THE PRINCE'S RAINFORESTS PROJECT

AN EMERGENCY PACKAGE FOR TROPICAL FORESTS

MARCH 2009

AN EMERGENCY PACKAGE FOR TROPICAL FORESTS

TABLE OF CONTENTS

CLARENCE HOUSE

Climate change, alongside the rapidly increasing destruction of the Earth's ecosystems, which provide materials and services that sustain all life on this planet, including human life, are, to my mind, the greatest challenges facing the world. If unchecked, they will dwarf any difficulties which the world faces from the financial crisis, resulting in billions of environmental refugees, uncertain production of food and lack of water, the increasing spread of disease, and, of course, growing social instability. In other words, they will affect the well-being of every man, woman and child on our planet. To meet what has become a real emergency, we must strain every sinew to find solutions and that is why I started my Rainforests Project.

Eighteen months ago a group of scientists came to me and warned that if we did not halt the destruction of the tropical rainforests - and the ecosystems associated with them - very quickly indeed, then the catastrophe of climate change would accelerate at a terrifying rate, along with the loss of those life-sustaining services that are delivered free of charge and which humanity takes for granted. Not only are huge amounts of greenhouse gases being emitted from the cutting down and burning of the forests - more than the entire global transport sector - but these ancient and complex ecosystems, which encircle the equator as if in the form of a giant planetary lifebelt, are one of the world's most effective carbon sinks. In addition, they control the planet's climate, creating much of the rainfall pattern on which global agriculture depends; they contain an astonishing range of biodiversity, on which so many of today's, and tomorrow's, prescribed medicines depend, and they are home to some of the poorest people on earth whose livelihoods are also linked to them.

If deforestation can be stopped in its tracks, then we will be able to buy ourselves some much-needed time to build the low carbon economies on which our futures depend. If we fail, global warming will occur faster and more dramatically and the ecosystem services on which we all ultimately rely - the provisioning services such as food, fuel and medicines; the regulating services such as purifying air and water, mitigating floods and detoxifying soils; and the supporting services such as pollination, nutrient cycling and the photosynthetic capture of the sun's energy and the production of biomass by plants - all these will be drastically threatened because they are so complex and on a scale so vast that humanity would find it impossible to recreate them.

Knowing this, I felt I should do all in my power to help find some kind of solution to these incredibly complex issues before it was too late. Drawing on the experience I have gained working with the business and N.G.O. community over the last twenty-four years, I have endeavoured to create a global public, private and N.G.O.

partnership by bringing together the best brains and ideas to discover an innovative means of halting tropical deforestation. There are so many individuals and organizations that I would like to thank for the crucial role they have played in our efforts, particularly King Abdullah bin Abdul Aziz Al-Saud, Sheikh Khalid Alireza, Dr. Bruno Wu, the World Bank, the Government of Norway and all the businesses and other experts who have generously supported the project and are members of the Steering Group. I must also pay a special tribute to my tireless Project Team.

This report explains our analysis and sets out our proposal for an emergency funding package that would assist the conservation of the world's tropical forests and their associated ecosystems by helping Rainforest Nations embark on an alternative, low carbon economic development path.

I am encouraged by the experts with whom we have worked to believe that this proposal has real validity. At the very least, I can only pray that it will stimulate the desperately needed debate on the fate of the world's rainforests. But, above all, my most fervent hope is that it may perhaps encourage the crucial global consensus necessary for the scale of action required. The world's scientists are increasingly concerned that we are not taking their most recent research results sufficiently seriously. It is now abundantly clear that half measures are no longer enough and delay is not an option. The urgency of this emergency must be of paramount importance. We face the imminent loss of Nature's already dangerously depleted capital on which we depend and by which our economies are provisioned and sustained. Without capital you cannot have capitalism; without ecosystem services, you cannot have life as we have come to know it. It is time we renewed our respect for the miracle that is Nature's harmony.

Background

The Prince's Rainforests Project was established in 2007 to develop consensus as to how to curb tropical deforestation. This report contains a set of proposals that could form the basis for rapid and coordinated global action.

The Prince's Rainforests Project

The Prince of Wales has long been concerned about climate change and the role of tropical rainforest loss. In 2007, following reports from the Intergovernmental Panel on Climate Change (IPCC), Lord Stern and others, he established The Prince's Rainforests Project (PRP) with the aim of encouraging consensus as to how the rate of tropical deforestation might be slowed. The PRP has sought to understand the economic drivers of deforestation, to design an equitable, effective mechanism to compensate Rainforest Nations for not deforesting, and to identify ways that action could be financed.

The project has received input from senior politicians, business leaders, Non-Governmental Organizations and other interested stakeholders from around the world. This has involved discussions with government, civil society and the private sector in Africa (Cameroon, Congo Democratic Republic, Gabon, Ghana, Liberia, Sierra Leone and Tanzania), Central and South America (Brazil, Colombia, Costa Rica, Ecuador, Guatemala, Guyana and Peru) and Southeast Asia (Indonesia, Malaysia and Papua New Guinea). The PRP has also made a close study of the programmes being developed by other organizations to address tropical deforestation.

Lush foliage in rainforest
A single hectare of rainforest can contain hundreds of species of trees.
© Nicola Sutton

Through this process of consultation, the project has developed a proposal for an Emergency Package for tropical forests. Its goal is to achieve a significant reduction in tropical deforestation in the near-term by helping Rainforest Nations embark on alternative, low-carbon economic development paths. It would generate substantial funding quickly through an innovative public-private partnership in developed countries. Some of these ideas are already being considered by governmental and non-governmental institutions around the world. The PRP hopes that this proposal can act as a catalyst for coordinated global action.

The proposal is complementary to forest carbon mechanisms currently being negotiated through the United Nations Framework Convention on Climate Change (UNFCCC). It is designed to fill the funding gap that will arise before the UNFCCC mechanisms are implemented at scale and to facilitate and accelerate the transition to these future arrangements. The Emergency Package would also provide an important economic stimulus to developing countries during the current global recession and help spur their growth along a low-carbon trajectory.

Objective of the Report

This report describes, in broad terms, an Emergency Package of measures that would have a material impact on slowing the rate of tropical deforestation. It does not contain all the answers. In some cases, it sets out alternative options for implementation, all of which have merits. During 2009, the Prince's Rainforests Project (PRP) intends to work with a wide range of stakeholders to refine further the proposal and to integrate it with other initiatives. Ultimately, the implementation of this Emergency Package will depend on acceptance by the governments and communities of Rainforest Nations and the governments of major developed countries, together with the active involvement of private capital markets. It is hoped that sufficient consensus can be developed for core agreements to be in place to complement the debate at the UNFCCC Conference of the Parties (COP) in Copenhagen in December 2009 and for implementation of the emergency plan to start early in 2010.

Acknowledgements

The PRP team has benefited enormously from its discussions with governments, non-governmental and private sector organizations, project teams and individuals who have shared and continue to share their perspectives and expertise. Moreover, neither the project nor the ideas developed would have been possible without the support and help of the companies and individuals who sit on the Steering Group.[1]

[1] See Annex C for the composition of the PRP Steering Group

Summary

Reducing tropical deforestation will be vital if the world is to avoid catastrophic climate change and preserve important ecosystem functions. An Emergency Package is needed to provide substantial funding to Rainforest Nations to help them address the drivers of deforestation and embark on alternative economic development paths. Rainforests cool the planet, regulate the water cycle and provide a home to countless species; it is right and essential that the world pays for these services.

Why Rainforests Matter

In addition to supporting the livelihoods of 1.6 billion of the world's poor, tropical rainforests provide important ecosystem services to the global community.[2] They store water, regulate rainfall and contain over half the planet's biodiversity. Most importantly, tropical forests play a crucial role in climate change. Emissions from tropical deforestation contribute 17% of annual greenhouse gas emissions, while conserved rainforests continue to sequester almost the same amount of atmospheric carbon each year. Tackling the issue of tropical deforestation will be essential if the world is to achieve the goal of limiting global warming to below two degrees Celsius this century and avoiding catastrophic climate change.

Rainforests are being lost at an alarming rate, mostly because destructive logging and conversion to agriculture provide compelling financial returns. Previous initiatives have lacked the funding and have been unable to generate the necessary political will to tackle these drivers of deforestation. Although climate change is now directing more attention to this issue, it is likely that a forest carbon scheme agreed through the UNFCCC may take many years to generate financing at sufficient scale. In the meantime, the world could lose an additional 100 million hectares of tropical forests – an area the size of Egypt.

The Prince's Rainforests Project believes that an Emergency Package is needed to decrease tropical deforestation rapidly. This can only be done by addressing the economic drivers of deforestation and providing strong financial incentives to Rainforest Nations – the forests need to be worth more alive than dead.

The international community will have to fund this, but it represents a wise investment. Reducing tropical deforestation is one of the quickest and cheapest carbon abatement options available: the net present value of reducing carbon emissions in this way has been estimated at US$3.7 trillion.[3] Taking action now will give the world a better chance to achieve its climate stabilization goals, while also preserving the other important ecosystem services that rainforests provide. Indeed, as the latest McKinsey & Company research has shown, on current trajectories, without including the conservation of forests in the short-term, it will effectively be impossible to achieve climate stability.[4]

The Proposal

1 Payments to Rainforest Nations for not deforesting

Deforestation occurs because it is in the financial interests of individuals, enterprises and local communities in Rainforest Nations. The PRP proposes that the international community make payments to these countries based on the costs of pursuing an alternative, low-deforestation economic development path. These costs would include foregone income from logging, agriculture and other land uses, and transaction and enforcement costs involved in switching to alternative economic activities (although the local economic benefits derived from conserving forest ecosystems should also be recognized). Global surveys estimate the opportunity costs of halving deforestation at between US$10 billion and US$15 billion per year.[5] The exact amount would be a matter for negotiation, based on the situation in each Rainforest Nation.

2 Multi-year 'service agreements' based on clear performance targets

Rainforest Nations would sign national-level forest maintenance agreements, covering five-year periods, under which they would commit to reduce deforestation to agreed levels and/or conserve areas of forest. In return, they would receive annual payments. The bulk of the payments would be linked to actual delivery of results in the forest, such as area of forest conserved or deforestation avoided each year, measured through national and global monitoring systems using remote sensing technology. However, in the early years of an agreement, these payments could cover the costs of capacity-building, policy reform and the other preliminary steps a Rainforest Nation would need to take to alter its deforestation trajectory. This would be a business-like arrangement, a service contract under which the world pays Rainforest Nations

[2] World Bank (2004)
[3] Eliasch, J. 'Climate Change: Financing Global Forests' (Eliasch Review), London, Office of Climate Change, Government of the United Kingdom (2008)
[4] McKinsey & Company, 'Global GHG Abatement Cost Curve v2' (2009); Project Catalyst
[5] IIASA cluster model, GCOMAP model and Grieg-Gran study, cited in Eliasch Review, Ch. 5

for delivery of ecosystem services, rather than providing aid in a traditional way.

3 Payments used to fund alternative, low-carbon economic development plans

Rainforest Nations would be free to decide how best to use the payments to address the drivers of deforestation and to reorient their economies onto an alternative development trajectory. Some interventions would be within the forestry sector but much of the funding would be deployed outside the forests, as this is from where much of the pressure for deforestation comes. Likely actions might include the following.

- Changing policy and legal frameworks related to land title and land use.
- Strengthening forest monitoring and enforcement systems.
- Providing incentives to private individuals and enterprises to sustainably manage existing forests, to plant new forests, to shift agriculture to available non-forested land, and to increase and sustain yields on existing agricultural land.
- Creating Payment for Ecosystem Services (PES) schemes for landowners.
- Investing in general economic development projects such as infrastructure, enterprise finance and education.

The annual transfer of funds to Rainforest Nations would act as an important economic stimulus that could help counter the effects of the global recession and further the Millennium Development Goals of poverty alleviation and sustainable development. By financing clean development, it would also help deliver broader climate change mitigation and adaptation goals.

Man-made forest fires, Para State, Brazil
Tropical deforestation contributes up to 17% of global greenhouse gas emissions each year.
© Daniel Beltrá / Greenpeace

4 Transparent, multi-stakeholder disbursement mechanisms in-country

The Emergency Package would respect the sovereignty of nation states. It could only work with the full cooperation of Rainforest Nation governments. But addressing the drivers of deforestation would require the engagement of local communities, indigenous peoples, the private sector, and provincial, state and district administrations. All stakeholders would need to be consulted when national governments draw up their alternative economic development plans and make decisions about the allocation of funding. High standards of transparency would be required in relation to how money is spent; this may include appeal mechanisms and safeguards for the rights of forest communities and indigenous peoples. Special institutions and accounts to handle rainforest payments may need to be created in rainforest countries to allow for multi-stakeholder involvement. The Prince's Rainforests Project is working with Rainforest Nation governments and its other partners to develop a set of principles for these in-country disbursement mechanisms.

5 A 'Tropical Forests Facility' focused on results

The Emergency Package would require a global institutional framework – referred to here as the 'Tropical Forests Facility' – that is capable of negotiating agreements with Rainforest Nations, raising finance from the international community, and disbursing annual payments. It may also need to coordinate a global forest monitoring programme and to support capacity-building by other international agencies within Rainforest Nations. The Tropical Forests Facility would need the technical ability to carry out these functions rapidly and effectively, and a governance mechanism that balances the interests of funding countries, Rainforest Nations and other stakeholders. The Prince's Rainforests Project is studying alternative development agency models and consulting with governments to design an appropriate global architecture. One option would be to create the capacity within an existing institution (such as the World Bank). Another would be to create a new entity, either as a supranational agency or a charitable foundation, supported by a wide range of governments. In either case, the agency, as a temporary institution, would seek to outsource functions to existing institutions and would retain a light structure. Any new institution would also work closely with the existing forestry initiatives of the World Bank, Norway, Japan, the UK and other countries.

6 Developed country financing from public and private sources

Developed countries would be asked to make long-term commitments to the funding of the Emergency Package. The required financing, which could rise to US$10-US$15 billion per year, is small compared to the potential benefits: the net present value of halving tropical deforestation has been estimated at US$3.7 trillion.[6] It would be up to individual countries to decide how to finance their obligations. Funds could come from general government revenues or from sector-specific levies. Suggestions that have been put forward include auctioning carbon emission permits in national cap-and-trade systems, a levy on the catastrophe risk component of insurance premiums, and levies on commodity markets

[6] Eliasch Review, Ch. 5

Borneo rainforest at dawn
Rainforests recycle water back into the atmosphere, cooling the surface and helping to regulate rainfall over vast distances.
© Global Canopy Programme / Katherine Secoy

or aviation and shipping fuel. One option that has much potential is for governments to raise money from private capital markets by issuing specialist bonds. The Prince's Rainforests Project is developing the concept of a global 'Rainforest Bond' that could finance the Emergency Package while minimizing the short-term liabilities of governments.

