaries of the relevant literature, preparing briefings for ANAM officials, translating different documents into English and vice-versa as well as drafting parts of the submission of views.

**Participant observer experience no. 2: - Identifying Possible Sources of Funding (July 10th)**

I met with Edgar Salinas an ANAM official from the Climate Change Department. The purpose of the meeting was to talk about sources of funding for the future AD mechanism. ANAM was interested in finding out whether or not ODA could reach sufficient levels to finance avoided deforestation and so they asked me to study the question and go data mining to find out about ODA flows for the environment and see if the trend was towards increased willingness to pay for environmental protection in tropical countries focusing on Panama.

Salinas explained what information ANAM needed to refine its position ant perhaps take a final stance on the issue.

a) How much will implementing reductions in deforestation cost
b) What is the agenda of the other actors involved in this debate?

I made a short report on green aid flows in Panama and trends in the carbon market for forestry which I handed in to Climate Change Department officials (this report is available upon request).

**Participant observer experience no. 3:-Meeting with Carlos Melgarejo, Head of Forestry Department (September 28th)**

The meeting was called by Catherine Potvin coming back from the workshop in Rome. The purpose of the meeting was to see whether or not Panama was interested in going on with negotiations on avoided deforestation. We asked Melgarejo to express his views regarding the issue and to tell us what he deemed possible at national level and how things could be achieved.

**Participant observer experience no. 4: -Meeting at ANAM (October 2)**

Sub Administrator, Head of Forestry Department, Two officials from the Climate Change Department, Catherine Potvin (Biologist).

Coming back on The Rome workshop, the meeting's purpose was to give the Sub administrator a briefing on recent developments and to consult the group on further steps to take.

**Participant observer experience no. 5: -Meeting at FAO (October 7th)**

The meeting was called by the FAO and included a presentation of ANAM's vision for PES schemes at a national level. In reality it is a case study of feasibility in Rio La Villa. ANAM exposed its vision for the national PES scheme. The design has focused on the institutional functioning of the mechanism (which institutions will manage, how will funds be distributed, acquired and managed, new institutions to be created, etc.) In general they put forward an idea the institutions to be created.

At this meeting were present a number of consultants both independent and affiliated to USAID- AED. Consultants expressed their views on policies and possible strategies.

## Interviews

Interviews were conducted at ANAM offices in Panama City during a two week period starting friday November 24th 2006. The same questionnaire was used for all interviews. Different interviewees emphasized different key points relevant to their different area of competence. The material collected included many recurrent statements and concerns. No contradiction between the views of different members of the policy-making team was identified.

Interviewees included:

Interviewee no.1.-Eduardo Reyes, ANAM sub administrator (December 7th)

Interviewee no.2.-Carlos Melgarejo, Head of forestry Department (November 24th)
Interviewee no.3.-René Lopez, Head of Climate Change Department (November 24th)
Interviewee no.4.-Darysbeth Martinez, Climate Change official (December 5th)

