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SAVING TROPICAL FORESTS AS A GLOBAL WARMING COUNTERMEASURE:
AN ISSUE THAT DIVIDES THE ENVIRONMENTAL MOVEMENT

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COMMENTARY

Saving tropical forests as a global warming countermeasure: an issue that divides the environmental movement

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Abstract

Saving tropical forests as a global warming countermeasure has become one of the environmental movement's most divisive issues. Divisions are just as sharp as the better-known ones between government positions. While the debate is often couched in scientific terms and with appeals to high universal principles, the positions of the different partisans to the debate are better understood in terms of hidden agendas, conscious or not. In the case of European governments, which oppose inclusion of forests in the Kyoto Protocol's Clean Development Mechanism, the exclusion of forests would lead to improvement of industrial competitiveness as compared to the United States. In the case of Brazil, opposition to including avoided deforestation fits with conspiracy theories regarding internationalization of the Amazon. For European and European-dominated NGOs, opposition to forests is best explained as an opportunistic blow at US consumption culture, which is reviled for reasons largely unrelated to climate change. From the point of view of Brazilian NGOs concerned with maintaining Amazonian forest, these alternative agendas are side issues that, attractive as they might be, do not merit throwing away a major opportunity for obtaining monetary flows for forest maintenance. . More carbon can be maintained in the forests than the amount of carbon credit granted. In this way, even if the carbon in the forests is temporary, at some point a net benefit exists for the climate from having the forest project instead of a smaller reduction in fossil-fuel emissions. Proposals for ton-year accounting and for temporary credits effectively deal with issues such as carbon permanence to make the climatic benefits of avoided deforestation real, allowing both a gain for climate and the maintenance of biodiversity and other values through carbon mitigation activities. The importance of tropical deforestation in global greenhouse gas emissions means that agreement will eventually have to be reached on how to account for the benefits of avoided deforestation and incorporate them into mitigation activities. This will continue to be the case regardless of the course of negotiations in the coming months in the wake of the March 2001 announcement by US president George W. Bush of his desire to renege on US commitments under the Protocol.

Keywords: Global warming, Kyoto Protocol, Deforestation, Tropical forest, Greenhouse gases, Non-Governmental Organizations

1. Introduction

The place of tropical forest conservation in efforts to combat global warming has become a source of sharp disagreement among environmental non-governmental organizations (NGOs), and also, although they are very loathed to admit it, within their ranks. This paper gives the viewpoints of one participant in these controversies and makes no pretense of detachment or neutrality. For almost 20 years the author has been a strong advocate of slowing tropical deforestation as a means of reducing greenhouse gas emissions, and much of his professional work over this period has been devoted to providing the scientific basis, both in terms of data and theory, that is needed to make this possible. This is part of a wider strategy to shift the support of human populations in tropical forest areas such as Brazilian Amazonia from a system based on destroying the forest to one based on maintaining the forest for its environmental services (Fearnside, 1997a).

The positions of environmental NGOs on inclusion of avoided deforestation in the Kyoto Protocol's Clean Development Mechanism (CDM) are tightly linked to geography, with European NGOs opposing inclusion of forests, US NGOs (other than US branches or affiliates of international groups) favoring inclusion of forests, and Brazilian NGOs (also excepting most branches or affiliates of international NGOs) also favoring forests. If one were to represent opinions on this issue by throwing colored darts at a map of the World, the chances of the colors representing these views being clustered in Europe, North America and Brazil in this way would be vanishingly small. In other words, these positions are based on something other than the universal concerns about climate change and future generations that predominate in public statements on all sides. The reasons for these differences are not scientific, despite the debate frequently being couched in scientific terms. The European-dominated NGOs have a scientific argument that, combined with moral choices regarding time horizon, time preference and "ancillary" effects, leads to their rejecting avoided deforestation. However, an equally sound scientific argument, combined with different moral choices on the other critical factors, leads to the opposite conclusion.

Much opposition to avoided deforestation as a supposed "loophole" stems from the belief that it is a "dangerous distraction" because "The way the Protocol has been written, every ton of carbon absorbed by a sink allows a ton of carbon to be emitted from burning fossil fuels" (WWF Climate Change Campaign, 2000). Fortunately, this interpretation is mistaken because one does not need to make the assumption of a ratio of one-to-one between the carbon maintained in the forests and the credit granted that allows fossil-fuel carbon to be emitted. More carbon can be maintained in the forests than the amount of carbon credit granted. In this way, even if the carbon in the forests is temporary, at some point a net benefit exists for the climate from having the forest project instead of a smaller reduction in fossil-fuel emissions. If well negotiated, inclusion of forests can result in concrete gains for global climate, in addition to large advantages in

other spheres. The same logic that applies to permanence also applies other aspects of forest projects, such as uncertainty and leakage.

Avoided deforestation should not be confused with plantation silviculture, despite the two being virtually always lumped as “sinks” in European NGO discourse (eg., Greenpeace International, 2000a,b; Hare and Meinshausen., 2000). They are very different, both in terms of carbon benefits and in terms of their impacts and benefits for biodiversity and social concerns. Avoided deforestation almost always is more beneficial than tree plantations (Fearnside, 1995, 1996a).

It is very important to distinguish between what is a scientific conclusion and what is a moral judgment. Science can provide answers to questions such as “how much carbon will a given project hold out of the atmosphere, for how long and with what degree of certainty.” It cannot tell us whether that answer means that the CDM should include or exclude avoided deforestation. Such a conclusion requires moral choices. We must have the courage to admit that we are making moral decisions, and to go ahead and make them. Decisions on the value of time, as reflected in the discount rate and the time horizon, are based on the value that society (represented by “decision makers”) places on a suite of different considerations, such as the importance placed on present versus future generations. The environmental price would be high if we throw away a major opportunity to maintain tropical rainforest in exchange for an expected climate benefit several centuries in the future.