7 'Rainforest Bonds' issued in private capital markets

A fixed income security – a Rainforest Bond – could be issued in global private capital markets to raise upfront financing. Such bonds typically offer investors a fixed rate of return, normally an annual coupon, together with the repayment of the principal on maturity. Over US$400 billion of Sovereign, Supranational and Agency Bonds were issued in 2008. The Project has held discussions with pension funds and the insurance sector (through The Prince of Wales' P8 and ClimateWise initiatives) which indicate that there would be significant demand for AAA-rated bonds with long-term maturities. Rainforest Bonds could be issued by the World Bank, or by an independent entity with support from the World Bank. The bonds would be guaranteed by developed country governments, which would be responsible for payment of the coupon and repayment of the principal. However, it may be possible to mitigate the financial calls on these governments, for example by channelling some of the money into green investments that would generate financial returns – this would have the added benefit of supporting broader clean development goals. Private sector bonds provide a way to raise large amounts of finance for tropical forests in the near-term, while allowing underwriting governments the time to generate revenues for repayment from clean development investments, domestic carbon permit auctions or other schemes. The Prince's Rainforests Project is working with the World Bank to develop this bond concept further.

8 Rainforest Nations participate when ready

The Emergency Package would be open to all Rainforest Nations. However, the speed with which they engage would depend on their political will and their capacity to address the drivers of deforestation. Some Rainforest Nations would be in a position to sign multi-year agreements with the Tropical Forests Facility quickly. Others would require time to study the opportunity costs of not deforesting, to consult with stakeholders on an alternative economic development plan and to initiate policy reform. Some countries may require more fundamental institutional capacity-building. The Tropical Forests Facility would work with existing bi-lateral and multi-lateral programmes to build these capacities. Nonetheless, it is expected that countries representing over two-thirds of current deforestation would be able to participate in the scheme rapidly.

9 Facilitating and accelerating a long-term UNFCCC agreement on forests

The Emergency Package would not be a replacement for, or an alternative to, a Reduced Emissions from Deforestation and Degradation (REDD) mechanism or any other avoided deforestation scheme formulated under the UNFCCC. Instead, it would act as a bridging mechanism. It would build the capacities in Rainforest Nations that would be needed in any event to participate in a REDD mechanism. Its payments would decrease as carbon-based payments started to flow to Rainforest Nations. In addition by preserving large amounts of rainforest it would increase the future scope of REDD. More broadly, substantially reducing the amount of carbon emissions from deforestation over the next ten years would make it easier for the world to reach its carbon emission targets.

10 Global action to address the drivers of deforestation

The Emergency Package focuses on action in Rainforest Nations. But steps can also be taken in major commodity-importing countries to weaken the drivers of deforestation. Developed and rapidly developing economies import large quantities of agricultural commodities and timber products from tropical countries. As such they are in a position to offer positive incentives to producers in rainforest countries who do not contribute to deforestation. This could reinforce the efforts taken by Rainforest Nations to change the nature of production in forested areas and support the implementation of their alternative economic development plans. A number of certification and incentive schemes have already been launched or are in development. By participating, consumers, businesses, and governments in commodity-importing countries can all play a role in helping Rainforest Nations to save the world's tropical forests.

Next Steps: from Proposal to Action

A number of entities – such as the European Commission and the UK, Canadian and Norwegian Governments – are studying ways to reduce tropical deforestation. The PRP will continue to work with these institutions to build consensus around a coordinated mechanism that could address the issue of tropical deforestation. One possible way forward would be for developed country governments and Rainforest Nations to form a working group to scrutinize the Emergency Package proposed in this report, as well as other similar initiatives, and decide what action to take. During this phase, further work could be done to resolve some of the questions about the most effective design of the mechanism, and clear linkages established with other forest and climate change programmes. It is hoped that sufficient consensus can be developed so that core agreements will be in place to complement the debate at the UNFCCC Conference of the Parties (COP) in Copenhagen in December 2009. The initial implementation of the emergency plan could then start in early 2010.

1 Why Rainforests Matter

Rainforests regulate climate and provide a range of other ecosystem services to humanity. But they are being lost at an alarming rate. Urgent action is required to halt this trend and preserve these forests for the good of the world.

1.1 Rainforests and Climate Change

Just a few centuries ago humid tropical forests covered 12% of the planet's surface; now they cover just 5%. Most of this forest loss has occurred in the last 50 years. A broad set of issues are addressed by slowing and halting this process of tropical deforestation. These include the conservation of biodiversity, the maintenance of ecosystem services – such as rainfall generation and watershed protection – and the sustenance of human cultural diversity. Above all, there is now the urgent priority to cut the emission of greenhouse gases.

Natural forests – especially those heavy-biomass and carbon-rich forests of the humid tropics – must be fully included in any future climate change agreements. Tropical deforestation is one of largest causes of global greenhouse gas (GHG) emissions. But in contrast to many of the other major GHG contributors, it is possible to take short-term action to address the causes of deforestation. Tackling this problem does not require new technology but does require political will, from both the North and the South. Reducing forest loss should therefore be treated not only as a desirable but also a realistic policy objective.

Forest ecosystems draw down atmospheric CO_2 through photosynthesis and store it in biomass and other carbon stocks. Deforestation and forest degradation – through the decomposition and burning of plant matter and the oxidation and burning of soils, especially peatlands – release this carbon into the atmosphere. The IPCC estimates that the global forest sector accounts for 17% of anthropogenic GHG emissions (approximately 7-8 Gt CO_2 each year).[7] Forest emissions are greater than the entire transport sector, and larger than the annual emissions of the USA or China.

Although there is some debate over the share attributable to tropical forests, there is little doubt that it is very high: one study estimates that tropical deforestation accounts for 96% of global forestry emissions.[8] Humid tropical forests, or rainforests, account for most of this, as mature rainforests carry very high carbon loadings (up to 800 tons of CO_2 per hectare). In aggregate, there is more carbon stored in rainforests than there is in the atmosphere: just one day of tropical forest emissions from deforestation is equal to 12.5 million people flying from London to New York.[9]

Recent technological advances have enabled scientists to establish that mature tropical rainforests continue to sequester carbon at a rate of a few tonnes of CO_2 per hectare per year. One study estimates that old-growth tropical forests absorb 4.8 billion tonnes of CO_2 equivalent (Gt CO_2e) each year through this sink effect, or up to 15% of annual anthropogenic GHG emissions.[10] So in addition to the 17% of global GHG emissions resulting directly from rainforest loss, tropical deforestation produces an 'amplification effect', because the stock of natural forests remaining to absorb carbon dioxide out of the atmosphere is reduced. Moreover, the cloud cover over tropical

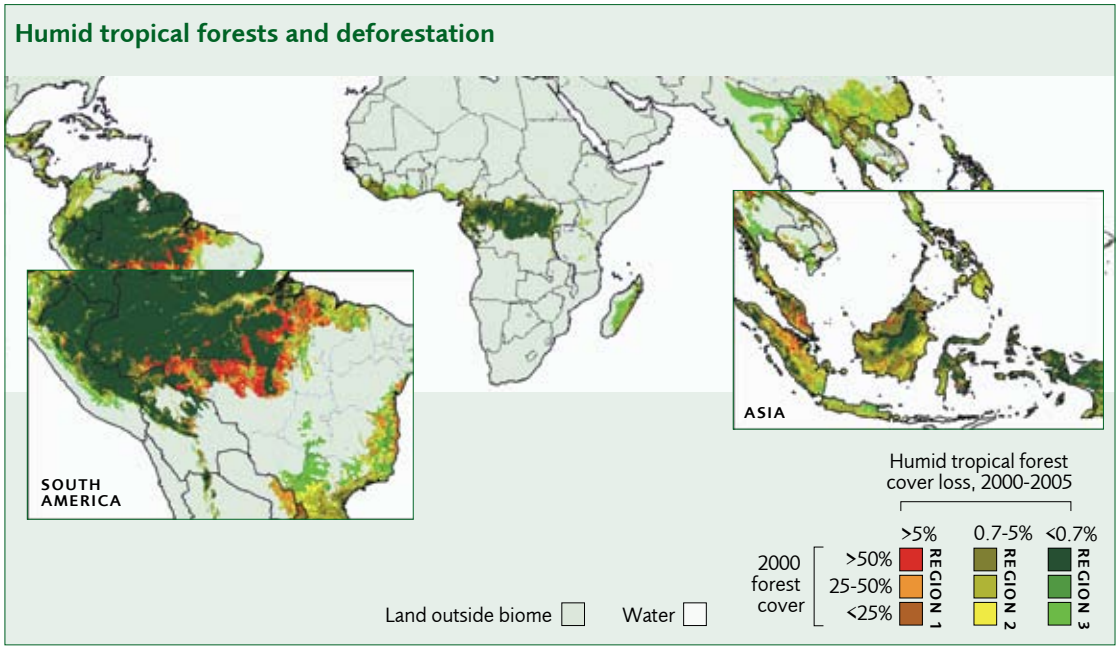
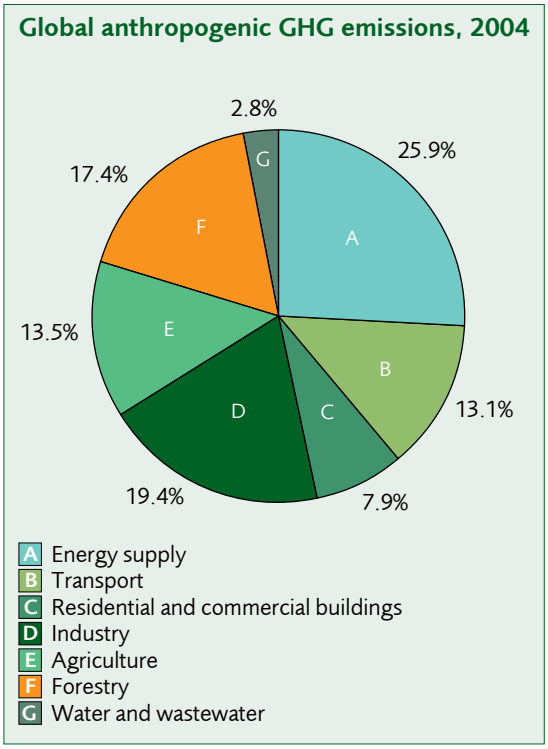


FIGURE 1
Rainforests straddle the equator in a green belt. They are being lost most quickly in South America and Southeast Asia.
Source: Hansen et al, PNAS (2008)

[7] IPCC, AR4 Synthesis Report (2007)
[8] Houghton (2003)
[9] Mitchell, A. W. et al 'Forests NOW in the Fight Against Climate Change, Forest Foresight Report 1.v3' (2008) Global Canopy Programme, Oxford
[10] Lewis study in Science Daily (20 Feb 2009). See also IPCC (2007) WG1 Ch. 7

FIGURE 2
The forest sector contributes 17% of global greenhouse gas emissions. Tropical deforestation is responsible for the vast majority of this.
Source: IPCC (2007) AR4



rainforests provides an insulating belt around the planet, reflecting sunlight and evaporating moisture: this can reduce the ground temperature by as much as five degrees Celsius. This insulating effect is lost after forests are cleared.

It will be extremely difficult to develop a sufficiently fast and adequate response to climate change that does not include an effective programme to reduce deforestation. The IPCC concluded that to avoid warming greater than two degrees Celsius, and therefore the worst effects of climate change, the global concentration of atmospheric greenhouse gases (GHG) needs to stabilize between 445 and 490 parts per million (ppm) CO_2e. The present atmospheric CO_2e level stands at 433ppm. Recent research by McKinsey & Company indicates that to get on the pathway to 450ppm the world must reduce its global CO_2e emissions, relative to Business-As-Usual, by 17 Gt by 2020. (Even this scenario assumes that the world overshoots and reaches a 510ppm peak before atmospheric carbon starts to decrease.) Action must be taken immediately: each year of delayed action will 'cost' another irreversible 3-5ppm increase. This same research concludes that the forest sector offers one of the largest opportunities for carbon abatement. Significantly reducing tropical deforestation could contribute over 5 Gt CO_2e per year of avoided carbon emissions. It could also do so rapidly and at a low cost relative to other measures. Without addressing the issue of tropical deforestation, it is difficult to see how the world can achieve its 450ppm goal and avoid the worst impacts of climate change.[11]

1.2 Other Ecosystem Services

Serious and urgent as the GHG emission reduction task is, it is by no means the full story on the value of tropical rainforests. Rainforests provide a range of other large-scale ecosystem services, as well as many more localized goods and services. Annex A provides a full list of these ecosystem services, the most important of which are described below.

1.2.1 Rainforests and rainfall

Rainforests are huge freshwater regulators. Rain that falls on them is itself a function of the diversity of life in these forests. The combined activity of animal and plant life releases huge quantities of volatile organic compounds which create the fine condensation nuclei around which water droplets form. Moisture is held in these humid, cool ecosystems, and also evaporates slowly to make clouds. It has been estimated that a rainforest tree can transpire eight to ten times more water vapour into the atmosphere than an equivalent area of the ocean evaporates.[12] Collectively the Amazon rainforest releases 20 billion tonnes of moisture into the atmosphere each day. If put into a kettle and boiled, this would require energy equivalent to the largest hydro dam in the world working on full power for 135-years. The value of rainforest water services is therefore immense.

Some models suggest that the removal of rainforests could result in reductions in rainfall globally, including in the American Mid-West and parts of Central Asia.[13] At a regional scale the water vapour from the Amazon feeds agriculture in Southern Brazil and may be carried as far south as the agricultural heartland of the La Plata Basin in Argentina. The extent to which food and energy security (for hydro power) in the region is underpinned by these ecosystem services should not be underestimated.

Rainforests also sustain large waterways, some of which (such as the Amazon, and the Mekong) flow across international boundaries, raising the prospect of conflict as the flows in these systems are affected by changing rainfall patterns and reduced forested catchment.

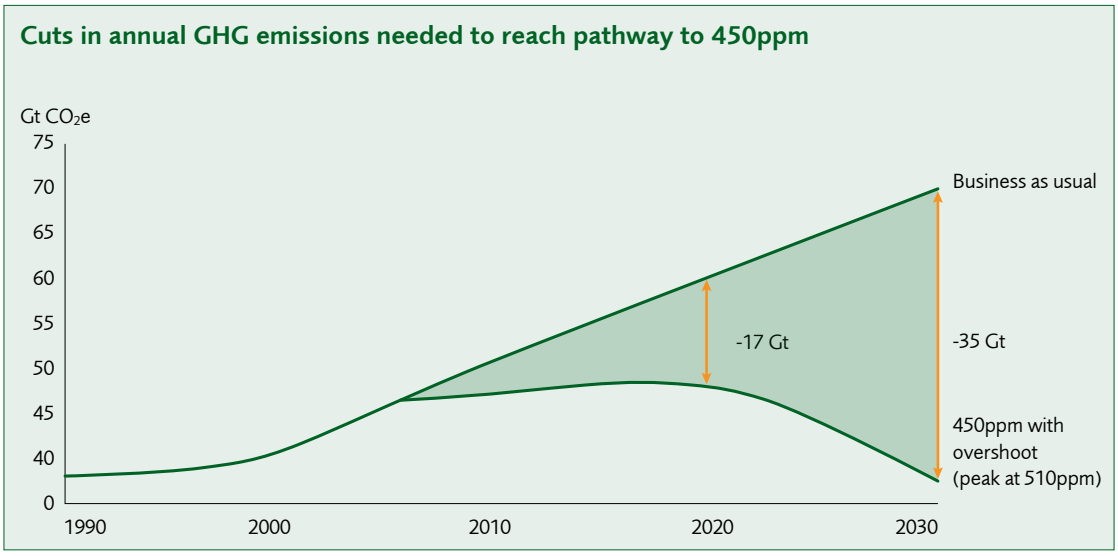
1.2.2 Rainforests, temperature and disease

All this water means that rainforests act like a global air-conditioning unit cooling the earth's surface. Rainforest loss means that temperatures at the land surface will rise. This in turn leads to more extreme weather conditions; violent storms, soil erosion and flooding. Damaged forests can also result in increased disease frequency: for example, the

[11] McKinsey & Company, 'Global GHG Abatement Cost Curve v2' (2009); ClimateWorks Foundation / McKinsey & Company 'Project Catalyst'
[12] Global Canopy Program, 'Forests First in the Fight Against Climate Change' (June 2007)
[13] D. Werth & R. Avisar, 'The Local and Global Effects of African Deforestation', Geophysical Research Letters, (2005), vol. 32, no. L1270

FIGURE 3
Action must be taken immediately to put the world on a pathway towards stabilizing atmospheric carbon at 450ppm. Tropical forests can make a major contribution – up to 5 Gt CO_2 of abatement each year.