## Complementary work

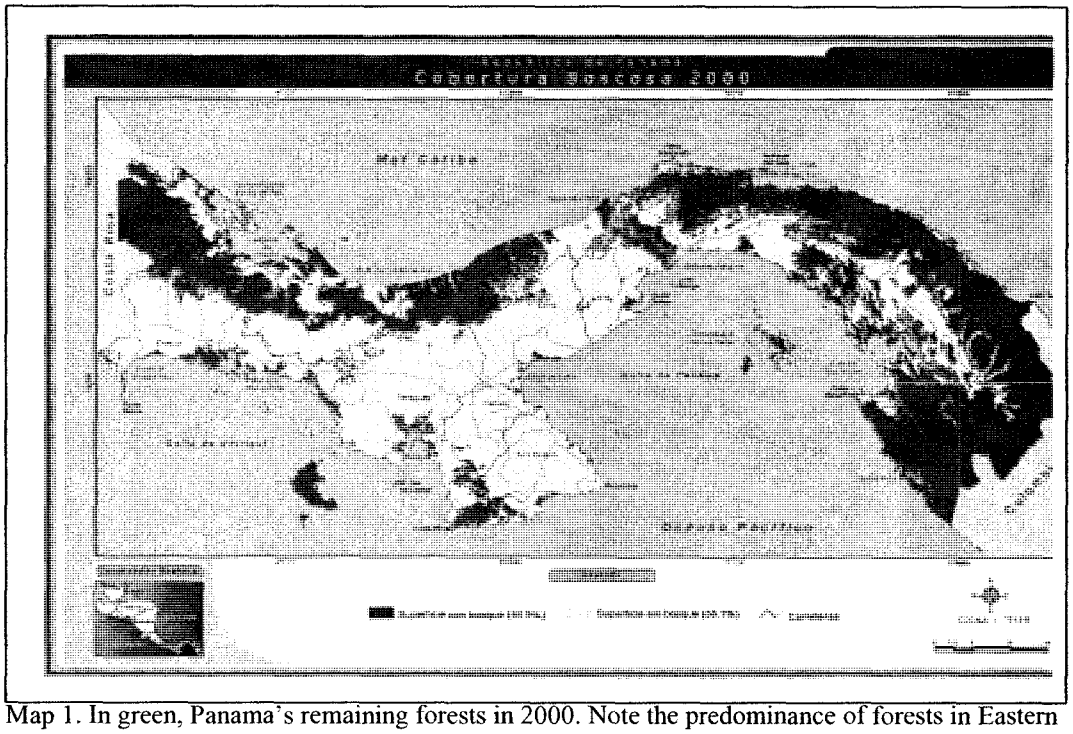
In the context of the research I conducted with fellow NEO students, I met with numerous actors from NGOs and aid agency to discuss the issue of Deforestation in Panama. The most important of which are: USAID-AED, SOMASPA, FSC, Fundacion Natura, The Nature Conservancy, ANCON and The Association of Private Reserves of Panama. With fellow Neo students I conducted a survey of the deforestation situation in 12 Panamanian National Parks. The results of this work is included in a paper prepared for the ENVR 610 core course of the Neotropical Environmental Studies program taught in Panama in August 2006.

Guay, B. Meiners, M. Pelletier J. and M.C. Ruiz-Jaen. 2006. Avoided deforestation: the costs and priorities to ensure forest protection within National Parks and important conservation areas in Panama. McGill-STRI Neotropical Environmental Program. Unpublished.

NB: Transcripts of my participant observer notes, questionnaire transcripts as well as the final papers submitted with my NEO classmates are available up-on request.