People involved in the debates over forests in the Kyoto Protocol are only rarely aware of underlying motivations that affect the various positions, including their own. Most people are not consciously pursuing a hidden agenda while cynically mouthing an intellectual argument. Rather, people are carried along by the social context in which they live: in general virtually everyone any given individual knows is on the same side of the issue, and those on the other side are painted in the blackest terms. Trusted “trademarks” of known NGOs serve as substitutes for individual analysis of the issues involved. For example, very few European environmentalists chanting “Don’t sink the Protocol” could explain the difference between an avoided emission and a sink, or the assumptions and implications of time-preference choices underlying different means of accounting for carbon.

In the following pages I will suggest rationales for government and NGO positions that explain such facts as the highly improbable geographical distribution of opinions. These must be understood in the context of the role of tropical forests in climate change and the carbon and non-carbon considerations in policy choices for mitigating global warming. When viewed from the perspective of the wider environmental concerns that many environmental NGOs hope to address, one must conclude that those groups that oppose inclusion of avoided deforestation in global-warming mitigation measures should rethink their positions.

2. Tropical forests and climate change

The United Nations Framework Convention on Climate Change (UN-FCCC), signed by over 150 countries in Rio de Janeiro in 1992 (UN-FCCC, 1992), provided a general framework for continuing international negotiations over reducing emissions of greenhouse gases. Negotiations have proceeded at a series of Conferences of the Parties (COPs), the most important being the third such conference (COP-3) in Kyoto, Japan, where the Kyoto Protocol was negotiated in December 1997 (UN-FCCC, 1997). COP-6 took place in November 2000 in the Hague to decide on the role of forests under the Kyoto Protocol, including the role of tropical forests under the Clean Development Mechanism. No agreement was reached, and the conclusion of COP-6 was delayed to another meeting in Bonn, Germany in May, later postponed to July 2001. Negotiations on the inclusion of tropical forests in efforts to combat the greenhouse effect have behind them a series of hidden agendas, although the debate is frequently expressed in terms academic and moral arguments. Understanding the unspoken underpinnings of the debate so far is essential to finding solutions in the future, regardless of the direction that negotiations may take in the coming months or years.

The statements by US President George W. Bush and his spokespersons in March 2001 voicing opposition to the Kyoto Protocol as a whole have shocked all those concerned with climate change. The urgency of pressuring the United States into admitting its responsibilities as the World's largest net emitter of greenhouse gases and taking effective measures to reduce these emissions should not be allowed to smother ongoing discussion of the merits of the different mitigation options, including slowing tropical deforestation.

Regardless of what is decided in the coming months concerning the first commitment period of the Kyoto Protocol (2008-2012), or even on the fate of the Kyoto Protocol as a whole, the greenhouse effect will be with us for centuries to come, and, as its impacts become more obvious and undeniable, the measures taken to combat it will increase in scale. Sooner or later the role of tropical forests will be recognized and incorporated into global warming mitigation measures because the logic behind the carbon benefits of maintaining tropical forests is scientifically sound.

No option exists to do nothing about global warming. "Business as Usual" scenarios indicate tremendous impacts over the course of the 21st century using the best available information, such as the "IS-92a" scenarios in the IPCC's Second Assessment Report or SAR (e.g., Pearce et al., 1996). Developing countries are expected to bear the greatest losses from global warming, especially human life losses. Under the obviously optimistic assumption that world population does not grow after 1990, increased mortality from doubling pre-industrial CO₂ (i.e., in approximately 2070) would be 138,000 lives/year (115,000 of which would be in developing countries), while monetary losses independent of loss of life would be US\$221 billion/year in constant 1990 dollars according to the reference scenario used by the SAR (Pearce et al., 1996, p. 197). The realization that developing countries will suffer greatly has not yet penetrated many developing countries. For example in Brazil global warming is popularly viewed as a problem that primarily affects northern countries. Unfortunately, the IPCC Special Report on Regional Impacts points out Brazil as one of the countries where agriculture will suffer the most from global warming (Canziani et al., 1998, p. 213).

Concern about the gravity of climate change and the urgency of action should not be confused with the question of what should be done about it. One often sees European NGO presentations beginning with dramatic statements on the gravity of climate change, followed by condemnation of “sinks”. The subliminal implication is that anyone who favors any “sink”, a category in which European NGOs include avoided deforestation, is somehow not concerned about combating climate change. This implication is quite erroneous, as those who favor crediting avoided deforestation are just as concerned about climate change as anyone else; the difference of opinion is over what should be done about it.

The carbon emissions from tropical land-use change indicate a substantial contribution to global warming. For tropical countries throughout the World over the 1981-1990 period the net emissions from all clearing of natural vegetation and of secondary forests (including both biomass and soil fluxes) was 2.0×10^9 t C, equivalent to $2.0\text{-}2.4 \times 10^9$ t of CO₂-equivalent carbon considering the global warming potentials adopted under the Kyoto Protocol. Adding emissions of 0.4×10^9 t C from land-use category changes other than deforestation brings the total for land-use change (not considering uptake of intact forest, recurrent burning of savannas or fires in intact forests) to 2.4×10^9 t C, equivalent to $2.4\text{-}2.9 \times 10^9$ t of CO₂-equivalent carbon. If one considers the average annual fossil fuel emission of 6.0×10^9 t C over the 1981-1990 period (Watson et al., 1992, p. 29), the 2.4×10^9 t C land-use change emission represents 29% of the combined total.

Deforestation in Brazilian Amazonia releases quantities of greenhouse gases that are significant both in terms of their present impact and in terms of the implied potential for long-term contribution to global warming from continued clearing of Brazil's vast area of remaining forest (Fearnside, 2000a). Brazil is the largest single contributor to land-use change emissions, with 23% of the tropical land-use total; Brazil's 0.462×10^9 t C annual emission from forest clearing, plus 0.094×10^9 t C from category changes (a proportional share of this emission), together represent 6.6% of the global total from fossil fuels and land-use change (Fearnside, 2000b).