Source: McKinsey & Company 'Global Abatement Cost Curve v2'; ClimateWorks Foundation / McKinsey & Company 'Project Catalyst'



biting incidence of malaria-bearing mosquitoes can rise in degraded forests. The 2005 drought in the Amazon caused catastrophic dysfunction of local transport affecting health services to millions of people. Disruptions to high-quality drinking water supplies, natural medicines and other forest goods resulting from forest clearing can also threaten the health of local residents.

Red eyed tree frog (Agalychnis callidryas)
Over half of all lifeforms on earth are thought to be found in rainforests. Many species remain to be discovered.
© *David Tipling*

1.2.3 Biodiversity

Whereas there are just 29 native tree species in the UK, every single hectare of rainforest contains dozens or even hundreds of species of trees. There are millions of insect species and thousands of other large animals and bird species in the tropical rainforests. Perhaps half to three quarters of all life-forms on Earth live in tropical rainforests; they appear to be the most diverse expressions of life ever to have evolved. High in the rainforest canopy, as much as 60-80% of insect species have never been described by scientists.

The economic value of these individual species is inestimable; evolution will not make good their extinction within a million years, but the loss of the ecosystem services they supply to everyone will be felt within a generation. As is well-known, rainforests have been the source of compounds vital to the discovery and potency of many modern medicines, and also of genetic stock for new crops and plants that have revolutionized agriculture in many parts of the world. Most of the species that exist in rainforests are still inadequately researched, their potential value to humanity, and to the maintenance of environmental sustainability, as yet unknown.

1.2.4 Non-timber forest products

There are a great many products harvested from rainforests which provide food and livelihood necessities to local populations, often at low or zero prices. Some of these products enter more formal markets, and some, such as rattan, guarana, brazil nuts, latex from bush rubber gathering and so forth, have developed large and sometimes international markets.

1.3 Forest Dependent Peoples

An estimated 1.6 billion of the world's poorest people (those surviving on less than US$2 per day) rely to some extent on forests for their welfare and livelihoods.[14] These people include subsistence farmers, economic migrants and 'extractivists' such as rubber tappers, small-scale loggers, gold miners, hunters, and harvesters of nuts, berries, fruits and medicinal plants. Indigenous peoples have a particularly close relationship with rainforests. The status of indigenous peoples varies from country to country, but, whether their rights are documented and respected or not, the area of forest occupied by them is significant. For example, in Brazil officially-demarcated indigenous territories cover 20% of the Amazon region. Cattle ranchers, soy farmers and palm or timber plantation owners are also part of the wider community linked to rainforests.

FIGURE 4

Rainforests and indigenous people

The search for equilibrium between mankind and the natural world, and the need to manage the drivers of climate change (including deforestation), lie at the heart of the PRP. Sustainable development involves maximising the well-being of people alive today without prejudicing the interests of generations to come.

Indigenous people often act as guardians of the forest; they have acquired remarkable knowledge of the medicinal properties of countless rainforest plants; and although relatively small in number, their cultures embody great wisdom and diversity within the human family. Their rights to land, dignity and development at a pace of their own choosing need to be respected.

In Brazil, officially-demarcated indigenous territories, comprising 140 separate peoples, cover 20% of the Amazon region. In Colombia, the area of the country under the control of indigenous peoples is over 40%. The Yanomami number 20,000 and occupy some 170,000 sq km straddling the borders of Brazil and Venezuela. Iconic groups include the Kayapo in Brazil, the Pygmy peoples of the Congo Basin and over 300 peoples in Papua New Guinea. Several dozen entirely uncontacted peoples are still believed to exist in remote parts of the forests of Latin America and Papua New Guinea.

Indigenous people have suffered the consequences of unsustainable development beyond the forest frontier, and they need to be included in benefit-sharing mechanisms as part of national development plans supported by the Emergency Package.

1.4 Drivers of Deforestation

Despite the many ecosystem benefits provided by rainforests, they are rapidly disappearing. The FAO estimates that 15 million hectares of tropical forests, an area greater than the size of England, are converted to other land uses every year.[15] Of this, approximately six million hectares are humid tropical forests, or rainforests, which contain the highest carbon loadings and the greatest amount of biodiversity.[16]

Deforestation occurs because it is in the rational economic interest of actors in Rainforest Nations. Deforestation allows rural populations to practice subsistence agriculture, landless people to acquire a patch of their own, the private sector to produce commodities and sell them on national and international markets, and local and national governments to generate tax income and foreign exchange. The global ecosystem benefits of preserving tropical forests are diffuse, unmonetized and delivered over a long period; the benefits of deforestation are specific, financial and immediate. The forests are therefore worth more dead than alive. It should be remembered that today's richest countries actively pursued deforestation and land conversion to agriculture in early phases of development for exactly these reasons.

1.4.1 Changing nature of deforestation

The nature of deforestation is changing. Traditionally, the lion's share of deforestation has been associated with poverty and local subsistence activities. Population growth, increasing land scarcity, and declining productivity push people to look for new lands to practice subsistence agriculture. This includes farming activities that permanently deforest, and those linked to 'swidden' agricultural systems that rotate over secondary forest fallows (and do not cause new deforestation). In addition, trees are cut for building or fuel needs.

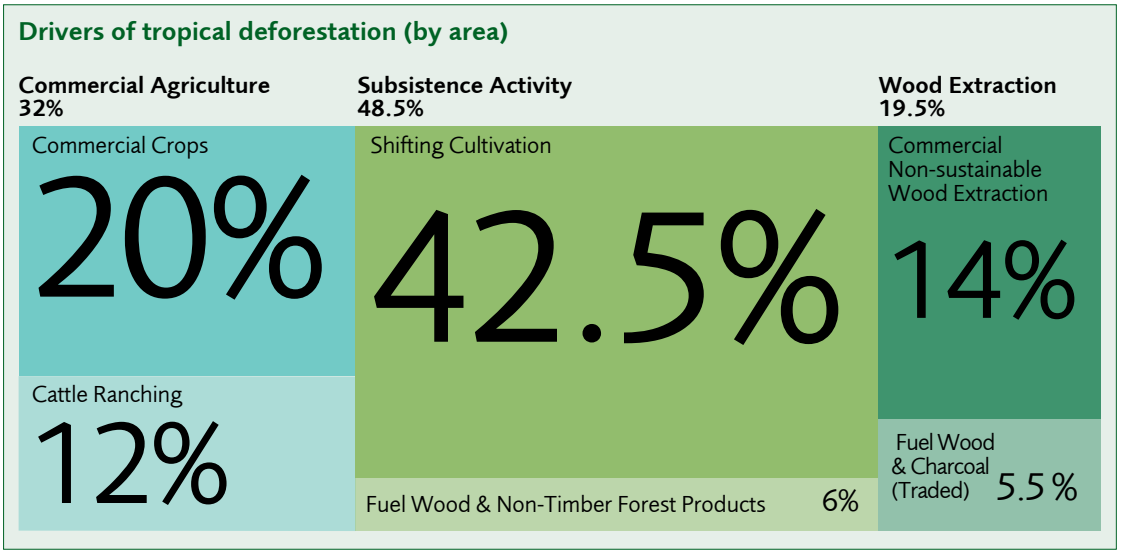
But now the consumption needs of developed economies and rapidly expanding developing economies are increasingly driving deforestation. In Indonesia and Brazil, the two countries accounting for nearly two-thirds of tropical rainforest loss between 2000 and 2005, a growing proportion of forest loss can be attributed to export-led commercial agricultural expansion – palm oil, cattle and soybean production are the key commodities. In other areas, cocoa, coffee and rubber production play a role, while mining and growing demand for biofuels can have an indirect impact on forest loss. The global wood products industry is also a significant driver, both

[14] World Bank (2004)

[15] This figure does not include afforestation and reforestation in tropical countries, which may account for 2 million hectares each year. FAO (2006)

[16] Hansen et al, PNAS (2008)

FIGURE 5
Deforestation is driven by a number of factors. Subsistence activity is still the largest driver, but commercial agriculture and wood extraction are becoming increasingly important. Moreover, they generate much greater financial return per hectare.
Source: Blaser and Robledo (2008)



directly through destructive logging of hardwood timber and clear-felling for paper pulp, and indirectly by opening up the forest to other uses.

The lack of precise and consistent data on the causes of deforestation only allows for estimates of the relative importance of each driver. Figure 5 illustrates the results from one global study. It should be noted that deforestation often occurs because of the complex interplay between these drivers. For instance, land can be opened up by roads for logging, slashed and burned by subsistence farmers migrating in, cultivated for a few years, sold over to cattle ranchers and then bought by soy farmers. It is not always easy to attribute deforestation to a particular driver. Moreover, many drivers of deforestation are indirect. For example, the expansion of cattle ranching in rainforest areas can be driven by the expansion of commercial agriculture in non-rainforest areas.

Illegal logging, Papua, Indonesia
Illegal loggers cut a fallen Iron Wood tree (Intsia Palembanica), also known as 'Merbau'.
© Daniel Beltrá / Greenpeace

The drivers of deforestation generate very different economic returns. Commercial agriculture, such as palm oil or soy cultivation, is far more lucrative than subsistence farming. Any effort to slow deforestation must take these differences into account.

1.4.2 Regional differences

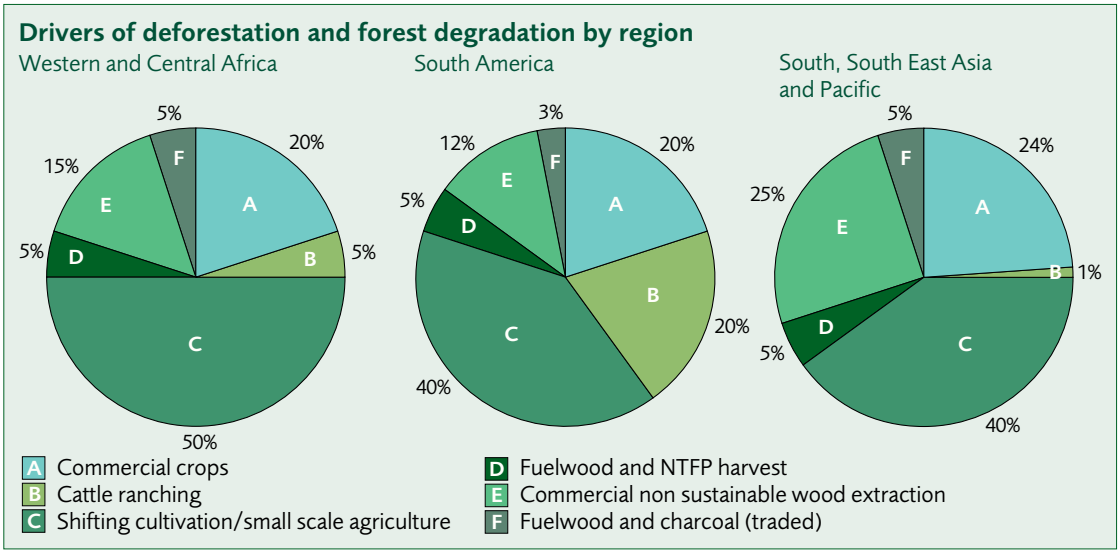
Deforestation patterns differ from continent to continent. South America has the largest amount of rainforest loss, caused by cattle ranching, commercial agriculture, logging and subsistence agriculture.[17] In Brazil (which has historically experienced high rates of deforestation but has made recent progress in implementing forest protection policies) cattle ranching and associated land speculation are widely recognized as being the main drivers of deforestation. Clearing land for cattle by poor families bestows, albeit often illegal, ownership rights to land. However, cattle ranchers' migration into the Amazon biome can be linked to the growth of soy cultivation in drier biomes, which has pushed cattle ranchers north into the forest frontier.

South East Asia is the continent with the highest rate of deforestation, albeit on a smaller area of forest. It accounts for the second highest amount of rainforest loss after South America. Logging for timber and pulp and paper, as well as subsistence and commercial agriculture, are the main drivers of deforestation. In Indonesia and Malaysia, logging, often followed by the establishment of palm oil and increasingly pulpwood plantations, is the main cause for the disappearance of forests.

The African continent, where subsistence agriculture accounts for 60% of deforestation, features the third highest amount of rainforest loss after South America and Southeast Asia. Logging activities are multiplying, facilitated by improved transport infrastructure. Large-scale agriculture is also increasing from a very low base, and might account for more deforestation in the future, as land for agricultural expansion grows scarce on other continents.

[17] FAO, between 2000 and 2005

FIGURE 6
The importance of different drivers varies from region to region. Subsistence activities are more dominant in Africa; cattle ranching is a major factor in South America; commercial crops, such as palm oil, are important in Asia.
Source: Blaser and Robledo (2008)



1.4.3 Growing pressure on forests

A growing global population, rising incomes and changing diets will continue to increase demand for food, animal feed and fuel, which will lead to more pressure on forests. The world's population is likely to increase by 50%, from six to nine billion, over the next 40 years. The Gallagher Review estimates that despite potential yield improvements, growing demand for food and feed is likely to require an additional 200-500 million hectares of agricultural land by 2020.[18] Increasing demand for food and fuel, and growing scarcity of land, will also inflate the opportunity costs of not deforesting.

FIGURE 7

Key commodities driving deforestation

Timber | Global trade in tropical timber is worth approximately US$16 billion per year, with illegal timber representing an additional US$7 billion. Asia is currently the largest exporter of logs, followed by South America and then Africa.

Palm oil | Production of palm oil is highly lucrative and has grown rapidly over the last decade due to its versatility and high productivity. Demand projections for edible palm oil suggest that an additional 250,000 hectares per year will be required worldwide until 2050. In Indonesia and Malaysia, which produce over 90% of palm oil, about half of palm oil expansion is reported to occur at the expense of forests.

Cattle | Ranching is one of the leading causes of deforestation in South America. Brazil has become the world's largest exporter of beef, with exports reaching US$4.4 billion annually. Global demand for beef is projected to rise by 1.7% yearly over the next decade.