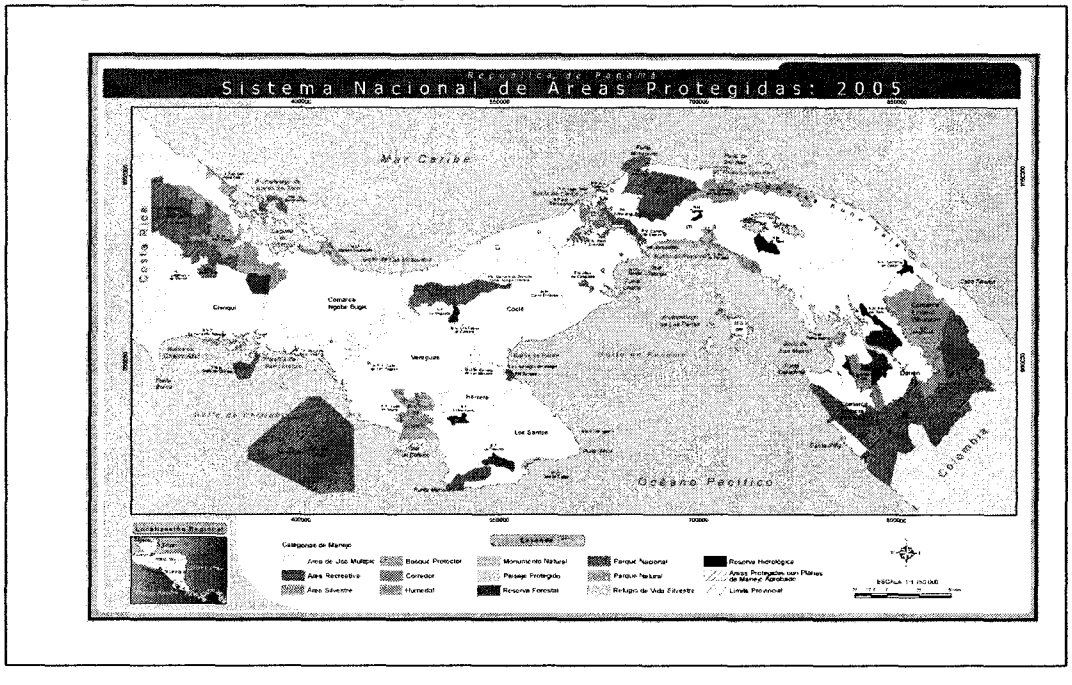
## Annex A

### Map 1. Forest Cover



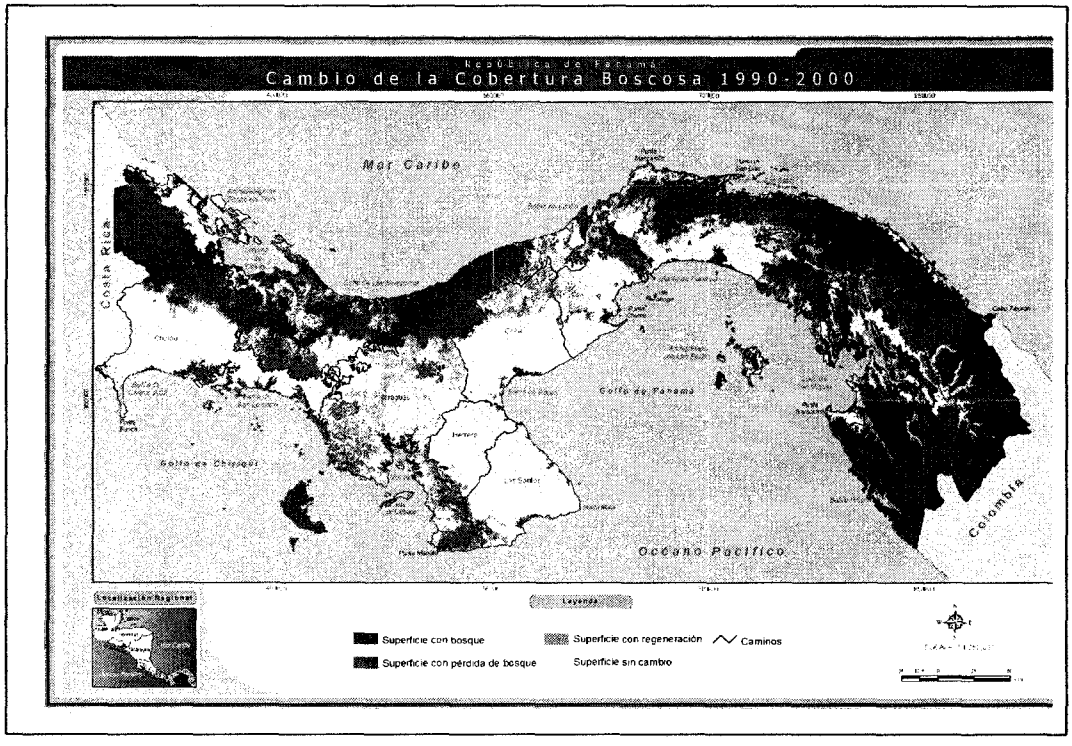

Map 1. In green, Panama's remaining forests in 2000. Note the predominance of forests in Eastern Panama (Province of Darien), on the Caribean Coast (Ngobé Buglé Comarca) and in Western Panama (Province of Bocas del Toro). Source : Forest Resource Assessment (FAO 2000)

### Map 2. Panama's National System of Protected Areas



Map.2. Protected areas are in the remote Darien (bottom right) and Bocas Del Toro Provinces (far left) as well as in the Panama Canal Watershed (middle).