3. Impasses in negotiations

3.1. National positions

3.1.1. European Union

The representatives of the European countries are the ones who press hardest for a reduction of the inclusion of activities in tropical forests as measures to combat the greenhouse effect (Table 1). The rationale given is that carbon in forests is inherently at risk of emission to the atmosphere, and that the only acceptable form of mitigation should therefore be reduction of fossil fuel emissions “at source”. Later on, the weakness of this justification will be examined.

[Table 1 here]

The position of the European countries is best explained by the basic fact that fossil fuel prices are much higher in Europe than in the United States. In virtually any European country a liter of gasoline costs at least double the price in the US. This increases production costs for European industries and puts them at a disadvantage in competition for international markets. European governments are therefore anxious to force the US to increase its energy prices. By closing the door to potentially large sources of carbon credits available for purchase abroad, such as CDM projects for avoiding tropical deforestation, the US would be forced to apply carbon taxes to fossil fuels. For the same reason, the European countries would like to institute a limit on the percentage of each country's Kyoto commitment that can be met through the CDM and/or through other "flexible mechanisms" such as joint implementation and emissions trading among members of Annex B of the Kyoto Protocol (the countries that have agreed to national caps on their emissions—a list of countries currently almost identical to Annex I of the UN-FCCC). These considerations can lead to a tendency to question practical and theoretical aspects of forest-sector applications of the CDM beyond what would otherwise be the case. While there is a certain fairness in leveling the playing field for international competition, this is a separate issue from mitigating climate change. Obviously, the diplomatic struggle between Europe and North America is not based on the national interests of tropical forest countries such as Brazil, and tropical countries would be wise to consider carefully where their own interests lie.

The hypocrisy of European countries in claiming that their opposition to inclusion of avoided deforestation in the CDM stems from concerns about permanence (the time that carbon remains out of the atmosphere) and certainty, as opposed to geopolitics, is shown by the priorities of the same countries expressed outside the context of the Kyoto Protocol. In 1991, prior to both the June 1992 UN-FCCC and the 1997 Kyoto Protocol, Germany, France and the UK were key players in drafting the objectives of the PP-G7, or G-7 Pilot Program to Conserve the Brazilian Rainforest. Concern over reducing Amazonian deforestation as a means of reducing greenhouse gas emissions is explicitly stated as a primary motivation of the Program, formally presented in the World Bank's January 1992 Rain Forest Trust Resolution: "The overall objective of the pilot program is to reduce Brazilian rain forests' contribution to global carbon emissions..." (World Bank, 1992). These countries have now invested over US\$250 million in the PP-G7. In the negotiations following from Kyoto these European countries oppose assigning any value to avoided deforestation based on the notion that only the very long term (i.e. equilibrium) composition of the atmosphere matters and that combating tropical deforestation is therefore unimportant because forests are likely to be cut and/or burned anyway for one reason or another over the course of a few centuries. Obviously, in the context of the PP-G7 the European countries think that avoided deforestation has a real value for climate, even though the impossibility of controlling history over a time scale of centuries means that the carbon in the forests might eventually be emitted to the atmosphere. The European countries were not wrong in 1991, nor in the years since then over which they have supported this ongoing program. Instead, they are being hypocritical now in claiming that emissions avoidance only has value if it is permanent

and certain. From the point of view of climate change and its impacts, however, maintaining carbon in forests has value even if uncertain and impermanent. Per ton of carbon this value is not 100% of the value of a ton of fossil-fuel carbon, but neither is it zero. The relevant question is how to quantify the conversion and make the appropriate adjustments to crediting (Fearnside, 2000c; Fearnside et al., 2000).

3.1.2. Brazil

The aversion of Brazil's Ministry of Foreign Relations to including forest protection mystifies many people because of the very large potential benefits to the country both from carbon revenue and from help in achieving national objectives such as controlling deforestation. Deforestation in Brazilian Amazonia produces little economic benefit because most of the deforested area becomes cattle pasture with low productivity and a tendency to degrade to secondary forest (Fearnside, 1996b). Reducing deforestation in Brazil represents a great opportunity to avoid carbon emissions because of the country's large areas of remaining forest and rapid rate of deforestation, because clearing could be substantially reduced on large cattle ranches with little economic loss or social hardship and because Brazil could profitably accept an arrangement that grants a smaller fraction of the "real" benefit in credit terms, thereby guaranteeing an advantage for the atmosphere (Fearnside, 2000a,d).

The official justifications of Brazil's negotiating position are rather confused, since Brazil opposes inclusion of avoided deforestation but at the same time wants plantation silviculture to be included. Appeal to the EU argument regarding permanence is contradictory because carbon storage in silvicultural plantations and wood products is inevitably temporary (with the exception of charcoal or other fossil-fuel substitutes). The position of the Ministry opposing inclusion of avoided deforestation is best explained by the widespread belief that the rest of the world is engaged in a permanent conspiracy to take Amazonia away from Brazil (Fearnside, 1999b; Council on Foreign Relations Independent Task Force, 2001). A scenario of "internationalization" of the Amazon using environmental protection as an excuse is frequently evoked by politicians and has a popular following that cuts across all educational levels. It is worth noting that the opposition of the Ministry of Foreign Relations to including forests in the CDM is not shared by the governors of the Amazonian states, nor by most of Brazil's scientific community. It is also not shared by the Minister of the Environment, who, in Cochabamba, Bolivia in June 1999 signed a joint statement of ministers of the environment in Latin American countries supporting inclusion of forests in the CDM.