Soy | While most of soy production occurs in grasslands and dry forests in countries such as Brazil, Argentina and the United States, occurrences of soybean production replacing closed-canopy forests increased by 15% between 1999 to 2004. Soy production also has an indirect impact on forests by displacing cattle ranching into the forest frontier. Demand for soybeans – for human consumption and animal feed – is projected to require an additional 20 million hectares over the next decade.

Cocoa | West Africa accounts for 70% of the world's cocoa production. Approximately six million farmers depend on cocoa production for their livelihoods. Demand for cocoa has increased steadily over the last century by 3% annually. Meeting this demand has led to deforestation in parts of West Africa and Indonesia.

Coffee | Traditionally, coffee was grown under canopy and did not result in outright deforestation. However, the development of higher-yielding varieties requiring full sun in combination with a rapid rise in coffee consumption has led to increased forest loss. Brazil, Vietnam, Colombia and Indonesia are the leading exporters of coffee.

Rubber | Rubber plantations have resulted in forest loss in Africa, South America and especially in Asia, where three quarters of natural rubber is produced. The majority of rubber production occurs at smallholder scale providing a livelihood to 20 million families.

Mining | The world's rainforests feature vast deposits of bauxite, coltan, diamonds, gold, oil, and many other minerals. While mining operations occupy relatively small areas, infrastructure built to extract minerals often facilitates increased migration into the forest, resulting in timber extraction and clearing for subsistence agriculture.

Biofuels | The link between biofuels and forest clearance is most often indirect. For example, in the case of palm oil, only 2 to 5% is used for biodiesel production. However, demand for biofuel feedstocks (such as sugarcane or corn) can increase the value of land in agricultural zones, pushing lower yielding activities such as cattle ranching into forested land.

Source: Multiple reports

[18] CE Delft (2008), commissioned for Gallagher Review

1.5 Initiatives to Address Deforestation

There has long been a consensus that the international community should work with the governments of Rainforest Nations to slow or halt the destruction of tropical forests. However, traditional donor programmes have been unable to compete with the strong drivers of deforestation outlined above. The economic imperative often overwhelms the best intentions of the law: for example, it is estimated that 80-90% of Brazilian deforestation is illegal. Current initiatives mark a step in the right direction, and it is hoped that a long-term UNFCCC climate deal will eventually generate strong financial support for forests, but this will still leave a gap over the next decade, during which deforestation is likely to continue unless additional action is taken.

1.5.1 Historical approaches

A number of initiatives have been taken by the World Bank, UN agencies and bi-lateral donors to preserve forests in tropical countries: these have included the Tropical Forestry Action Plan in the 1980s, National Environmental Action Plans from the 1990s and the integration of forestry into broader donor assistance programmes since. In addition, dozens of international NGOs have conducted project-level activities in rainforests. While there have been some success stories, the overall results have been disappointing, as evidenced by the huge area of the world's tropical rainforests that has been cleared or heavily degraded over the past fifty years.

The following reasons have been put forward to explain the failure of previous initiatives to reduce deforestation.

- Too narrow scope: Initiatives focused only on the forestry sector rather than addressing the wider drivers of deforestation and creating alternative economic opportunities for local people.
- Lack of political buy-in: In many cases, neither governments nor local communities within Rainforest Nations shared the goals of international donors.
- Uncommitted institutions: The importance of forests was not always shared within development agencies, nor was there coordination between agencies.
- Inadequate funding: Historically, less than US$1 billion per year was available through Official Development Assistance for tropical forestry.[19] This was never enough to compete with the drivers of deforestation.

In essence, political will has not been strong enough, or sustained for long enough, to ensure the implementation of development approaches that tackled the fundamental economic issues that cause deforestation in tropical countries. Clearing forests remained more lucrative than conserving them.

[19] PRP research

FIGURE 8

Recently announced forestry initiatives

The World Bank's Forest Carbon Partnership Facility, supported by several international donors, with a proposed budget of US$300 million of which US$170 million has been pledged.

The World Bank's Strategic Climate Fund, which has funding commitments from the G8 group of nations of US$6 billion and will include a Forest Investment Programme.

The Norway Forest Fund, which has committed US$2.8 billion over five years from 2008.

The Congo Basin Fund, supported by Norway and the United Kingdom, with funding of US$195 million.

The Japanese Government's Cool Earth Partnership designed to support adaptation to climate change and access to clean energy, with some forest interest, allocating US$2 billion per year from a US$10 billion fund.

The Australian Deforestation Fund, aimed at reducing deforestation in the Southeast Asia region, with funds of AUS$ 200 million.

The German commitment of € 500 million a year for biodiversity.

The suggestion by the European Commission for the creation of a Global Climate Financing Mechanism, part of which could fund tropical forests.

Brazil's Fund for the protection of the Amazon rainforest has received a commitment for an initial US$130 million from Norway (drawn from the Norwegian Forest Fund).

Guyana has offered to place its forest under international stewardship in return for compensation for development opportunities foregone.

1.5.2 Current initiatives

The growing importance of climate change has led to a dawning realization that a new approach is needed. A number of funds and mechanisms have been put forward which are either focused on, or include, substantial programmes for tropical forests. These have come from the World Bank, Norway, Japan, Germany, the United Kingdom, Australia, the European Commission, Brazil and Guyana. See Figure 8 for more details.

These initiatives represent real progress. Nonetheless, in aggregate they will not provide enough funding to address the drivers of deforestation globally. As a result, they will tend to focus on project-level activities, on pilots in individual countries or on capacity-building. Many are explicitly designed as a transition to a forest carbon mechanism (such as REDD) agreed through the UNFCCC process.

1.5.3 Future prospects: REDD

It is widely expected that a post-2012 climate change agreement will include mechanisms that promote action to reduce carbon emissions from deforestation and forest degradation. This is known as Reduced Emissions from Deforestation and Degradation (REDD) under the United Nations Framework Convention on Climate Change (UNFCCC). Linking forest carbon to global compliance regimes could generate large-scale financing for rainforests, as it would be in countries' interests to invest in avoiding deforestation whenever it was less costly than other carbon abatement measures.

Dayak girl, Seturan Village, East Kalimantan, Indonesia
© Gabriel Eickhoff

However, there is great uncertainty about how REDD would be financed, what reference levels would be used, and how much Rainforest Nations might receive; much will have to be worked out in negotiation over the next two years. Moreover, even if REDD is included within a 2012 agreement, it could take many more years to grow to scale. Rainforest Nations may initially lack the capacity to make verified reductions in forest carbon emissions; at the same time, there may be a lack of demand from the industrialized nations that could fund these reductions. (Similarly, the Clean Development Mechanism (CDM), set up under the Kyoto Protocol in 1992, took many years to become operational). As a result, many observers believe that it could be 5-10 years before significant funds would flow to tropical countries under a REDD mechanism. In the meantime, millions of hectares of rainforests could be lost.

1.6 The Need for Urgent Action

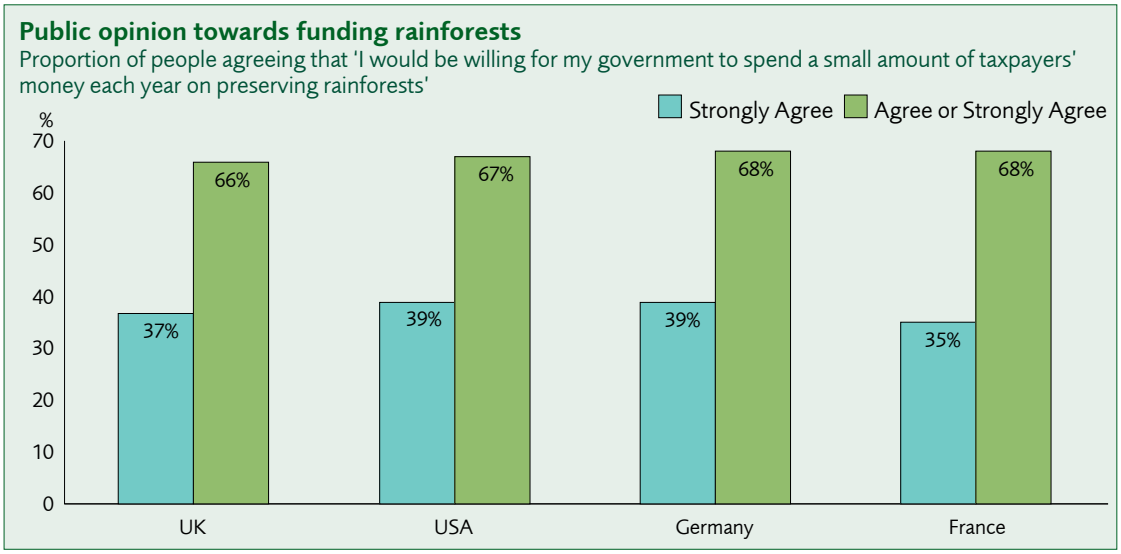
Significantly reducing tropical deforestation will be essential if we wish to stabilize atmospheric carbon and prevent catastrophic climate change. It will also ensure that tropical forests go on providing other crucial ecosystem services such as regulating rainfall and harbouring biodiversity. The world must take action now. Every day 15,000 hectares of rainforest are lost – irrevocably.

After consultation with a wide range of stakeholders, the Prince's Rainforests Project believes that an Emergency Package to reduce deforestation should have the following features.

- Generate sufficient funding to deliver a significant reduction in tropical deforestation in the near-term by addressing the underlying drivers ('Make the forests worth more alive than dead').
- Assist Rainforest Nations to deploy funds on cross-sectoral, alternative development programmes, with full involvement of local communities and indigenous peoples.
- Establish a funding mechanism that draws on the combined strengths of the public and private sectors.
- Create a light, temporary global institutional framework that acts as a bridge to a long-term UNFCCC solution.
- Take global action to support rainforest programmes by making sustainably produced products more attractive to consumers and more lucrative to producers.

The Prince's Rainforests Project, alongside other initiatives, has begun to build consensus around these ideas among the governments of Rainforest Nations and developed countries, among international agencies and NGOs. Research conducted in Europe and the USA also indicates that there is strong support for this sort of initiative among the general public.

FIGURE 9
There is strong public support in developed countries for action to reduce tropical deforestation.
Source: Research conducted for PRP by Lippincott – sample of 1,000 people in each country (April 2008)



1.7 The Economic Rationale

The benefits of reducing deforestation are potentially huge. The Eliasch Review estimated that the net benefits of halving deforestation could amount to US$3.7 trillion over the long term (net present value). This is based on the global savings from reduced climate change minus the costs involved in avoided deforestation.[20] The benefits would be even greater if deeper cuts to forest emissions were made or the preservation of other ecosystem services was taken into account. For example, a study by TEEB puts the annual welfare cost of forest loss at between US$2 trillion and US$5 trillion.[21]

The likely costs of addressing the drivers of deforestation, and providing a financial incentive to Rainforest Nations to embark on an alternative development path, are low compared to the benefits. Tackling deforestation offers one of the cheapest forms of carbon abatement. In the Stern review, it is estimated that the costs of reducing GHG emissions to levels consistent with a 550ppm CO_2e stabilization trajectory to 2050 would be around 1% of global GDP or US$650 billion per annum.[22] Considering that tropical deforestation accounts for approximately 17% of global emissions, this would imply that over US$100 billion could be channelled to this sector each year. In practice, as will be explained in this report, the funding costs of a mechanism that significantly reduces tropical deforestation could be much lower, perhaps US$10-15 billion per year. This represents very good value.

The entire international community should pay for the carbon abatement and other ecosystem services that rainforests provide. However, it could be argued that the developed, industrialized nations should take most of the responsibility because they will benefit disproportionately. Industrialised nations will have to accept the deepest cuts in carbon emissions under any global climate deal. Protecting the rainforests represents one of the cheapest and most rapid carbon mitigation measures available. If no action is taken now on tropical deforestation, industrialized nations will have to take on even deeper cuts in the future for the world to have any chance of stabilizing atmospheric carbon and averting the impacts of catastrophic climate change. Indeed, without action on tropical deforestation it is difficult to see how this goal can be achieved at all.

The remainder of this document describes in detail an Emergency Package that could achieve a significant, rapid reduction in tropical deforestation and generate equitable benefits for the world and for Rainforest Nations.

[20] Eliasch Review, Ch. 5
[21] TEEB, 'The Economics of Ecosystems and Biodiversity' (2008)
[22] Stern, N. 'The Stern Review on the Economics of Climate Change', Cambridge University Press (2006)

2 The Proposal

This section describes the 10 key elements that make up the proposed Emergency Package for Tropical Forests. If implemented, the PRP believes that this mechanism would have a significant impact on reducing deforestation.

2.1 Payments to Rainforest Nations for Not Deforesting

Deforestation occurs because it is in the financial interests of individuals, enterprises, local communities and governments in Rainforest Nations, largely driven by global commodity demand. Any scheme to arrest deforestation will have to provide equally strong financial incentives to encourage countries to follow an alternative, low-deforestation development path. In effect, the world will need to pay for the annual provision of ecosystem services from the rainforests.

How should the value of these payments be calculated? Attempts have been made to value the ecosystem services provided by tropical forests, for example by assessing the benefits to global GDP of mitigating climate change. Other studies have taken an arbitrary market price for carbon and applied it to avoided emissions from reduced deforestation to generate values. These approaches may be overly theoretical. It is the PRP's contention that payments could legitimately be based on the costs incurred by a Rainforest Nation, and the value lost, by switching to an alternative development path. Payments must be large enough to convince Rainforest Nations that it is in their economic interests to change behaviour.

2.1.1 Possible methodologies

To be able to assess the costs of not deforesting, Rainforest Nations would first establish a reference level, based on historical rates of deforestation and/or projected future rates of deforestation. Countries would then analyze the likely impact of switching to an alternative development path that conserves forests. This might include the following.

- The transaction costs associated with switching to a low deforestation path (e.g. policy changes, institution building and research activities).
- The ongoing enforcement and monitoring costs associated with maintaining forests and preventing deforestation.
- The value lost by switching away from economic activities associated with deforestation (opportunity costs).

Less

- The economic value of standing forests (e.g. income from non-timber forest products, sustainable forest management and ecotourism).
- Some assessment of the value to the nation of the local ecosystem services provided by standing forests (e.g. flood control and rainfall regulation).