**Map 3. Land use change from 1992 to 2000 in Panama.**




Map 3. In red, Panama's deforested area between 1990 and 2000. Note the important deforestation taking place in Eastern Panama (mostly in the Province of Darien) and in the Western part of the country, an area which is mostly comprised by the indigenous Comarca Ngobe-Buglé and Bocas Del Toro Province.

**Table 1. Deforestation in Panama per Region: 1992-2000 ANAM-ITTO**

| Province | Area | Forest 92 | Forest 2000 | Forest lost | Aver. annual lost | Annual % lost |
|---|---|---|---|---|---|---|
| Bocas | 4662.55 | 3522.52 | 3421.91 | 100.61 | 12.57625 | 0.003570242 |
| Cocle | 4947.33 | 691.15 | 654.22 | 36.93 | 4.61625 | 0.006679086 |
| Colon | 4832.5 | 2844.72 | 2606.26 | 238.46 | 29.8075 | 0.010478184 |
| Chiriqui | 6513.08 | 1049.41 | 1211.12 | -161.71 | -20.21375 | -0.019262014 |
| Darien | 11943.08 | 9907.37 | 8531.25 | 1376.12 | 172.015 | 0.017362327 |
| Herrera | 2337.71 | 102.25 | 93.21 | 9.04 | 1.13 | 0.011051345 |
| Los Santos | 3791.79 | 212.3 | 279.71 | -67.41 | -8.42625 | -0.039690297 |
| Panama | 11718.34 | 5670.53 | 4978.32 | 692.21 | 86.52625 | 0.015258935 |
| Veraguas | 10577.74 | 3019.05 | 2830.53 | 188.52 | 23.565 | 0.007805435 |
| C. KY | 2422.75 | 2155.64 | 2123.42 | 32.22 | 4.0275 | 0.001868355 |
| C. E-W | 4342.7 | 4018.92 | 3976.14 | 42.78 | 5.3475 | 0.001330581 |
| C. N-B | 6818.2 | 3757.75 | 2939.82 | 817.93 | 102.24125 | 0.027208103 |
| **Total** | **74926.77** | **36951.6** | **33645.91** | **3305.69** | **413.21125** | **0.0111825** |

Source: ANAM-ITTO 2000

## Annex B

## Deforestation Drivers

### Table 2. Population and Growth by Province 1970, 1980, 1990

| Province | Population | | Growth rate (%) 1980-1990 |
|---|---|---|---|
| | 1980 | 1990 | |
| Bocas del Toro | 53,487 | 93,361 | 5.73 |
| Coclé | 140,903 | 173,190 | 2.08 |
| Colón | 133,833 | 168,294 | 2.32 |
| Chiriquí | 287,350 | 370,227 | 2.57 |
| Darién | 26,524 | 43,832 | 5.15 |
| Herrera | 81,963 | 93,681 | 1.35 |
| Los Santos | 70,261 | 76,947 | 0.91 |
| Panamá | 809,100 | 1,047,127 | 2.85 |
| Veraguas | 173,245 | 203,626 | 1.63 |
| **Total** | **1,805,287** | **2,329,329** | **2.58** |

**Source**: Censo de Población y Vivienda, Contraloría General de la República de Panamá

### Table 3. Agrarian Society Structure: Ownership Concentration: 1980 and 1990

| Total number of farms | | Area (ha) | Size(ha) | Number of farms | % farms | Occupied area(ha) | % of total exploited area |
|---|---|---|---|---|---|---|---|
| **Year** | **Totals** | 2,941,895 | < 5 | 152,948 | 71.5 | 122,549 | 4.16 |
| 1990 | 213,895 | | > 200 | 1,794 | 0.83 | 1,098,159 | 37.32 |
| 1980 | 151,283 | 2,276,697 | < 5 | 99,378 | 65.7 | 90,931 | 3.99 |
| | | | > 200 | 1,491 | 0.98 | 771,341 | 33.9 |