A supposed institutional incapacity to reduce deforestation is sometimes mentioned as a reason for Brazil not wanting any international commitment to slowing deforestation, as the country could be exposed to penalties if it later found itself unable to meet the commitments. However, Brazil is not incapable of controlling deforestation. A strong indication of this was provided by the dramatic drop in the number of fires on 1 July 2000, when a prohibition on burning came into effect. The drop was more than 80% in Mato Grosso, which is one of the states that traditionally has the greatest problems

with burning. The critical factor is self-confidence in the country's ability to make any changes it decides upon, and I believe that Brazil doesn't lack for patriotism.

Brazil currently holds the chairmanship of the G-77+China (the "Group of 77 and China", a negotiating block now totaling 131 countries). Thus, in addition to being the most important tropical forest country because of its current and potential deforestation emissions, Brazil has tremendous influence in international climate negotiations (Dutschke, 2000). The members of the G-77+China have diverse views, ranging from oil-producing countries in the Middle East that oppose much of the content of the Protocol to countries on both sides of the avoided-deforestation issue that are strongly concerned about climate change (Mwandosky, 1999). Brazil takes a leading role in discussions within the group, and its views count heavily in group decisions.

3.1.3. Other Countries

Most tropical forest countries in the Spanish-speaking portion of Latin America favor inclusion of avoided deforestation in the CDM: Bolivia and Costa Rica have been particularly vocal, and Colombia and Mexico have also been influential; Peru, however, has opposed inclusion of forests. The Association of Small Island States (AOSIS), represented by the Island of Tuvulu, has opposed inclusion of forests

The "Umbrella Group" of the United States, Canada, Japan, Australia and New Zealand have supported inclusion of forests. Particularly in the case of United States, Canada and Japan, these countries stand to gain financially by buying credit to satisfy their Kyoto commitments. These countries have an interest in having carbon mitigation activities under the Clean Development Mechanism be accompanied by few if any requirements for promoting sustainable development, including safeguards to prevent environmental and social impacts. Strong safeguards are needed (Fearnside, 1999a,b). The United States has made a diplomatic play for a huge credit for alleged domestic forest activities that appear to be essentially "business as usual". In August 2000 the US claimed that the country had 148×10^6 ha of forest in the country under management, and that as a result of this management 300×10^6 t C were being absorbed annually (Smaglik, 2000). A large part of this represents soil carbon from the ongoing shift of US agriculture to no-till methods (Kaiser, 2000). The total is half of the "gap" of 600×10^6 t C/year by which the US expects to need to reduce its emissions during the 2008-2012 first commitment period in order to comply with its Kyoto Protocol commitments. At COP-6 in the Hague in November 2000, the US initially tried to obtain credit for the full 300×10^6 t C under Article 3.3 of the Protocol (for domestic afforestation, reforestation and deforestation activities) and Article 3.4 ("other" activities, which are as yet undefined but may include activities such as timber management in native forests and no-till agriculture to enhance carbon stocks in agricultural soils). Over the course of the meeting in the Hague, this proposal was reduced to a claim of around 70×10^6 t C—still a tremendous subterfuge of the spirit of the Kyoto Protocol. The US was rightly considered the principal villain of the event, culminating in the head US delegate receiving a pie in the face (Dickson, 2000). The vehemence of other parties and of NGOs of all types in rejecting the US maneuvers based on Articles 3.3 and 3.4 tends to

overshadow the discussions on the more modest quantities of carbon involved in the Clean Development Mechanism of Article 12. It is important that the debates over these different articles of the Protocol not be confused by lumping them indiscriminantly into categories such as “sinks” or “loopholes”. With proper safeguards, avoided deforestation under the CDM need not be a loophole (“Scientists’ Call for Action...”, 2000). The fact that the US has earned itself a reputation as the principal villain in climate change negotiations and that the US also supports credit for avoided deforestation does not mean that avoided deforestation is necessarily tainted or suspect as a legitimate effort to combat climate change.

3.2. NGO positions

The fact that the climate sectors of the European head offices of four major environmental NGOs (Greenpeace International, WWF-International, Birdlife International and FOE-International) oppose inclusion of avoided deforestation in the CDM (Table 1) is not easily understood – at least in terms of the arguments presented. US branches or affiliates of these NGOs follow the positions of the European head offices, but the opposite position is held by major environmental NGOs headquartered in the US, such as Conservation International (CI), Environmental Defense (EDF), the Natural Resources Defense Council (NRDC) and The Nature Conservancy (TNC). The Indigenous Peoples’ Forum on Climate Change, an association of indigenous groups throughout the world that is lead by groups from Southeast Asia, opposes inclusion of any forests in the CDM. It is significant that not a single representative of Brazil’s indigenous peoples was present at the meetings in September and November 2000 that approved this position (Indigenous Peoples’ Forum on Climate Change, 2000a,b).

Environmental groups in Latin America have varying positions. The Regional Alliance for Conservation Policy in Latin America and the Caribbean (ARCA) issued a statement in November 2000 supporting inclusion of avoided deforestation in the CDM, signed by groups in 11 countries (ARCA, 2000). However, several other groups are opposed to forests, the most voluble being the Friends of the Earth branch in Paraguay.

Environmental groups in Brazil are virtually all in favor of including forests (“Manifestação...”, 2000), including the Brazilian Amazonia affiliate of FOE (Monzoni et al., 2000). Perhaps the situation was best summed up in a press interview by Mario Monzoni, climate coordinator of FOE-Brazilian Amazonia: “It is very easy to be in Washington or Amsterdam saying what nongovernmental organizations in the south (developing world) should do. We live here, this problem is here.” (Bugge, 2000).