Plus

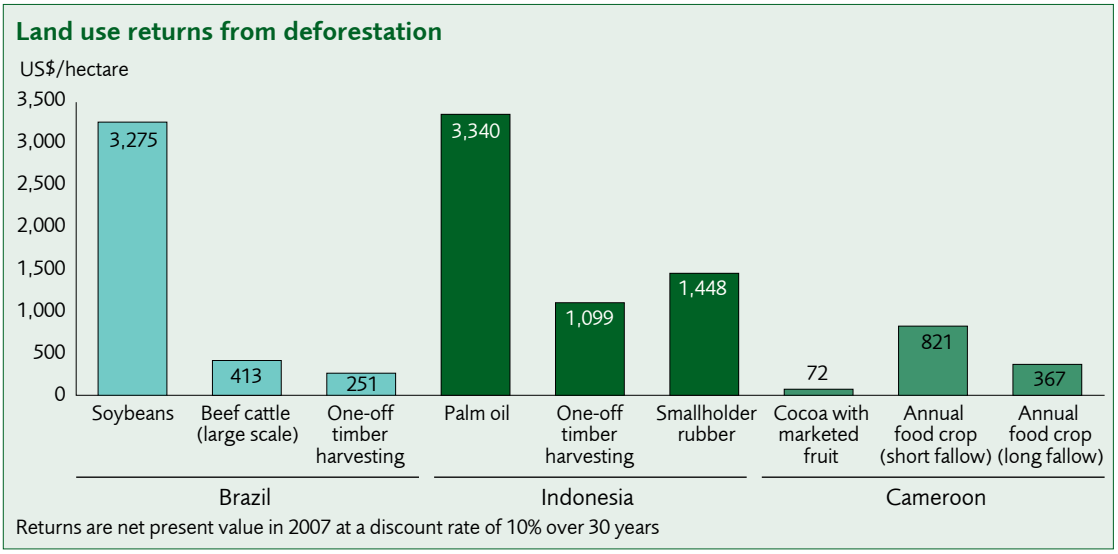
- A 'margin' or 'premium' that provides an incentive to act and compensates for the risks of embarking on change.

Assessing the value that a Rainforest Nation loses by switching away from economic activities associated with deforestation – the opportunity costs – will require a broad perspective. In some cases, the foregone value will be the full profits derived from the activities associated with deforestation: for example, the amount of income a farmer could expect each year from cultivating soy on cleared land. But in many cases, it will be the costs associated with switching these activities to other non-forested areas within the country.

For example, in Indonesia it is estimated that palm oil plantations will expand by 125,000 hectares per year over the next 40 years to meet global

Protected forest abuts agricultural land, Iguacu River, Brazil
The dense, untouched forest is part of the Iguacu National Park. Forest on the other side of the river has been cleared for agriculture.
© S. Rocha-UNEP / Still Pictures

FIGURE 10
The drivers of deforestation can produce very different financial returns. Therefore, the opportunity cost of not deforesting will vary from place to place.
Source: Grieg-Gran (2008)



demand.[23] Currently, much of this plantation area is being established by clearing rainforests. However, there may be 10-20 million hectares of under-utilized grasslands, known as alang-alang, that could support productive palm oil operations if local communities were engaged equitably and appropriate investments were made to prepare soils. The foregone value of a low deforestation path, therefore, would be the costs, and any reductions in future income, associated with palm oil producers making this switch.[24]

2.1.2 Valuations

The potential opportunity costs of reducing deforestation will vary from region to region. In areas where the primary driver of deforestation is low intensity grazing and commercial timber volumes are low, the foregone value per hectare may be relatively low. In areas, such as in Southeast Asia, where the alternative land use is palm oil cultivation and forests are rich in harvestable timber, profits per hectare can be very high. Assessments of opportunity costs are also highly sensitive to assumptions about commodity prices over time.

A number of global surveys have attempted to estimate the opportunity costs of reducing deforestation. One study for the UNFCCC estimated that an investment of US$12 billion per year could reduce deforestation to zero by 2030.[25] The Eliasch Review refers to two studies that estimate costs at US$13 billion and US$15 billion per year to halve global deforestation, and another that puts the cost at US$7 billion per year to eliminate deforestation in eight countries (which represent 46% of global deforestation).[26] On a national level, the Government of Guyana, supported by McKinsey & Company, has conducted an extensive, bottom-up study of the 'Economic Value to the Nation' associated with deforestation, which put the value at between US$430 million and US$2.3 billion per year for that country.

FIGURE 11

Guyana's valuation methodology: EVN & EVW

The Office of the President of Guyana, based on an independent assessment by McKinsey & Company, carried out an analysis of what will be needed to match the economic interests of rainforest countries and the rest of the world. Two concepts explain the misalignment of current incentives: deforestation's Economic Value to the Nation (EVN) and rainforests' Economic Value to the World (EVW).

EVN is calculated from four components.
- Standing timber value
- Post-harvest land value
- Forest protection costs
- Loss of local ecosystem services

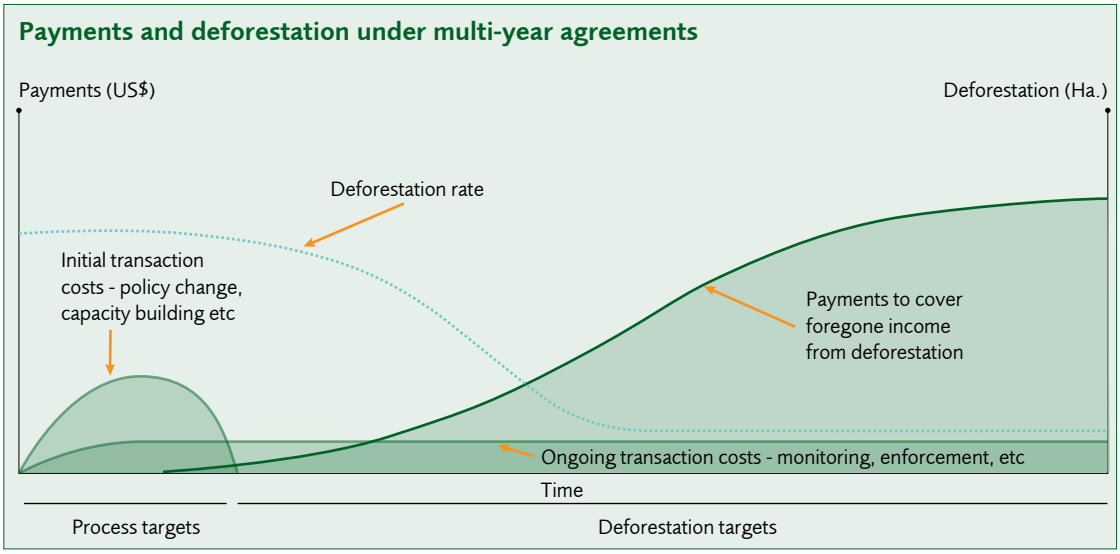
The Office of the President of Guyana estimated the EVN to range between US$4.3 billion and US$23.4 billion (largely reflecting sensitivity to commodity prices). This translates into an annuity of between US$430 million and US$2.3 billion per year. This is the 'floor' value that Guyana would need to receive to make forest conservation economically rational.

EVW assesses the economic value of the ecosystem services provided by forests to the world. In practical terms, the only way to capture this value now is by reference to the carbon market, which represents the world's willingness to pay for carbon abatement because of deforestation. EVW is the 'ceiling' value that the world should be willing to pay. Any arrangement that produces an agreed value between EVN and EVW will satisfy the economic interests of Guyana and the rest of the world.

Source: Government of Guyana (Dec 2008)

[23] Corley 'How much palm oil do we need?' (2008); PRP analysis
[24] Fairhurst & McLaughlin, 'Sustainable oil palm development on degraded land in Kalimantan', WWF (2009)
[25] Blaser et al (2007)
[26] Eliasch Review. These were the IIASA cluster model, the GCOMAP model, and the Grieg-Gran study used in the Stern Report. The figures given in this report represent the opportunity costs, or lost value, incurred by local actors when not deforesting. The Eliasch Review also quotes a figure of US$17-33 billion per year to halve deforestation through carbon trading. This would provide a fixed price per ton of carbon, regardless of the different opportunity costs associated with timber harvesting, cattle ranching, palm oil cultivation or other agricultural uses in each region. It, therefore, includes a large element of 'surplus' or 'rent'.

FIGURE 12
Most payments would be linked to achievement of deforestation targets. But some upfront payments would be made to cover transaction and enforcement costs.



2.1.3 Negotiated deals

Top-down, global surveys provide some indication of the scale of funding that the Emergency Package would require to reduce deforestation. But the PRP believes that each Rainforest Nation should conduct its own in-depth, bottom-up assessment of the costs of pursuing an alternative, low-deforestation path. It is for each country to assess what payments it needs to make such a path economically attractive. This would then form the basis for negotiation with the international institution designated to implement the Emergency Package – what is called in this report the 'Tropical Forests Facility'.

The Tropical Forests Facility could provide guidelines to Rainforest Nations on the methodology they may wish to use to assess the costs of switching to an alternative path. It would study the valuations and alternative economic development plans put forward by countries. It would also compare proposals from different Rainforest Nations to test assumptions and to help create consistency. But, ultimately, the value of the payments will be the subject of negotiation between a willing seller (the Rainforest Nations) and a willing buyer (the international community represented by the Tropical Forests Facility). It must be greater than the net opportunity costs incurred by a Rainforest Nation when not deforesting, and less than the value of the ecosystem services provided by the standing forests to the world, in terms of carbon abatement and other benefits. It is the PRP's conclusion that a deal satisfactory to both parties could be reached.

2.2 Multi-year 'Service Agreements' Based on Clear Performance Targets

Rainforest Nations would negotiate multi-year agreements with the Tropical Forests Facility, offering to achieve defined performance targets in return for annual payments.

2.2.1 Performance targets

In the early years of an agreement, the payments may be linked to process targets. A country would need to reform policies, build institutions, put in place monitoring and enforcement systems, and prepare to implement its alternative economic development plan. These are the 'transaction' costs the country faces when embarking on this development path. It may be one, two or three years before these actions have an impact on deforestation rates.

As soon as possible, payments would be linked to actual delivery of substantial results in the forest, such as area of forest conserved, or deforestation avoided, each year. These payments would be made *ex post* after results had been verified. If a country under-performed against its agreed target, it would receive lower payments; if it achieved more than expected, it would receive a larger amount. These results-based payments would account for the bulk of the funding provided by the Emergency Package.

This approach decreases the risk for funders. The only money that can be 'wasted' is that which pays for the initial stages of policy reform and capacity-building; most of the funding will be directly tied to actual results in the forest. Conceptually, this approach seems appropriate. Under the Emergency Package, Rainforest Nations are being compensated for the net opportunity costs of not deforesting; if deforestation continues, then the country does not experience these opportunity costs and therefore should not receive compensatory payments.

The opportunity costs associated with not deforesting will change over time: for example, commodity prices may rise, making agricultural activities more lucrative. It is suggested that Rainforest Nations would sign five-year agreements with the proviso that payments could be renegotiated, if the underlying assumptions changed, after three years. Agreements could also contain provisions for payments to reset automatically each year depending on changes in commodity prices. This would ensure that the incentives remained sufficiently strong to prevent deforestation from increasing again.

Rainforest Nations would commit to national deforestation targets, not project-level targets. This would prevent 'leakage' from one area to another. Within each country, funds could be deployed to regions and regional targets set, but these would be consolidated at a national level within the terms of the multi-year agreements with the international community.

Satellite image of Amazon region
Remote sensing technology, in conjunction with field-level techniques, can help to monitor deforestation across the world.
© Marvin Dembinsky Photo Associates / Alamy

2.2.2 Forest monitoring

A performance-based system will require effective forest monitoring. The PRP has consulted widely with monitoring experts, and the consensus is that the technology exists to monitor deforestation consistently across the world. Two tiers of forest monitoring are likely to be required – national systems, owned and operated by Rainforest Nations, and a global verification system, which could be formed from a network of existing scientific and research organizations.

To meet the terms of a payment agreement, Rainforest Nations would need to demonstrate that they were implementing or had plans to implement a robust forest monitoring system. The monitoring of forest change in a consistent, transparent and reproducible manner would, after a couple of years of participation in the scheme, become a prerequisite to receiving annual payments for avoided deforestation. A small number of countries already have adequate systems in place; the majority of countries will require assistance to build the capacity in terms of trained personnel and infrastructure.

FIGURE 13

Existing forest monitoring systems
Countries that have developed high quality forest monitoring systems include:

Brazil | The Brazilian Institute for Space Research (INPE) has created a system that comprises three tiers of monitoring. The PRODES programme produces an annual gross deforestation map of the Amazon, the DETER programme provides near real-time detection of deforestation events and reports to IBAMA, and the new DETEX programme is used to identify selective logging activities. All of the data is available on the INPE website.

India | The Ministry of Environment and Forests assesses the forest cover of the country on a two-year cycle using satellite data and reports publicly.

Australia | The Australian Commonwealth Scientific and Research Organisation (CSIRO) has developed a National Carbon Accounting System, which comprises maps showing vegetation cover change and the modelling of consequent greenhouse gas emissions.

Regional collaboration for forest monitoring is also starting to occur. Brazil has plans to expand its monitoring system to the pan-Amazon region, and Australia is working with the Clinton Global Initiative to provide national carbon accounting systems in four Rainforest Nations this year.

Forest area change monitoring should be the immediate concern, but this could be closely followed by carbon emissions monitoring. A combination of remote sensing, field studies and models will be required to achieve these aims. The Tropical Forests Facility could help fund global verification systems if other institutions did not play this role.

2.2.3 Beyond the aid paradigm

The performance-based agreements between the international community and Rainforest Nations would follow an approach that is very different to traditional development aid paradigms. It would be more akin to a service agreement between trading parties. Rainforest Nations would provide ecosystem services to the world by reducing deforestation and conserving forests; the global community would pay as these services were received.

Purus River bank, Amazon, Brazil
Reducing tropical deforestation may require changes to land use policies and enforcement mechanisms in Rainforest Nations.
© Greenpeace / Russel Monk

2.3 Payments Used to Fund Alternative, Low-carbon Economic Development Plans

Rainforest Nations would develop alternative, sustainable development plans that address the drivers of deforestation. The payments they require from the world will be the cost of implementing these development plans.

Rainforest Nations would be free to decide how best to tackle the drivers of deforestation and reorient their economies onto an alternative trajectory. The way funds are used will vary from country to country, as the causes of deforestation are different. Some interventions may be within the forestry sector but much of the funding is likely to be deployed outside the forests, as this is from where much of the pressure for deforestation derives.

The actions taken under an alternative economic development plan are likely to fall into five categories.

- Changes to policy and legal frameworks.
- Improved forest monitoring and enforcement.
- Incentives to change private sector activity.
- Payments for Ecosystem Services (PES).
- Investments in general economic development.

There are examples of all of these approaches being successfully used to tackle deforestation in tropical countries, albeit mostly on a small-scale. The Emergency Package will allow Rainforest Nations to integrate them into a scaled-up national strategy.

2.3.1 Policy and legal frameworks

Changes to the policy and legal framework within a Rainforest Nation could mitigate the drivers of deforestation and anchor the alternative development path. They would not only include forest sector regulations, but agricultural policy, land use planning and economic and fiscal policies. It would be important to involve all relevant government departments to ensure policy coordination and a cross-sectoral approach.

2.3.1.1 Delineating forests

Most governments have invested heavily in land use planning processes, and would therefore be in a position to identify forests which should be permanently conserved, degraded forests which can be restored, areas suitable for afforestation and reforestation, as well as non-forested areas that are suitable for agricultural expansion.

Mapping forest cover, terrain and soil characteristics would enable governments to assess the yield potential of different areas and determine where agricultural expansion should be promoted. Results obtained through satellite imagery should be enhanced with on the ground verification of data, as land appearing to be idle may in reality be used by local populations or unsuitable for agricultural use.

2.3.1.2 Clarifying tenure, access and usage rights

Absence of clear land tenure is often cited as a barrier to investment for sustainable forest management and agriculture. Moreover, land tenure laws can also provide perverse incentives. For example, some countries grant land rights following clearance of forests. This can lead to speculation, as actors deforest land, establish title and then sell it on to agricultural users.