**Source**: Censos Nacionales 1980-1990, Contraloría General de la República de Panamá

### Table 4. Soil Aptitud in Panama

| Aptitud | Area(ha) | Percentages |
|---|---|---|
| Agricultura or Livestock grazing | 1,887,922.5 | 25 |
| Forestry and agroforestry | 5,663,767.5 | 75 |
| **Total** | **7,551,690** | **100** |

**Source:** Capacidad agrológica de los suelos de Panamá, Atlas Nacional 1980

**Table 5. Cattle density 1970, 1980, 1990**

| Year | Area with pastures (ha) | | | Livestock | | | Head per ha. |
|---|---|---|---|---|---|---|---|
| | Total | Absolute change | % change | Total | Absolute change | % Change | |
| 1970 | 1,140,795 | ---------- | ---------- | 1,259,892 | ---------- | ---------- | 1.10 |
| 1980 | 1,300,503 | 159,708 | 14.0 | 1,432,740 | 172,848 | 13.7 | 1.10 |
| 1990 | 1,470,559 | 170,056 | 13.1 | 1,339,487 | (33,253) | 2.3 | 0.95 |

**Source:** MIDA, base on numbers of the Censos Nacionales, Contraloría General de la República de Panamá.

**Annex C**

# Reducing emissions from deforestation in developing countries: Approaches to stimulate action

**Submission by:**

**The Countries of Central America**
**Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua and Panama**

## I. Mandate

UNFCCC COP11 in its document FCCC/CP/2005/L.2: "Reducing emissions from deforestation in developing countries: approaches to stimulate action", Draft conclusions proposed by the President, calls for Parties to send submissions to the Secretariat as follows:

"The COP invited Parties and accredited observers to submit to the Secretariat, by 31 March 2006, their views on issues relating to reducing emissions from deforestation in developing countries, focusing on relevant scientific, technical and methodological issues, and the exchange of relevant information and experiences, including policy approaches and positive incentives..."

## II. Preamble

This document presents the views of Central America on reducing emissions due to deforestation in developing countries. Taking into account that the document FCCC/CP/2005/MISC.1 submitted to COP by Papua New Guinea (PNG) and Costa Rica with the support of Guatemala and Nicaragua amongst others, provides a good general overview of the links between deforestation and climate change, we have focused our analysis on key principles, questions and methodological issues that we wish to bring to the attention of the COP. Consequently, this submission is divided into four sections: (1) Preamble, (2) Principles, (3) Scientific and methodological aspects, and (4) Information and Exchange of Experiences on Matters of Policies.

*Central America's Vulnerability to Climate Change*
Central American countries are deeply concerned with Climate Change because of their high vulnerability to the impact of changing weather patterns, including but not limited to increasing frequency of hurricanes and tropical storms.

The Central American Isthmus is one of the regions of the world most frequently affected by climate related disasters: hurricanes, floods, droughts, land slides, etc. These events exact a high toll of human lives and cause enormous damages to

national infrastructures and productivity. Data from regional disaster management agencies (CEPREDENAC) and for United Nations sources (ECLAC), indicate that, due to such events, the Isthmus has lost thousands of lives and has suffered losses for more than US$30 billions since 1960.

*The Central American Context*

In an attempt to fight environmental degradation and implement more sustainable land use, the Central American Forestry Strategy (EFCA) was approved during the XXXIV Ministerial Meeting of the Central American Commission on the Environment and Development (CCAD), of October, 2002. The EFCA hopes to curb the deforestation process in the region by having all Central American countries reviewing or updating their forest policies and National Forest Development Programs.