One reaction not infrequently heard to the controversies around the world over forests in the CDM is that “I’m so confused, I go to bed thinking one thing and get up thinking something else”. However, no one is confused who is closer to the heat of the burning in Amazonia, as evinced by the positions of Brazilian NGOs, most of which support inclusion of forests (“Manifestação...”, 2000; see Table 1), but a few do not (“A Brazilian NGO Declaration”, 2000; see Table 1). Among the organizations supporting inclusion of avoided deforestation are grassroots groups such as the National Council of

Rubber Tappers (CNS), which is composed of people who both before and after Chico Mendes have been living at the front lines of an environmental battle that gives them much better credentials than anyone in European NGOs, the Amazonian Working Group (GTA), which represents over 390 grassroots organizations in Brazilian Amazonia, the Pastoral Land Commission (CPT), which represents many small-farmer groups linked to the Catholic Church, the Federation of Agricultural Workers of Pará (FETAGRI) that represents a large number of small-farmer groups, and the Coordinating Body of Indigenous Peoples of Brazilian Amazonia (COIAB), the largest indigenous peoples group. These organizations support forests in the CDM not as a result of decisions by a few leaders, but rather after extended meetings and discussions with their memberships. The key difference between the thinking of most Brazilian NGOs, especially grassroots groups, and the ethereal intellectual arguments regarding permanence and uncertainty is that in the grassroots groups the people know what it looks, smells and feels like to be at the frontier where the forest is being chain-sawed and burned.

It is interesting to note that, prior to the 1997 Kyoto Protocol, the climatic value of reducing tropical deforestation was stressed by the same NGOs that now claim that only permanent offsets by reducing fossil fuel use have value. In a report for Friends of the Earth-UK, Norman Myers (1989) even described the effect of plantations as “positive” for climate, although these are now anathema to the same groups on carbon accounting grounds. However, it is the shift in position on avoided deforestation, the subject of the present paper, that represents the greatest mystery.

It is difficult to understand how any environmental organization could take a stand that implies throwing away one of the most important opportunities for maintaining tropical forests. This is particularly so for organizations like WWF and Birdlife International that have protection of biodiversity as their primary purpose, since without tropical forests the World’s biodiversity would be much reduced. The gain from attempting to force the US to meet its Kyoto emission quota almost exclusively from reducing fossil fuel consumption (a highly uncertain payoff, given that the US Senate has not yet ratified the Protocol) would be very modest if achieved. This opportunity results from the unusual circumstance of the US being “over a barrel” in the current negotiations because it signed the Kyoto Protocol, accepting an assigned amount 7% below its 1990 emission level, before decisions had been reached on the rules of the game, such as whether or not forests would be included in the CDM. This situation is very temporary. Any gains would be on a “one-shot” basis because the “assigned amounts” (the amount each Annex I country is allowed to emit without penalty) will be renegotiated for each commitment period after the first one, so countries like the United States will simply not agree to make emissions reductions as large as they would have were forest mitigation measures included. While excluding forests would be a very important loss for biodiversity, this would be in exchange for only a modest (or even nonexistent) gain for climate.

The counter proposal often raised by governments and European-dominated NGOs opposed to forest inclusion is that forest protection is a biodiversity concern and should be handled through the UN Framework Convention on Biodiversity. Saying that

tropical forests should be protected with money from other sources, such as the Biodiversity Convention, is only a diversion, since significant amounts of money simply do not exist in these “other” sources. None of the countries suggesting that these sources be used is offering to put billions of dollars on the table.

The same applies to suggestions that forest protection should be done with funds from Articles 4.8 of the UN-FCCC and 12.8 of the Protocol (the “adaptation fund”). Setting up forest reserves in Brazil by taking money from Bangladesh and other countries that will desperately need funds for adaptation measures would hardly be a fair solution.

A ceiling on use of Land Use, Land-Use Change and Forestry (LULUCF) projects is likely to be adopted. It is important to realize that this is a reflection of diplomatic reality rather than of scientific argument. If LULUCF carbon benefits are real and, one might presume, adjusted in value to give a greater benefit to climate than fossil fuel carbon for each unit of certified emissions reduction (CER), then it would be logical to use as much LULUCF mitigation as possible rather than restricting it. A proportionality with the land-use emissions of either the Annex I party or the global total does not follow unless the CERs [Note: not the tons of actual carbon] are less beneficial to climate if derived from forest rather than fossil fuels.

Greenpeace and other groups opposing forests in the CDM base their argument on Article 2 of the UN-FCCC, which specifies the criterion as “stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system,” and Article 12, Paragraph 5(c) of the Protocol, which calls for “long-term benefits.” The words “stabilization” and “long-term” are interpreted to mean that we should only be concerned about the state of the atmosphere when equilibrium is reached centuries from now, and that what happens between now and then has no importance for humankind. Theoretically, the difference between the positions in Europe and in Brazil could be explained if people in Brazil were interested in their children and grandchildren and Europeans were only interested in here generations at least 200 years in the future, but the probability of a difference of this type in priorities for future generations is virtually zero, as people all over the World appear to be basically same in their priorities for the future. Since any explanation of the motivations of the different groups must explain the peculiar geographical distribution of opinions, the public declarations and publications of the groups are of little usefulness. Other motivations, even if unconscious, are more probable.

The position of European NGOs can better be understood in terms of a logic parallel to the motivations of the European governments that want to improve European industrial competitiveness relative to the US. While the NGOs are by no means doing the bidding of the EU governments, the desire use the Kyoto Protocol as an opportunity to force the US to drastically reduce its consumption is shared. In Europe, the US consumption lifestyle and associated cultural domination is resented on many counts, and symbols such as McDonalds, Coca Cola and Walmart are generally reviled. An opportunity to strike a blow at this vaguely defined complex of targets finds a ready following among environmental groups for reasons that have little to do with climate

change. These include a desire to punish the US for its various sins in the world, the country's role as villain in climate negotiations among them. Although reducing US consumption would have climate benefits, reducing consumption should be viewed as a means to an end rather than as an end in itself. Viewed in this way, it should not be allowed to subvert global-warming mitigation efforts in other spheres, such as tropical forest conservation.