Land tenure clarification is a long-term process that may involve many types of government-led interventions: for example, clarification of law and jurisdiction, establishing registers, conducting land commissions and cadastral surveys, developing institutions for dispute resolution, etc. Land tenure reforms can create adverse consequences if not carried out appropriately. For instance, granting property rights over forested land to individuals and communities might actually increase economic incentives to deforest unless other measures were taken at the same time.

Poorly executed reform processes can legitimize existing inequities in land relations and facilitate elite or corporate capture of local rights and

resources. Clarification of land tenure and usage rights would need to be combined with policy interventions that addressed forest governance more widely. Clarifying rights would be of little value unless those afforded rights were able to defend them, and develop viable enterprises and livelihood strategies around them. This would include securing appropriate benefits from payments linked to forest conservation.

2.3.1.3 Reorientation of subsidies, fiscal and credit policies

In the past, subsidies, tax incentives and preferential credit rates have encouraged expansion of the timber industry and agribusiness into forests in order to stimulate economic development and generate foreign exchange earnings. Subsidies and preferential fiscal and credit policies could be redirected to promoting sustainable forest management and agricultural intensification outside the forests. Countries may also wish to introduce domestic certification schemes for timber and agricultural products, to create incentives for production not linked to deforestation.

Log sorting yard, Para State, Brazil
This yard, containing illegally harvested timber, was seized by the Brazilian police.
© Daniel Beltra

2.3.2 Forest monitoring and enforcement

Increased monitoring and enforcement would be essential to any strategy to curb deforestation. Yet the remoteness and vastness of rainforests, as well as the lack of technological and institutional capacity, have inhibited adequate monitoring and enforcement in many rainforest countries. Funding could go to building this capacity. This may include internet access, satellite imagery, digital mapping tools, and increasing and training staff. Improved monitoring and enforcement would also allow authorities to intervene immediately where deforestation was taking place.

Increased monitoring and enforcement may also be needed beyond the traditional forest sector and in downstream activities. For example, the establishment of processing facilities for timber, crops and cattle can increase the movement of producers into forested areas. Thus, the appropriate location of processing facilities and transport infrastructure could contribute to diminishing deforestation.

2.3.3 Incentives to the private sector

Deforestation is largely driven by private actors, whether individuals or companies, acting according to their economic interests. A successful programme will need to create incentives for the private sector to conserve forests, either through sustainable activities within the forest, or by shifting activities outside the forests.

2.3.3.1 Sustainable Forest Management

Reduced impact logging (which is a key element of Sustainable Forest Management, or SFM) can maintain economically viable log yields while improving the condition of the regenerating forest. National governments may want to offer financial incentives to private companies or communities to use SFM approaches. They may also want to provide preferential credit rates or partial subsidies to help companies meet the costs of forest certification and audits (which can be up to US$200,000 for an area of 100,000 hectares).

There is tremendous potential for improved efficiency in the timber sector. For example, to produce 100m3 of exportable tropical sawnwood in Central Africa, currently 400-600m3 of logs are felled. This compares unfavourably with 55-60% recovery rates in modern sawmilling facilities. The introduction of new incentives, and the removal of disincentives, could improve recovery rates and thereby increase the value of standing forest.

2.3.3.2 Afforestation and reforestation

Afforestation and reforestation (A/R) on non-forested land would be important ways to alleviate pressure on natural forests, especially to meet the increasing demand for paper pulp and other timber products. A/R operations are likely to be carried out by the private sector (including smallholder farmers) since they are commercially viable. But because they are capital intensive activities and require high upfront investments without early financial returns, financial incentivization mechanisms may be needed. Commercial plantations offer a good opportunity for innovative public-private partnerships involving governments and private investors from within the Rainforest Nations and abroad.

2.3.3.3 Agricultural expansion into degraded, suitable and available land

A key means to alleviate pressure on forests would be to expand agriculture and plantations to under-utilized, non-forested land. Selected land should be degraded (already deforested), suitable (fertile or where fertility can be restored), and available (not in use and with clear land tenure). For this reason, the term Degraded, Suitable and Available (DSA) land is used. According to many estimates, there is sufficient DSA land to meet global demand for food, fuel and fibre.[27]

[27] Gallagher Review

FIGURE 14
The World Resources Institute is piloting a land-swap scheme in Indonesia to encourage palm oil companies to shift production away from forests.

FIGURE 14

POTICO project

The World Resource Institute is piloting the use of land-swaps in Indonesia to avoid deforestation with its Project POTICO (Palm Oil, Timber and Carbon Offset).

WRI is using satellite imagery and on the ground consultation with communities to identify lands where establishment of palm oil plantations is ecologically, economically and socially desirable. This includes clarifying land tenure and discovering whether local communities are amenable to the establishment of palm oil plantations.

POTICO targets companies which hold undeveloped palm oil concessions on forested land and aims to assist their relocation onto degraded, suitable and available land. Companies will then recover foregone income through revenue from certified palm oil, FSC-certified timber from the original concession, and carbon credits from voluntary markets.

The cost of establishing operations on cleared land can differ from establishment on forested land in two aspects: DSA land offers no revenue from felled timber and may require investment and time to improve soil quality. Grants or subsidized credit could be given to producers to cover the costs of rehabilitating land. The POTICO project in Indonesia shows how the private sector can be encouraged to relocate planned production from forest concessions to degraded, suitable and available land.

2.3.3.4 Improving and sustaining agricultural yields

Agricultural expansion into forested areas occurs because of growing domestic and global demand for food and fibre. Intensifying the use of existing agricultural land could meet this demand, while alleviating poverty, generating higher returns for producers and therefore reducing the pressure on forests. Recent research indicates that agricultural intensification outside the forests has far more economic potential than expansion within the forests.

The physical and economic potential for yield improvement and expansion onto cleared land varies between different crops and regions. Palm oil offers important scope for improvement: a recent study by WWF estimates that a 35% increase in yield could be achieved in Indonesian plantations, which would spare the establishment of 1.6 million hectares of new plantations.[28]

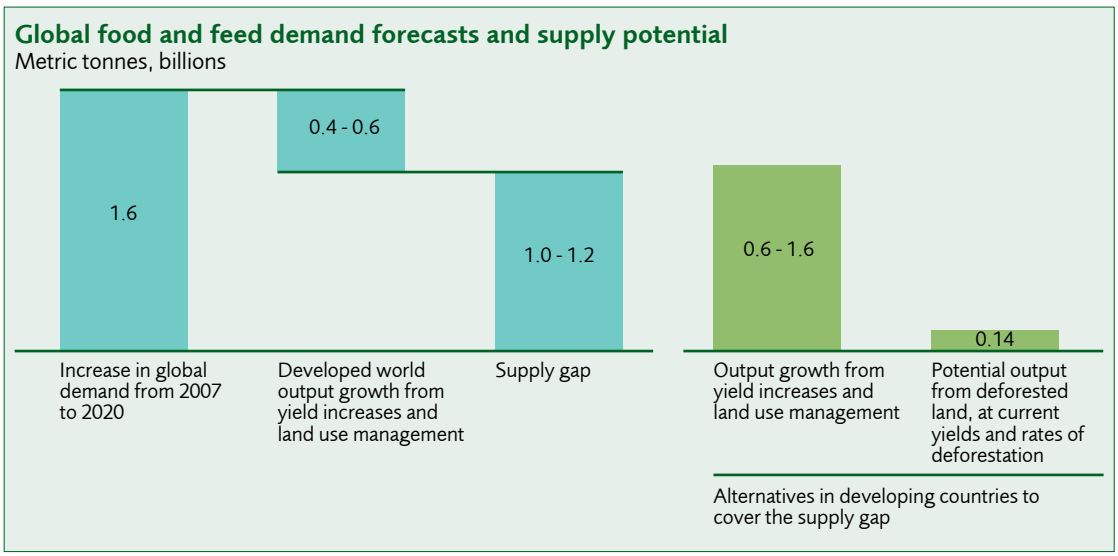
It is also important to ensure that land maintains its productivity. Land degradation leads to declining yields, which can force farmers to relocate production, putting pressure on forests. For example, in the Cerrado, where approximately 60% of Brazilian soy is grown, yields decline after only three to four years. Land degradation is also a major contributor to CO_2 emissions, due to oxidation of carbon in upper soil layers. Ensuring long-term productivity requires sustainable land management techniques. This can include intercropping, agroforestry, nutrient management, crop rotation, application of adequate fertilizer, planting of leguminous crops, reduced tillage, less-intensive cropping systems, reduced residue removal and improved irrigation practices.

Producers may lack the know-how, the technology, the access to inputs or the necessary capital to implement the sort of management practices that increase and sustain agricultural yields. Smallholders, in particular, can struggle to achieve potential yields for these reasons. Funding through the Emergency Package could be used to increase access to extension services, to provide targeted credit, to conduct research and to develop new technologies. Governments, financial institutions and agricultural intermediaries (such as commodity processors and traders) could all play a role in driving improvements in the use of land.

2.3.4 Payments for Ecosystem Services

Incentives to keep forests standing can be provided to landowners in the form of Payments

FIGURE 15
Global demand for food and feed is expected to grow strongly, and most of the increased supply will need to come from developing countries. Increasing the productivity of existing agricultural land has far more potential than expanding into relatively-infertile forested land.
Source: FAO; McKinsey & Company



[28] Fairhurst & McLaughlin, 'Sustainable oil palm development on degraded land in Kalimantan', WWF (2009)

Cattle driving, Para State, Brazil
Cattle ranching is one of the main drivers of deforestation in the Amazon. Alternative opportunities will need to be provided for local farmers.
© Greenpeace / Luciana Napchan

for Ecosystem Services (PES). A price for the bundle of ecosystem services provided per hectare of forest would be negotiated, reflecting both the value of these services and the level of incentive necessary to make forest conservation more attractive to landowners than deforestation.

Payments could be administered by national and local bodies, or financial institutions, which would need to identify eligible recipients and monitor delivery of services. PES could provide individual and communal landowners with an alternative to deforestation and enable them to invest received PES payments in other economic activities. PES could be applied not only to forest conservation but also to incentivize farmers to increase tree cover on their farms.

While a number of PES projects have been successful at avoiding deforestation and increasing agricultural productivity at a local scale, funds from the Emergency Package could allow for scaling up of PES schemes at national or regional levels, making incentives to avoid deforestation widely available.

2.3.5 General economic development

The best way to address the drivers of deforestation would be to provide alternative economic opportunities for the individuals, communities and enterprises currently clearing forests. The most attractive opportunities may have little to do with forestry or the alternative land uses that drive deforestation. Annual payments under the Emergency Package could be used to fund general development programmes that improve livelihoods and stimulate economic growth. This would help build political commitment in Rainforest Nations to a low-deforestation and low-carbon development path.

Funding could be used to stimulate new opportunities for private sector activity, both inside and outside the forest sector. For example, the commercialization of non-timber forest products including tropical fruits, plants for the cosmetic and pharmaceutical industries and ecotourism may provide income opportunities from standing forests. To facilitate the creation of small and medium-sized enterprises, governments may want to ease access to finance, encourage foreign corporations to partner with local businesses to build local capacity, as well as reduce administrative steps required to set up a business.

Investment in infrastructure projects, such as transport links and energy generation, can integrate previously marginalized segments of population into the economy. In the past, however, both roads and hydroelectric dams have led to increased deforestation. Hence their development would need to be carefully planned to optimize benefits and minimize damage. For example, in Brazil,

FIGURE 16

PES scheme in Costa Rica, Nicaragua and Colombia

A pilot Payments for Ecosystem Services scheme has allowed 450 farmers in Costa Rica, Nicaragua and Colombia to increase their income by planting trees rather than expanding their farms.

Payments averaging US$500 per year have enabled farmers to transform traditional cattle ranches to silvopastoral systems where cattle, trees, and forage are cultivated together. This has resulted in the sequestration of 20,000 tons of carbon over an area of 12,000 hectares. Other benefits of the PES scheme include increased biodiversity and water quality, soil retention and soil productivity, reduced use of non-organic fertilizer through planting of nitrogen-fixing legumes, risk mitigation through diversification, and last but not least increased productivity and profitability for farmers.

The project was funded by the Global Environmental Facility (GEF) with support from the World Bank. It is implemented by the Tropical Agricultural Research and Higher Education Center (CATIE) in Costa Rica, in collaboration with other institutes in Colombia and Nicaragua. This approach is now being replicated in Brazil, Argentina, Bolivia, Mexico and Panama.

FIGURE 16
An innovative Payments for Ecosystem Services scheme in Latin America is helping to increase the productivity of cattle ranches and enhance carbon sequestration.

FIGURE 17
Rainforest countries can capture more value from sustainably harvested timber by engaging in efficient value-added processing.
Source: PRP regional task force

FIGURE 17

LIBERIA TIMBER INDUSTRY: ECONOMIC RETURNS BY PRODUCT CATEGORY

	PRICE PER M^3 (US$)	ANNUAL GROSS YIELD PER HECTARE OF FOREST (US$)
Raw logs	250	150
Mill processing	400	240
Advanced processing	800	480

IDESAM has suggested replacing a planned highway linking Manaus and Porto Velho with a railroad, which would provide the mobility benefits for people and goods produced in the region without facilitating deforestation to the same extent. An economic feasibility study demonstrated that while a railroad would require a higher upfront investment, lower maintenance costs would make it an equally viable economic option.

Where natural resource extraction, including timber and minerals, provides an important source of revenue, the government could aim to add value in-country and increase efficiency to maximize returns while minimizing environmental cost. For example, promoting the establishment of efficient log processing facilities in-country could provide employment and allow the sale of a higher value end-product.

Last but not least, investments could be made in human capital. Improved access to education and health services would empower local populations to create and capitalize on new economic opportunities.

2.3.6 Achieving broader goals

Working together, Rainforest Nations and the international community can ensure that the funding provided through the Emergency Package achieves more than simply reducing deforestation. The Emergency Package could support four broader goals.

- **Poverty alleviation:** Much deforestation is driven by poverty and the lack of alternative livelihoods for those living in and around the forests. The investments made using funds from the Emergency Package would allow rainforest countries to develop economic opportunities for their people. In this way, the Emergency Package would contribute to poverty alleviation in the developing world, a key Millennium Development Goal.
- **Clean development:** Avoiding deforestation will by itself significantly reduce the carbon emissions of Rainforest Nations. But the investments under the Emergency Package could be designed to support energy efficiency, clean energy generation and other features of a low-carbon economy. For example, Guyana intends to use future rainforest payments to build a hydro-electric facility that would supply the entire country with electricity, replacing costly and dirty fossil fuel-based power plants.
- **Private sector catalyst:** Most of the funding provided through the Emergency Package would go into schemes to incentivize, finance and support the private sector in Rainforest Nations. Therefore, the package would act as a powerful tool to develop the local private sector. In addition, opportunities could be created for international investors and companies to engage in Rainforest Nations. For example, the development of commercial timber plantations or new infrastructure may require international private sector partners.
- **Economic stimulus:** In the current economic recession, payments to Rainforest Nations would act as a major stimulus to these local economies. The flow of funds may also serve to improve the fiscal position of rainforest governments, and the enabling environment in these countries, thus allowing them to raise additional finance more easily in private capital markets. The Emergency Package could provide an immediate stimulus to domestic and international demand and trade for these countries.