The EFCA mission is to become a permanent forum for discussions and action pertaining to sustainable forestry development in Central America. Its strategic objectives are (i) to support the implementation of the principles, actions and agreements of the Forum and Intergovernmental Forest Panel (IPF/IFF) and (ii) to position the forestry sector as an important agent of economic, social and environmental development contributing to vulnerability reduction and poverty alleviation.

The goals of EFCA are: (i) Strengthen the forest agenda in Central America, (ii) Increase forest coverage in the region, (iii) Restore degraded forests, (iv) Strengthen the Central American System of Protected Areas (CAPAS) and, (v) Promote the competitivity of the Central American forest sector.

Within this context, the Ministerial Council of the CCAD, has approved three regional programs framed within the initiative of the Mesoamerican Biological Corridor: (a) PERTAP – Regional Program of Work in Protected Areas, (b) PERCON – Regional Program for Connectivity and (c) PROMEBIO – Regional Program for Monitoring and Evaluating Biodiversity.

*The causes of deforestation*

The policy undertakings highlighted above illustrate the concern of Central American countries regarding deforestation. Nevertheless the task is daunting and the probability of success of these measures is unknown. Uncertainties are linked to the complexity of the causes of deforestation and the difficulty of tackling them.

In Central America, deforestation is due mainly to land use change (expansion of the agricultural frontier, firewood consumption and urban processes). Focusing on the causes of deforestation and looking for solutions that take into account the socio-economic context are therefore essential for the success of this initiative. Central American countries wish to emphasize that a forest that is not sustainable used, is a forest that is lost.

The challenge facing Central America is to develop sustainable economic activities that will maintain natural forests dynamics, carbon stocks while maximizing social benefits. For example, activities such as ecotourism, sustainable forestry and extraction of non-timber forest products are all compatible with the idea of reducing emissions from tropical deforestation.

*Need for action*
The countries subscribing to this proposal recognise the importance of protecting forests to maintain their essential environmental functions, in order to avoid greenhouse gas emissions resulting from deforestation, and improve their adaptive capacity to projected impacts as a result of global climate change.

They also recognise that existing forests in the region must be conserved within the framework of both mitigation and adaptation strategies and measures. The Central American countries consider that strengthening, and taking advantage of, already existing mechanisms within the UNFCCC and the Kyoto Protocol on matters of adaptation and mitigation to reduce emissions coming from deforestation is necessary.

## III. Principles

The Central American proposal is based on some principles recognised at international level

Sustainable development and poverty eradication:
Countries have the responsibility to meet their present needs without limiting the options of future generations. In keeping with Article 3 of the Convention, activities that may be undertaken in pursuit of the objective of avoiding deforestation should be coordinated with social and economic development in an integrated manner (a) bearing in mind that the burden of reducing or avoiding deforestation falls on stakeholders such as peasants, indigenous peoples, small farmers and ranchers; (b) taking into full account the legitimate needs of developing countries to achieve sustained economic growth and eradicate poverty as stated at the September 2005 UN Summit.

Synergy with adaptation measures and with multilateral environmental conventions:
According to projections of the Third Assessment Report on Climate Change (TAR)[73] adaptation measures have the potential to reduce losses related to climate change in the forest and agricultural sectors. It is therefore important to take into account interlinkages between mitigation, adaptation and deforestation avoidance.

Furthermore, protecting existing tropical forests will help to achieve the goals of the UN Convention on Biological Diversity (CBD). Indeed tropical forests contain between 50% and 70% of all species and their importance is reflected in

[73] Climate Change 2001: Impacts, adaptation and vulnerability (IPCC-TAR).

the 5th technical paper of the IPCC where an entire section deals with forested lands and biodiversity[74]. Mechanisms for avoided deforestation should reinforce synergies and cooperation among existing international agreements on sustainable development such as the abovementioned CBD and the Convention to Combat Desertification. Small countries or regions have a great importance for biodiversity conservation even though their forested areas may not be very large.