International NGOs should take stock of what they are trying to accomplish. Organizations like WWF represent their memberships, which are composed of people who contribute funds primarily because they are concerned about biodiversity. In the 21st Century the greatest threat to biodiversity is likely to be habitat loss, especially tropical deforestation. Only on longer timescales would climate change rise to such major importance, and in this case would act mainly in finishing off species that had escaped a century of direct habitat destruction. In the case of WWF, the organization functions as a "network", with major decisions being taken in meetings of representatives of the different countries. Once a group decision is made, all of the national offices are obliged to abide by it. This can go against the perceptions of people in countries like Brazil as to what is best for the environment in their countries. For example, at the October 2000 meeting in Belém that produced the "Belém manifesto" supporting inclusion of avoided deforestation in the CDM, the WWF-Brazil representative (Manuel Cesário) presented the WWF-International position opposing inclusion, but signed the manifesto as an individual ("Manifestação...", 2000). It is worth noting that at the highest levels of WWF-International the anti-forest discourse of the climate sector is less evident; in October 2000 WWF-International signed a declaration at the IUCN International Congress in Amman, Jordan that leaves the door open to inclusion of forests in the CDM (IUCN, 2000).

4. Policy choices in mitigating global warming

4.1. Carbon considerations

4.4.1. Time and permanence

Permanence and other temporal issues represent an area of resistance against inclusion of forests, since it is always possible that forests could later be cut, degraded, or burned for some reason, thereby releasing their carbon to the atmosphere. Climatic change itself has become a weapon used in attacking forest conservation as a mitigation option, on the grounds that many forests in Amazonia and other tropical locations are doomed anyway due to predicted drying (e.g., Greenpeace International, 2000a; see rebuttal by Niles, 2000). Due to the fact that an amount of carbon would have been emitted to the atmosphere by burning fossil fuels in Annex I countries based on the credits generated by the CDM project, more carbon would be present in the atmosphere than in the no-project case (Meinshausen and Hare, 2000).

Fortunately, there are several factors that counteract this effect. Most important is the implication of the argument against forests that the same weight should be given to

events in the present and those at very distant times in the future. Such an assumption is completely inconsistent with the way in that social decisions are made in general. In the case of global warming, consistent arguments exist to give a value to temporary storage of carbon, although of course this value does not need to be the full value that would represent a permanent storage of the carbon. Global warming alters the probabilities of droughts, floods and other disasters, which, after the temperature increase, can be assumed to remain higher forever. Therefore, any postponement of global warming represents a permanent earnings of all the damages that would have occurred during the temporary time interval that the warming was postponed. In other words, time has value (Fearnside et al., 2000).

This value can be incorporated into carbon accounting in several ways, in addition to the traditional mechanism in economics of applying a discount rate. Choosing a time horizon has this effect, for instance the 100-year time horizon already adopted by the Kyoto Protocol for the global warming potentials (GWPs) used to translate the impact of the various gases into CO₂-equivalents. In the Special Report on Land Use, Land-Use Change and Forestry (SR-LULUCF) of the Intergovernmental Panel on Climate Change (IPCC), different proposed accounting methods are reviewed, including “ton-year” methods that would allow equivalences to be established between permanent and temporary storage of carbon (Noble et al., 2000).

It is important to understand that credit is only received for carbon that is actually stored, not for promises. While critics view liability issues under the CDM as “essentially insoluble” (Lanchbery, 2000), ton-year accounting offers a mechanism for rewarding carbon benefits as they are achieved, thus obviating the need for liability arrangements (Fearnside et al., 2000). However, in order to grant credit up-front in a manner comparable to energy projects, liability could be assumed. Certified emissions reductions (CERs) with finite periods of validity have been proposed under what is known as the “Colombian Proposal” (Blanco and Forner, 2000). Under this proposal, the CERs would expire when the carbon is emitted to the atmosphere for whatever reason, and the country holding the CER would have to either reduce national emissions by that amount or buy the same number of CERs from another forestry project. Two small modifications to the Colombian Proposal have been proposed by Kerr and Leining (2000) with which this proposal could effectively solve the permanence issue if adopted: provision for verification at least once per commitment period with immediate payback of CERs if carbon has been lost, and liability for payback being carried with ownership of specific CERs.

The treatment of the non-permanence of carbon in forests depends on the means adopted for compensating the climatic benefits of the projects. Payment could only be made after the atmospheric benefits take place, such that a liability system is not necessary to cover the case of non-delivery of the expected benefits. Although this has the advantages of the simplicity and of minimizing risks, it also implies the loss of part of the financial value of the projects when compared to projects in the energy sector, which would receive payment in advance due to the presumed certainty of the permanence of the carbon offsets. The “Colombian proposal” would create temporary credits for forest

projects, with the requirement that they be replaced by the buyer at the end of the period, either with a permanent credit (for instance from fossil fuel), or with another temporary credit.

4.1.2. Baselines

One of the criticisms frequently raised against including avoided deforestation in the CDM is that it would be impossible to establish reliable baselines. The baseline is the scenario without the mitigation project, which is compared with the observed stocks of carbon after the project to calculate the carbon gain. It is important to understand that, although constructing baselines is not easy, it is also neither impossible nor inherently different from the problems with baselines in the energy sector. In all cases it involves a control scenario of the future without the project, which is necessarily counterfactual. Difficulties exist in modeling future deforestation (Carvalho et al., 2001; Laurance et al., 2001; Nepstad et al., 2000), but Brazil has a great advantage in this area compared to other tropical countries due to the series of surveys of deforestation that the National Institute for Space Research (INPE) has carried out (Brazil, INPE, 2001).

An objection sometimes raised against inclusion of avoided deforestation in the CDM is that a large part of the deforestation that takes place is illegal, and therefore any payment to enforce the law implies a reward for a illegal acts if the value is derived from a baseline that represents an illegal situation. However, there is nothing in the Protocol that demands that the baseline be based on legality instead of using a description of reality independent of the legal situation. Using the real situation is consistent with basing the calculations only on things that can be seen from satellites, thereby minimizing the chances of situations where carbon credit ends up being granted for projects that do not produce real benefits for climate.