2.4 Transparent, Multi-stakeholder Disbursement Mechanisms in-country

Mechanisms would need to be created by Rainforest Nations to ensure that the funds provided through the Emergency Package would be used effectively and equitably. National governments would play a key role but a multi-stakeholder approach would also be needed.

The Emergency Package would respect the sovereignty of nation states. Because it would work on the basis of substantial, national-level deforestation targets, and national alternative economic development plans, it could only work with the full cooperation of Rainforest Nation governments. A national government would almost certainly be the 'counter-party' for each multi-year forest agreement.

Nonetheless, addressing the drivers of deforestation within rainforest countries will require the involvement of local communities, the private sector, indigenous peoples, NGOs and provincial/district governments. Part of the solution may lie in policies and initiatives taken by national governments; but many interventions would be best carried out by other entities. In general, funding and responsibility should be pushed down to local communities and local government as much as possible. This will help ensure that incentives reach the individuals and enterprises whose decisions have a direct impact on deforestation.

The implementation of the Emergency Package in Rainforest Nations, therefore, would require a multi-stakeholder approach. This would mean consulting all stakeholders with interests in the forest when designing an alternative economic development plan. It would involve using a multi-stakeholder oversight board or committee to decide on allocation of funding to projects and to monitor use of funds after payments were received from the Tropical Forests Facility. The implementation of projects and activities under the alternative development plan would then be delegated to a range of governmental and non-governmental entities within the country.

At the same time, the funds received by Rainforest Nations under the Emergency Package should be subject to high standards of transparency and governance. The use of funds should be audited and results made public. Safeguards and appeal processes should be created to ensure that the interests of indigenous peoples and other vulnerable groups are fairly represented. Safeguard procedures should also be included to ensure that environmental values are not undermined.

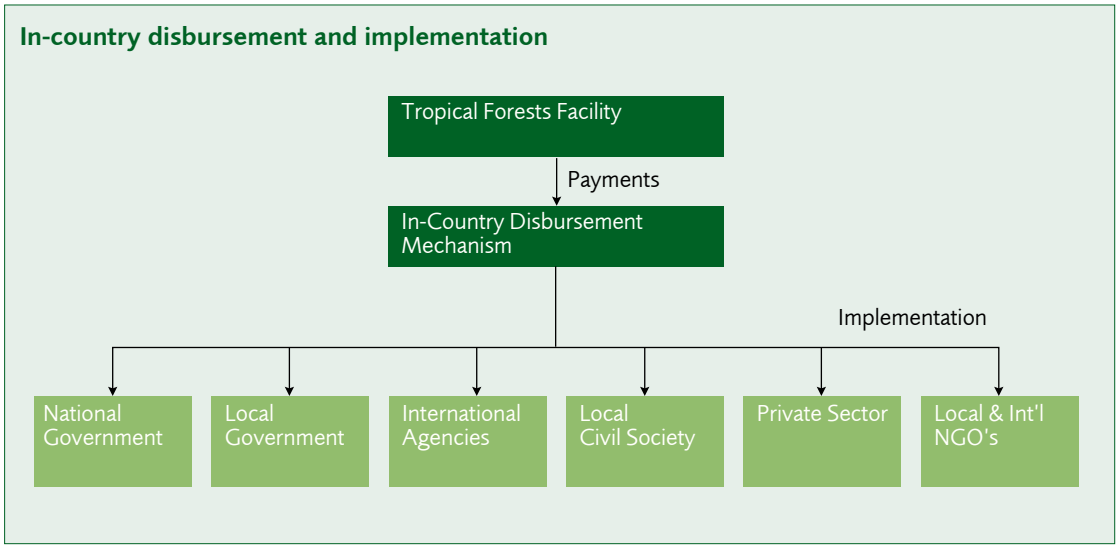
2.4.1 Possible models

The PRP studied a number of in-country disbursement mechanisms for large-scale development funds related to forestry, to the environment and to public health. There appeared to be four models widely used.

- Transferring funds directly to national government accounts (e.g. UNFCCC Adaptation Fund).
- Establishing special agencies or accounts in-country to handle funds (e.g. Brazil's Amazon Fund, USA's Millennium Challenge Accounts).
- Implementing projects through multi-lateral and bi-lateral aid structures such as the World Bank or UN agencies (e.g. Global Environment Facility, the Multilateral Fund for the Implementation of the Montreal Protocol).
- Disbursing funds directly to multiple recipients in-country including governments, NGOs and the private sector (e.g. Global Fund to Fight Aids TB and Malaria).

The PRP found great differences among countries in terms of the legal, policy and institutional frameworks for planning and managing forest land use. For example, many large rainforest countries are sub-divided into states or provinces, which often have the primary responsibility for forest management. In some countries, authority

FIGURE 18
Payments would be used to fund activities by a range of stakeholders.



Members of the Dani tribe, Papua, Indonesia.
In-country disbursement mechanisms would take into account the interests of indigenous people and other forest communities.
© Gabriel Eickhoff

over large areas of forests has been devolved to indigenous peoples. It is important that this diversity is reflected in the architecture of the national agreements that would be concluded under the Emergency Package. Provincial and state governments, and indigenous peoples, would be natural partners for implementing reduced deforestation initiatives in many countries.

It would be up to Rainforest Nations to design the implementation mechanisms that were best suited to local conditions. Countries vary in terms of institutional capacity, degree of centralization and governance. The Tropical Forests Facility would work with governments to design in-country disbursement mechanisms that meet a set of broad principles.

- Full transparency on use of funds.
- Effective governance mechanisms.
- Multi-stakeholder involvement.
- Clear environmental benefits.

FIGURE 19

Amazon Fund, Brazil

The Amazon Fund is an interesting example of the special agency/account model. Established by the Brazilian Government, it is governed by a board composed of representatives from the federal government, state government and civil society. All types of organization can submit proposals for projects – the money is allocated to those which will achieve the best results, thus encouraging innovation.

Funds are held in a special account in the state-owned Brazil Development Bank (BNDES). The Norwegian Government has committed US$1 billion to this fund for the period to 2015, tied to annual performance against forest delivery targets.

The Amazon Fund is part of a suite of national policies that has contributed to an impressive drop in deforestation in the Brazilian Amazon. The area deforested in 2008 (1.2 million hectares) was 60% lower than in 2004 and 40% lower than the average between 1996 and 2005.

Source: Brazilian Government

2.5 A 'Tropical Forests Facility' Focused on Results

The proposed Emergency Package is an innovative approach that would raise and deploy large amounts of funds in pursuit of ambitious goals. It would require new capacities at a global level. The right global institutional framework would have to be put in place to ensure that the proposal was implemented effectively. At the same time, there is an understandable reluctance to sanction the creation of a new organization, with all the cost, delay and bureaucracy that this can entail. This section sets out some of the principles that should govern the design of a global institutional framework, together with some organizational options. The PRP does not propose a specific solution; it recognizes that this will ultimately be decided by those nations that back the scheme, based on further research and consultation.

2.5.1 Functions

Before designing an institutional framework, it is important to define its functions and capabilities. Under the PRP's proposal, the following activities would need to be carried out (although not necessarily by a single agency). A global institutional framework would need to.

- **Negotiate:** Agree multi-year deals with RFNs based on the costs of switching to an alternative economic development path.
- **Finance:** Raise necessary funding from public and private sources.
- **Monitor:** Verify country performance against deforestation targets, as well as governance/ transparency standards.
- **Disburse:** Transfer money to Rainforest Nations based on agreements and results achieved.
- **Build capacity:** Coordinate and/or fund assistance to Rainforest Nations for development planning, monitoring systems, technical forestry issues, etc.

FIGURE 20

Monitoring – the possible role of the Tropical Forests Facility

The Food and Agricultural Organisation (FAO) is the UN agency responsible for forest monitoring, and it has been collecting the official forest data from Rainforest Nations every five years for over 60 years. The quality of official country data varies, so in its new Global Forest Resources Assessment (FRA 2010), the FAO intends to include a remote sensing component to overcome some of the limitations posed by relying on official numbers. But these assessments will only be conducted every five years and therefore could not support an annual performance system.

In order to verify accurately national forest monitoring programmes, an independent global dataset of forest area change information would be required on an annual basis. There are several scientific and research organizations that have already made one-off global assessments of forest area. These include The Woods Hole Research Centre, South Dakota State University, the European Joint Research Centre and the World Resources Institute. At a regional level, the Brazilian Institute for Space Research (INPE) conducts detailed analysis of the Amazon basin.

Global scientific efforts could be linked together by the Tropical Forests Facility to form a networked and coordinated global monitoring system, which would be less detailed than national systems but provide independent verification of the national data. Global, or a network of regional, assessments by each of these organizations could be compared with the five-yearly datasets collected by the FAO.

A technical board, encompassing a key member from each of the scientific organizations, could be funded by the Tropical Forests Facility to perform the global monitoring and verification function. Multiple datasets would be beneficial to the verification process. Other functions that could fall under the remit of the Tropical Forests Facility might include the development of standards and criteria for forest area change monitoring, capacity-building in Rainforest Nations and data archiving.

Source: PRP analysis

In addition, there would need to be appropriate governance mechanisms to make decisions on the overall strategy of the Emergency Package. This is likely to be achieved through a multi-stakeholder Board, with representatives from Rainforest Nations, donor countries, civil society, local communities and multi-lateral agencies.

2.5.2 Design principles

When designing an appropriate global institutional framework, the PRP believes that the following objectives or design principles should be kept in mind.

- **Effectiveness:** The primary aim is to achieve results in the form of significantly reduced deforestation. The institution must have the authority, the focus and the capabilities to deliver this outcome.
- **Cost efficiency:** A global mechanism should achieve the desired results at the lowest possible cost. It should be an efficient delivery mechanism.
- **Speed:** Results must be achieved quickly – i.e. in the next three years, not 10 years. Bureaucratic inertia must be avoided .
- **Equity:** The benefits of this scheme should be fairly distributed between Rainforest Nations and between stakeholders in the recipient countries. Decisions should be based on objective criteria and not be politicized.
- **Transition:** The goal of the Emergency Package is to transition to a long-term forest carbon mechanism to be agreed under the UNFCCC. Any global institutional capacity created will be temporary in nature and should be designed to facilitate this transition. Certain elements could be taken over and used for the implementation of a UNFCCC mechanism.

The PRP recommends that any global institutional framework should make maximum use of existing agencies and processes. For example, an institution such as the World Bank, acting as treasurer or trustee, could handle many of the financing and disbursement functions. For monitoring, a group of academic institutions, NGOs and UN agencies are already active in developing global forest verification systems – all that may be required is for a central body to coordinate and fund this activity.

Another function that could be 'outsourced' may be capacity-building in Rainforest Nations. Two existing World Bank programmes – the Forest Carbon Partnership Facility and the Forest Investment Programme – are heavily engaged in preparing countries for REDD. A number of bi-lateral donor agencies are also working to build monitoring, enforcement and other capacities in tropical countries. Collaboration with these existing programmes would help countries prepare for the Emergency Package and ensure coordination of potentially overlapping efforts.

Nonetheless, not everything could be outsourced. Some sort of core agency or institutional capacity would be needed that was, at a minimum, responsible for negotiating agreements with Rainforest Nations, assessing performance against targets, ensuring that funds are disbursed, and handling appeals and complaints. Even if other functions (such as fund-raising, treasury and forest monitoring) were outsourced, there would still need to be a single entity to manage this outsourcing. This agency would have final responsibility for delivering results and would answer to the international community. For simplicity, the PRP calls this new institutional capacity the 'Tropical Forests Facility'.

2.5.3 Global architecture

There are a number of different ways in which the Tropical Forests Facility could be established. The PRP has analyzed case studies and consulted with governments to identify three models that appear feasible.

- Housing the facility in an existing institution such as the World Bank.
- Creating a new multi-lateral agency.
- Establishing the facility as a new foundation or charity.

Each of these models has been used for previous development-oriented initiatives.

Para State, Brazil. Eucalyptus plantation on land cleared from the Amazon rainforest.
© Daniel Beltrá / Greenpeace

2.5.3.1 Existing institution (e.g. the World Bank)

The Emergency Package could be set up as a Trust Fund under the auspices of the World Bank. The Bank would provide secretariat and treasury functions, under the supervision of a multi-stakeholder board. This model is similar to the Strategic Climate Funds announced in 2008 and the Forest Carbon Partnership Facility that is helping countries prepare for REDD.

The advantages of this approach are that it would make use of an existing structure which is already active in almost all Rainforest Nations; this may provide some speed and reduce costs during set-up. The drawback is that the Tropical Forests Facility might be constrained by World Bank procedures, which may slow implementation.

In addition, the governments of some Rainforest Nations may prefer to keep the Emergency Package outside the traditional aid system.

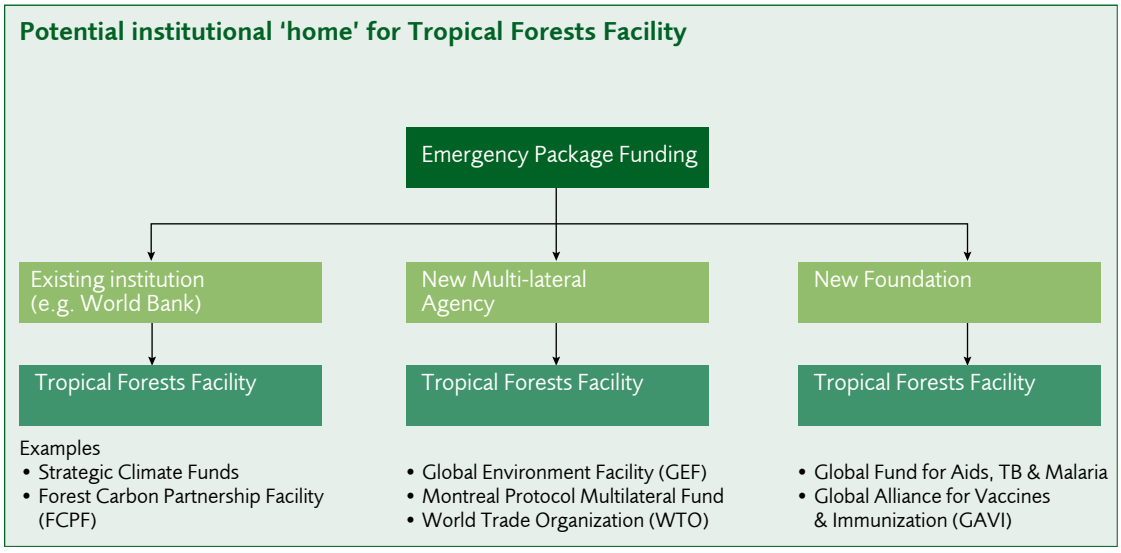
2.5.3.2 New multi-lateral agency

The Tropical Forests Facility could be created as a multi-lateral agency under a new agreement on deforestation. This may not need to include all countries, but could take the form of an agreement between developed countries and key Rainforest Nations. The Tropical Forests Facility would have the flexibility to develop its own procedures, but would also have the credibility that comes with being a multi-lateral agency. It could also outsource certain treasury and trustee functions to the World Bank if necessary.