As an example of synergy, the Mesoamerican Biological Corridor provides a cooperation framework allowing to link the conventions on Climate Change, Fight Against Desertification and Drought, Biological Diversity and Wetland Protection, as well as regional initiatives such as the Alliance for Sustainable Development, the Central American System of Protected Areas, and the Central American Forest Strategy.

Fairness/Equity:
A regime of avoided deforestation should insure a fair distribution of the responsibilities and possible benefits both between and within countries. For example to ensure fairness at the international level, differences in the national extent of forest cover should be taken into account when developing methodologies. The possibility that large countries may benefit disproportionately from the mechanism or may impair its smooth operation should be of concern.

At the national level, and in keeping with the Principle of Sustainable Development, Central American countries would welcome discussion around avoided deforestation options that could explicitly take the need to improve the livelihoods of poor rural communities or indigenous peoples, and therefore ensuring a fair and equitable distribution of the benefits among all stake holders.

Additionality of financial resources:
The Central American countries would like to recall the principle of financial additionality as defined in the Stockholm Declaration. Additional resources should be made available to developing countries to compensate for any expenses linked to implementing policies aiming to reduce or avoid deforestation. Aid for avoided deforestation should be additional to the current and already planned aid transfers.

Environmental integrity of existing mechanisms:
Avoided deforestation activities and measures should not weaken the environmental integrity of the UNFCCC and the Kyoto Protocol. Mechanisms for avoided deforestation should not undermine emission reduction efforts by Annex I countries, nor weaken the existing flexibility mechanisms.

## IV. Scientific and Methodological aspects

*Scientific Aspects*

[74] Gitay, H. (2002) Climate Change and Biodiversity. Technical paper V. IPCC

- Forests can act as either carbon sinks or sources; therefore they play a significant role in the global carbon cycle. Between 1990 and 2000, greenhouse gas emissions coming from global deforestation ranged between 10% and 38% of total anthropogenic emissions, including activities of forest conversion in farm and cattle land, migrating agriculture and forest crops[75].

- In Central America, biomass reserves have evidenced a progressive decrease in the last years, related to different processes, such as deforestation. The total regional biomass stock decreased from 1990 of 3.4 Gt, to 2.9 Gt in 2000, and 2.7 Gt in 2005.

- According to projections of the TAR, water and land ecosystems and, within the latter forests, will be impacted by global climate change. The increase in frequency of extreme events and disturbances, such as hurricanes, El Niño Southern Oscillation (ENSO), forest fires and pests may decrease productivity, increase soil degradation, increase the loss of already stored carbon[76].

- A sustained increase of 1°C in mean global temperature is enough to cause changes in regional climates, affecting the growth and regeneration capacity of forests in many regions. In some cases, this could significantly alter the function and composition of forest ecosystems[77].

- According to recent projections[78], in low latitudes, temperatures generally could increase. Although primary productivity of ecosystems might increase, biomass in standing forests might decrease due to a greater frequency and abundance of pest and diseases as well as greater intensity and frequency of forest fires.

*Definitions*
Definitions of forest, deforestation, avoided deforestation, and baseline should take into consideration, and be based on, the diversity of national circumstances and priorities.

*Methodological issues*
- Recalling the Principle of Synergy, the Central American countries suggest that implementation measures and actions to avoid deforestation in developing countries should be coherent with climate change adaptation objectives and already established mitigation mechanisms while taking into account other environmental conventions.

- Monitoring of deforestation reduction should be undertaken every five years. Many countries, however, currently lack the required financial and human

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[75] Houghton, R.A. (2005) *Global Change Biology*: 11, 945-958.
[76] *Ibid*
[77] Climate Change 1995: Scientific-technical assessments of impacts, adaptation and mitigation of climate change (IPCC-SAR).
[78] *Ibid*

resources to carry out such a task. Resources should be made available for technical training, logistical support, technology transfer and monitoring.

- Each country should negotiate its baseline according to existing information availability and criteria for national policies. The baseline should include a monitoring plan to be executed. Methodologies used must guarantee the environmental integrity of the UNFCCC and the Kyoto Protocol.