4.1.3. Leakage

“Leakage” is the loss of carbon that a project provokes indirectly, outside of the physical or temporal boundaries of the project or outside of the conceptual boundaries of the subject under study. For instance, if a forest reserve is created and the people who would be deforesting in that place otherwise simply move to another place in the forest to clear, the emissions from the clearing would represent “leakage.” In some situations this type of problem can be prevented through “leakage contracts”, as was done in Bolivia in the case of the Noel Kempff Climate Action Project, where logging companies were legally bound (with provisions for inspection) to not invest the funds they received in logging operations elsewhere (Brown et al., 2000a,b). A generic way to minimize the leakage problem is supporting projects in the area of deforestation avoidance through large-scale regional programs instead of localized projects (Fearnside, 1995b).

4.1.4. Verification

An inherent problem with forest maintenance projects for global warming mitigation is that virtually all parties have conflicts of interest leading to biases in the

same direction: exaggeration of the benefits. Imagine, for example, a hypothetical proposal to preserve a tract of forest in a tropical country. The government of the tropical country would have an interest in exaggerating the carbon benefits of the project, because more credit would be earned. An industrialized country financing the project would likewise want the benefits exaggerated, as its investment in the project would yield more credit towards the country's Kyoto Protocol commitments. Environmental NGOs that want to use carbon projects as means of maintaining tropical forests for their biodiversity will also want the carbon accounting to indicate the highest possible climate benefit. Local communities will want carbon benefits to be large, since the amount of money represented by their slice of the correspondingly greater financial flows will increase. The "independent" firms contracted to assess and monitor the project will also want maximal carbon benefit to result, as this will please the governments that hire them and increase the probability of future contracts, much in the same way as consulting firms that prepare environmental impact assessments in many countries have a built-in bias to produce favorable reports (e.g., Fearnside and Barbosa, 1996). In other words, a proposal that greatly exaggerated the claimed carbon benefits could easily pass through the system if stringent provisions are not included to counterbalance these built-in tendencies. This is not a problem that is specific to the forest sector, since energy projects suffer the same temptation. This would be counterbalanced by a system of certification and independent verification (Fearnside, 1997b).

4.1.5. Uncertainty

Provisions to restrict the amount of uncertainty in carbon mitigation calculations have substantial potential losses for climate and other interests because they threaten to remove credit for avoided deforestation projects with major potential for large "jackpot" carbon gains if effective. Canada (1998) has proposed requiring 95% certainty on all carbon calculations. This presents a problem analogous to Type II error in statistics, where desire for a miniscule risk of accepting an erroneous conclusion can often lead to the unintended and sometimes more detrimental result of considering a relationship to be nonexistent when it really exists. In this case, the understandable desire of countries such as the small island states to be certain that all carbon receiving credit towards assigned amounts under the Protocol is real may be throwing away the opportunity to get much greater expected gains for climate in exchange for a modest amount of Kyoto credit (Fearnside, 2000c). This is because the credit granted can be less than the expected carbon value of avoided deforestation projects.

4.2. Non-carbon considerations

4.2.1. Biodiversity

Biodiversity maintenance is an important benefit of avoided deforestation that is not attained by other mitigation measures such as promoting energy efficiency, planting eucalyptus or no-till agriculture. Considerable urgency is appropriate in taking actions to stem biodiversity loss. If we wait until after the Kyoto Protocol's First Commitment Period in 2013, there won't be much tropical forest left to save. The efforts of opponents

of including forests in the CDM to focus discussion exclusively on carbon and climate does a disservice to the wider objectives of the UN-FCCC and of the governments and NGOs involved in the debate. Particularly for the CDM, “sustainable development” is explicitly specified in Article 12 of the Protocol as the primary goal of the projects.

Strong parallels are evident between European NGO discourse and the “right to life” (anti-abortion) lobby in the United States, which convinces its partisans to engage in “single-issue politics,” or voting for or against political candidates based solely on their position on the legal status of abortion. Essentially the same strategy is being promoted in the global warming debate, by insisting that the decisions that will determine which mitigation measures are taken be based solely on carbon benefits, independent of the social and environmental impacts or benefits that these choices may have.

Decisions on what global warming mitigation measures should be supported involves a mix of considerations that includes the various values not related to global warming that are associated with different outcomes. In addition to the “hidden agendas” of the European Union and the Brazilian foreign ministry, more appropriate environmental concerns include the biodiversity value of maintaining tropical forests, as compared to other mitigation options such as planting eucalyptus or promoting, no-till agriculture. The environmental and social impacts of mitigation options, such as large hydropower projects, mega-plantations or nuclear energy contrast with the “ancillary” benefits of forest maintenance.

4.2.2. Sustainable Development

An important aspect of the CDM is that Article 12 of the Kyoto Protocol, which creates the CDM, explicitly states that the primary objective of the projects is sustainable development. Therefore, it is essential to clarify who defines what “sustainable development” is and what criteria characterize a project as conforming to this requirement. One line of diplomatic thought holds that sustainable development should be defined by each country for itself. Since all of the proposals for projects are sent to the Executive Council of the CDM by the CDM office of the government of the country where the proposed project would be located, any project that is forwarded to the Executive Council implicitly already has the approval of the country in terms of sustainable development, rendering the sustainable development clause in Article 12 completely innocuous. Although attractive because it avoids any possibility of undesirable influence on development decisions in the country, this line of thought also implies disadvantages in cases like Brazil. Brazil has a system of environmental impact assessment (EIA/RIMA) and a system of labor laws, while other countries exist without any of these. If each party defines sustainable development for itself, without any minimum set of standardized criteria, countries like Brazil with environmental and labor restrictions will not be able to sell carbon as cheaply as the countries without any restriction of this type, thereby creating unfair competition.