- Avoided deforestation should be calculated upon the basis of non-deforested surface considering the agreed monitoring plan. To respect the fundamental Principle of Fairness, methods must insure that countries with traditionally low deforestation rates are not at a disadvantage and that countries with historical high rate of deforestation are not rewarded. A possible mechanism to ensure fairness is to use the global deforestation baseline for the developing world as a reference.

- Various methods exist to estimate deforestation. Each country should be able to choose its methodology, but methodologies would need to be approved by an International Accredited Certification Body or any such qualified entities (FAO, OIMT, IPCC, etc.). The Revised 1996 IPCC Guidelines and the Good Practice Guidance for Land Use, Land-Use Change and Forestry could serve as the basis to develop appropriate methodologies.

- The monitoring process must use the highest standards of reliability and transparency.

*Resources for Implementation*

- According to the Principle of Synergy, countries should optimise available resources to satisfactorily meet their objectives of adaptation, mitigation and deforestation avoidance. Such integrated approach should be prioritized within the financing of Special Climate Change Fund (SCCF), the Adaptation Fund under the Kyoto Protocol, and the operational lines under the Global Environment Facility (GEF)

- Besides the above mentioned funds, bilateral and multilateral programs already established or to be established within UNFCCC, should prioritize avoided deforestation projects that take into account mitigation and adaptation to Climate Change.

- In order to be successful, efforts to reduce deforestation in developing countries need to identify appropriate enabling sources of finance. It is essential to recall the Principle of Additionality as financing new initiatives on avoided deforestation should not be done at the expense of aid in other sectors.

- The Central American countries are open to discussions on financing through the participation of private agents such as Social Corporate Responsibility Programs, Payment for Environmental Services, etc. In this context, the Central

American countries support the exploration into alternatives such as voluntary carbon markets as a means to stimulate action to reduce emissions from deforestation in developing countries.

- While the benefits from deforestation reduction should be given at the end of a monitoring period, mechanisms must be put in place to initiate the process. This will be an essential condition to foster action and this issue has to be discussed thoroughly.

- The assignment of resources must ensure the strengthening of the main actors that will intervene in this process, which may be grouped in two large categories: (i) Governmental Sector (Central Governments, local Authorities, etc.), (ii) Civil society (local communities, indigenous peoples, NGO's, private sector, Academy, among others).

*Recommendations on possible future processes*

- For the moment, we suggest that the discussions regarding deforestation in developing countries continue under the COP. It is hoped that discussions on avoided deforestation will strengthen the multilateral process of the UNFCCC and of the Kyoto Protocol.

- It is important to address avoided deforestation in developing countries within the policies already agreed by UNFCCC, on matters dealing with mitigation as well as adaptation. For this, the Central American countries proposed:

> (i) To incorporate avoided deforestation within the five-year working program[79] of the SBSTA on the impacts of climate change, vulnerability and adaptation. The issue should be addressed in the two thematic areas of the aforementioned program, namely: (a) Impacts and vulnerability; and (b) Planning, measures and activities related to adaptation.
>
> (ii) To foster the design and execution of projects to avoid deforestation within the Special Climate Change Fund (SCCF), taking advantage of already incorporated thematic sectors and areas such as: (a) forestry, (b) land planning and management, (c) fragile ecosystems, including mountainous systems, and (d) planning and integrated management of coastal areas.
>
> (iii) Capacity building issues, policy approaches and positive incentives should be addressed by SBI as soon as possible, to allow a prompt start of capacity building and implementation

**V. Information and exchange of experiences on matters of policies**

[79] FCCC/CP/2005/L.3

In Central America, a wealth of experience has been acquired from natural protected areas and is worth sharing with other signatory countries of UNFCCC. Table 1 presents a summary of the information on deforestation figures for 2005 together with an overview of effective conservation measures that have been adopted by different countries to reduce deforestation. Reference to the Mesoamerican Biological Corridor is abbreviated a CBM.