The concept of sustainable development requires leaving future generations with the conditions needed to satisfy their own needs (Brundtland Commission, 1987), which

implies both disqualifying projects with serious environmental and social impacts and offering the possibility of providing some type of additional bonus for projects that make positive contributions in this sense, for example in alleviating social inequalities and maintaining biodiversity. Therefore two possible complementary mechanisms exist, one to supply a screen against harmful projects and the other to reward projects with positive contributions. These possibilities are discussed in the IPCC's SR-LULUCF (Noble et al., 2000).

5. Conclusions

The issue of saving tropical forests as a global warming countermeasure has sparked tremendous controversy and divisiveness among and within NGOs and governments. While the debate is often couched in scientific terms and with appeals to high universal principles, the positions of the different partisans to the debate are better understood in terms of hidden agendas, whether conscious or not. In the case of European governments, which oppose inclusion of forests in the Kyoto Protocol's Clean Development Mechanism, the national positions would lead to improvement of industrial competitiveness as compared to the United States. In the case of Brazil, opposition to including avoided deforestation fits with conspiracy theories regarding internationalization of the Amazon. For European and European-dominated NGOs, opposition to forests is best explained as an opportunistic blow at US consumption culture, which is reviled for reasons largely unrelated to climate change. From the point of view of Brazilian NGOs concerned with maintaining Amazonian forest, these alternative agendas are side issues that, attractive as they might be, do not merit throwing away a major opportunity for obtaining monetary flows for forest maintenance. The technical arguments presented by critics of avoided deforestation contain distortions of the climatic consequences of projects in this area. Proposals exist to effectively deal with issues such as carbon permanence to make the climatic benefits of avoided deforestation real, allowing both a gain for climate and the maintenance of biodiversity and other values through carbon mitigation activities.

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7. List of acronyms

AOSIS – Association of Small Island States

ARCA -- Regional Alliance for Conservation Policy in Latin America and the Caribbean

CAN – Climate Action Network

CDM – Clean Development Mechanism

CER – Certified Emissions Reduction
 COIAB - Coordinating Body of Indigenous Peoples of Brazilian Amazonia
 COP – Conference of the Parties
 CNS –National Council of Rubber Tappers
 CPT – Pastoral Land Commission
 EDF – Environmental Defense
 EIA/RIMA – Environmental Impact Study/Report on Impact on the Environment
 EU-European Union
 FETAGRI - Federation of Agricultural Workers of Pará
 FOE – Friends of the Earth
 G-7—Group of seven: USA, UK, Germany, France, Italy, Canada and Japan.
 G-77+China-Group of 77 and China: 131 developing countries, plus China.
 GTA – Amazon Working Group
 GWP—Global Warming Potential
 INPE – National Institute for Space Research
 IMAZON-Institute for Man and the Environment in Amazonia
 IPAM-Institute of Environmental Research of Amazonia
 IPCC –Intergovernmental Panel on Climate Change
 ISA-Socio-Environmental Institute
 IUCN – World Conservation Union
 LULUCF – Land Use, Land-Use Change and Forestry
 NGO – Non-Governmental Organization
 NRDC – Natural Resources Defense Council
 PP-G7 - G-7 Pilot Program to Conserve the Brazilian Rainforest
 SR-LULUCF – Special Report on Land Use, Land-Use Change and Forestry
 UCS – Union of Concerned Scientists
 UN-FCCC - United Nations Framework Convention on Climate Change
 Vitae Civilis – Institute for Development, Environment and Peace
 WWF – Worldwide Fund for Nature

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Table 1
Positions on including land use, land-use change and forestry projects in the Kyoto Protocol's Clean Development Mechanism^(a)

	Plantations	Agro-forestry	Avoided deforestation
A.) Blocks of countries			
Brazil	+	+	-
Umbrella Group (USA, Canada, Japan, Australia, New Zealand)	+	+	+
European Union	-	-	-
AOSIS (Association of Small Island States)	-	-	-
G-77 + China			
B.) International NGOs			
Greenpeace-International	-	-	-
WWF-International	-	-	-
FOE-International	-	-	-
Birdlife International	-	-	-
Climate Action Network	-	-	-
Indigenous People's Forum on Climate Change	-	-	-
C.) US NGOs			
<i>National and US-headquartered NGOs</i>			
EDF (Environmental Defense)		+	+
CI (Conservation International)		+	+
TNC (The Nature Conservancy)		+	+
NRDC (Natural Resources Defense Council)		+	+
UCS (Union of Concerned Scientists)		+	+
<i>Branches or affiliates of International NGOs</i>			
WWF-US	-	-	-
FOE-US	-	-	-
D.) Brazilian NGOs			

National NGOs

CNS (National Council of Rubber Tappers)		+	+
GTA (Amazonian Working Group)		+	+
COIAB (Coordinating Body of Indigenous Peoples of Brazilian Amazonia)		+	+
FETAGRI (Federation of Agricultural Workers of Pará)		+	+
CPT (Pastoral Land Commission)		+	+
IMAZON (Institute for Man and the Environment in Amazonia)		+	+
IPAM (Institute of Environmental Research of Amazonia)		+	+
ISA (Socio-Environmental Institute)		+	+
Vitae Civilis (Institute for Development, Environment and Peace)	-	-	-

Branches or affiliates of International NGOs

Friends of the Earth--Brazilian Amazonia		+	+
Friends of the Earth--Porto Alegre	-	-	-
Greenpeace-São Paulo	-	-	-
WWF-Brazil	-	-	-

(a) Plus sign indicates favoring inclusion, minus sign opposing, and blank indicates no position. Often, NGOs that support avoided deforestation and agroforestry and do not have positions on silvicultural plantations would be likely to oppose many plantation projects on the basis of their environmental and social impacts (not on the basis of carbon accounting). The G-77 + China does not have a unified position (see text).