One example of this model is the Multilateral Fund for the Implementation of the Montreal Protocol. Since 1990, it has provided US$2.4 billion in funds to help developing countries comply with their obligations under the Protocol to phase out the use of ozone-depleting substances. It was set up on the basis of an agreement signed by 194 Parties, with funding provided by 49 industrialized countries. It is governed by an Executive Committee comprising equal numbers from industrialized and non-industrialized nations, and run by a Secretariat of approximately 30 staff based in Montreal. It transfers funds to the World Bank, UNDP, UNIDO and UNEP, which then implement projects.

The advantages of this approach are that it would provide flexibility to design the Tropical Forests Facility's functions and procedures in a way that would best deliver results. It would also provide credibility to the new agency, which may help it engage with other development institutions and raise finance from capital markets (for example, through bonds). The disadvantages are that creating a new multi-lateral agency may require a more formal agreement between large numbers of countries. It may as a result take considerable time to establish the organization, to staff it and to raise funding. There may also be concerns about the agency evolving into a large, costly, permanent bureaucracy.

FIGURE 21
There are three ways that a new Tropical Forests Facility could be established.



2.5.3.3 New foundation

The Tropical Forests Facility could be established as an independent foundation or charity, although with strong backing from governments. It could take on certain functions and outsource others to multi-lateral agencies such as the World Bank.

This would be similar to recent, innovative structures created for global public health. For example, The Global Fund to Fight Aids, TB and Malaria was created in 2002 to channel increased funding to health projects in developing countries, especially in Africa. It is a Swiss foundation, headquartered in Geneva. It has raised US$12.4 billion in funding, 95% of it from donor governments such as the USA, EU countries and Japan. Its Board is composed of representatives from donor and recipient governments, civil society, the private sector, private foundations, and communities living with and affected by the diseases. It does not implement projects itself, but transfers money to Principal Recipients in developing countries (often governments, but also NGOs and UN agencies) according to pre-approved plans. Another example of a charity or foundation structure is the Global Alliance for Vaccines and Immunization, or GAVI, which has raised money from bond markets through an International Financing Facility for Immunization (IFFIm).

The advantage of this model is that it would provide the greatest flexibility to design the Tropical Forests Facility's functions and procedures, especially with regard to its Board, which could be drawn from a wide range of stakeholders, including civil society and the private sector. It would be free to disburse funds to many types of implementing partners and could raise financing through bond issues if necessary. It would also be clearly signalled as a temporary, interim institution. On the other hand, it would require a new institution to be created, which could cause delays, and a foundation may find it more difficult to integrate with other programmes, as it would not be a member of the multi-lateral 'family'.

2.5.4 Further analysis

The PRP believes that establishing a new foundation, with the backing of a group of committed governments, may be the best way to create the necessary capacity to implement the Emergency Package quickly and cheaply. The other solutions described above could also work, but each appears to have greater disadvantages. Ultimately, the decision on the global institutional framework would be taken by developed country governments and Rainforest Nation governments when they decide to support the Emergency Package.

2.6 Developed Country Financing from Public and Private Sources

The Emergency Package for tropical forests outlined in this document would require significant finance. Developed countries would have to take responsibility for providing this funding because they will benefit most from the carbon abatement and other ecosystem services associated with reduced tropical deforestation. There are a number of ways in which this could be achieved.

2.6.1 Amount of financing required

As referred to earlier in this report, global studies indicate that the costs of reducing tropical deforestation by 50% or more could be US$10-15 billion. These studies typically include the opportunity costs associated with foregone profits from deforesting, along with the capacity-building, monitoring and other transactions costs that a Rainforest Nation would incur when tackling the drivers of deforestation.

In addition, there would be some extra costs associated with the Emergency Package. The Tropical Forests Facility would require operational funding (although, because it will be a light, temporary structure, this amount should be relatively low). A global verification system for forests, using remote sensing technology, may need funding: experts estimate that this may cost US$10-30 million per year.[29] Finally, Rainforest Nations may need some additional capacity-building support to get them to the point where they are ready to engage with the Tropical Forests Facility and negotiate a multi-year agreement. For example, the Eliasch Review estimated that it could require US$4 billion spread over five years to build the capacities of 40 nations to participate in a global forest carbon scheme.[30] This may need to be funded by the Emergency Package, although it is also possible that this could be covered by existing donor-funded capacity-building programmes.

The exact amount needed for the Emergency Package would be determined by the number of Rainforest Nations that participate, their bottom-up analyzes of the costs of shifting to alternative economic development paths, and, ultimately, the agreements negotiated with the Tropical Forests Facility. Because the approach advocated here takes into account the value to Rainforest Nations of the local ecosystem services provided by forests, and focuses on the costs of switching to alternative economic development paths rather than simply calculating the profits that would have derived from deforestation, it is hoped that the financing needs would be at the lower end of the US$10-15 billion per year range indicated by

[29] PRP research
[30] Eliasch Review, Ch.5

global studies. To put this in context, total Official Development Assistance (ODA) in 2007 was US$104 billion.

A final point is that the same amount would not be required each year throughout the life of the Emergency Package. Rainforest Nations would enter the scheme over two or three years, as not all would be ready to participate immediately. Payments to Rainforest Nations would increase over time, as the net opportunity cost calculation was applied to larger and larger areas of avoided deforestation each year. Therefore, the funding requirements would start small and reach a peak after a few years. By this time, it is hoped that funds would start to flow to Rainforest Nations under a UNFCCC forest carbon mechanism such as REDD. Payments under the Emergency Package would start to drop once REDD payments began.

Buildings submerged in a flood, Arizona, USA
Reducing tropical deforestation will benefit all countries that are at risk from climate change.
© *Peter Essick / Getty Images*

2.6.2 Possible sources of finance

Under the proposed Emergency Package, payments to Rainforest Nations would not generate any financial returns for the Tropical Forests Facility or the entities that fund it. These transfers would be payments for the ecosystem services of the forests, not loans that need to be repaid by the recipient countries. Any economic surpluses that derive from investments made using these payments – for example, from sustainably managing forests, increasing agricultural productivity or building new infrastructure – would rightly remain within the Rainforest Nations.

The entire international community should pay for the carbon abatement and other ecosystem services that rainforests provide. In practice, the developed, industrialized nations may have to take on most of the burden because they will benefit disproportionately from the rapid carbon abatement that this scheme will produce. If no action is taken on tropical deforestation, industrialized nations will have to take on even deeper cuts in the future for the world to have any chance of stabilizing atmospheric carbon and averting the impacts of catastrophic climate change. Indeed, without urgent action on tropical deforestation it is difficult to see how this goal can be achieved.

Four options have been suggested for generating the necessary funding for the Emergency Package.

- Funding from existing forest/climate change initiatives.
- Global levies or taxes.
- Direct transfers from developed country governments.
- Private sector investment through a Rainforest Bond.

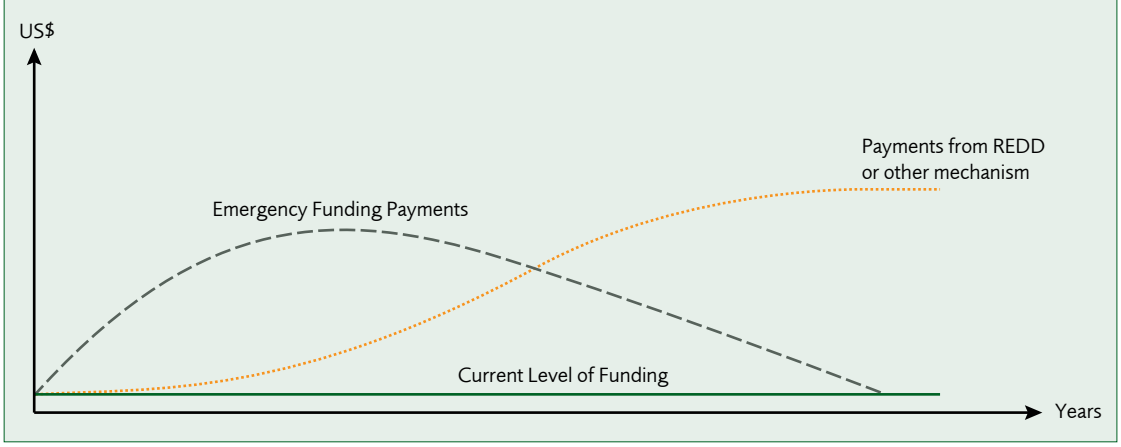
2.6.2.1 Existing climate/forest initiatives

It is estimated that US$540m to US$850m is already being provided to developing nations for tropical forestry each year through Official Development Assistance (although not all of this is used to address deforestation).[31] In addition, a number of programmes for climate change adaptation and mitigation in developing countries have been set up or are planned, some of which include financing for forests. (These initiatives have already been described in section 1.5.2.)

It may be possible for the Tropical Forests Facility to partner with these programmes to share the financing burden. For example, programmes

FIGURE 22
Funding needs will increase as more Rainforest Nations participate in the Emergency Package and decrease once payments begin to flow from REDD or other UNFCC mechanisms.

Trajectory of emergency funding payments and potential REDD payments



[31] PRP analysis

such as the Forest Carbon Partnership Facility and Forest Investment Programme could focus on capacity-building in Rainforest Nations while the Tropical Forests Facility funds the annual performance-related payments. Funding may also be available from existing bi-lateral programmes to help finance the service payments to Rainforest Nations. This sort of cooperation could reduce the financing needs of the Tropical Forests Facility by US$500m to US$1 billion in the first five years of its operations.

There is a strong argument for close integration between existing rainforest programmes and the Emergency Package, as this will provide a single, coordinated interface with Rainforest Nations. However, on their own, existing forest initiatives will be much too small to meet the total funding needs. Therefore, other approaches will be necessary to raise the required resources.

2.6.2.2 Global or regional levies

Global or regional levies to raise financing for climate change adaptation and mitigation, including tropical forests, have been suggested. One example of this type of measure is the air ticket solidarity levy, which raises money for HIV/AIDS treatment in developing countries. Since 2004, eight countries have implemented it. Other ideas include a proposed tax on all currency trades (known as the Tobin Tax), a proposed levy on aviation and maritime fuel, and suggestions to raise revenues from the global trade in commodities, especially those driving deforestation.

In theory, these sorts of schemes could raise large amounts. However, they may be legally and practically impossible to agree and enforce at present on a global scale. Therefore, it may be unwise to rely on them as a source of funding for the Emergency Package.

2.6.2.3 Direct transfers from governments

The Tropical Forests Facility could obtain long-term annual funding commitments from developed country governments, according to the size of their economies. It would then be up to each government to decide how to finance its commitments. Governments could simply fund the Tropical Forests Facility out of general revenues, similar to annual Official Development Assistance. Or they could use more innovative mechanisms to raise extra revenues from specific domestic sectors and link this to rainforest protection. Schemes that have been suggested to the PRP include the following.

- Auctioning permits as part of carbon trading systems, or taxing carbon emissions. For example, the Lieberman-Warner bill proposed that 2.5% of the proceedings from auctioning emission allowances in the USA should go to international forest mitigation. At an auction price of €30 per ton this could generate €10 billion – €15 billion per year by 2020.[32] The European Commission has explored raising proceeds for reducing deforestation from allowance auctions carried out under the EU Emission Trading Scheme (ETS).
- Placing a levy on catastrophe risk premiums in the insurance sector.
- Taxing domestic commodity markets, traders or importers, especially non-certified products that are helping to drive deforestation.
- Other hypothecation of taxes – e.g. on petrol or financial transactions.

Relying on developed country governments to provide annual funding has the benefit of being simple, and it gives national governments the flexibility to choose the most appropriate way to raise finance in their own countries. On the other hand, governments may be reluctant to take on long-term commitments in a time of economic difficulty and rising government deficits, especially as it may take time to generate revenues from national carbon markets or other climate change related schemes.

FIGURE 23

Suggested levy on catastrophe element of insurance premiums

In order to raise finance for the Emergency Package, policymakers may choose to impose levies on various industries. They may do this either because the industries are emitters of greenhouse gases (for example the aviation or power sectors), or they may pick those which would especially benefit from a reduction in pollution.

The insurance industry insures properties around the world against catastrophic losses arising from weather-related natural catastrophes. In the longer term, future generations of its policyholders will benefit from the mitigation of climate change, as this will restrict the growth in their premiums, or, in extremis, keep some locations insurable.

The frequency of catastrophes has been growing recently, and the severity of financial losses has been accelerating, which leads to increases in premiums as insurers react to cover their costs. Part of this trend is due to increases in property and contents values in exposed areas and also due to a migration to coastal locations. Nevertheless, if these factors are removed, there remains an upward trend in losses which is running at around 2% p.a. since the 1970s.

Many insurers believe that climate change will cause weather-related catastrophes to become more extreme in the future. Therefore, it may be appropriate to apply a levy to the catastrophe element of premiums to help slow this trend by reducing carbon emissions from rainforests. Due to competition issues, it is likely this would only happen if mandated by policymakers.

Research carried out for the PRP suggests that a fair levy would be around 4.5% of the relevant premium, leading to a contribution of US$3.3 billion to the Emergency Package each year. It would also be possible to spread a much smaller levy across all policyholders to generate the same level of contribution.

[32] McKinsey & Company analysis

2.6.2.4 Private sector bonds

Whatever shortfall remains from the other sources of finance could be met by issuing 'Rainforest Bonds', AAA-rated fixed income products issued with the help of an International Finance Institution such as the World Bank and guaranteed by developed country governments. Through consultations with the pension fund and insurance sectors, the PRP has discovered that there could be a large appetite for these types of bonds among investors. They offer a way to raise substantial amounts of capital in the near-term, while spreading the repayments over a longer period. This approach is one of the core innovations of the PRP proposal, and it is dealt with in greater detail in the next section.

2.6.3 Conclusions

The Emergency Package should tie in with existing forest initiatives wherever possible. Some of the tasks of the Tropical Forests Facility, especially related to capacity-building, could be shared with other programmes; existing initiatives may also choose to channel some of their funds to the Emergency Package. However, this leaves a large funding gap for which developed country governments would have to take responsibility. The way in which this is done will be a matter for negotiation between these governments and Rainforest Nations. Developed countries may adopt different approaches, depending on their domestic situation. Some countries may be prepared to commit to annual ODA-type transfers to fund the Emergency Package. Other countries may wish to use private capital markets by supporting the issue of Rainforest Bonds. All these options should be explored by policymakers as the Emergency Package and Tropical Forests Facility are developed further.

2.7 'Rainforest Bonds' Issued in Private Capital Markets

It is the PRP's contention that private capital markets could provide an important source of financing for the Emergency Package. Fixed income securities – 'Rainforest Bonds' – could be issued in one or more currencies with the backing of developed country governments and international institutions such as the World Bank. Such bonds typically offer investors a fixed rate of return, normally an annual coupon, together with the repayment of the principal on maturity. Developed country governments would have to guarantee the payment of coupons and the repayment of principal, but it may be possible to reduce the liabilities of these governments by linking the bonds to separate, but related, sources of revenue. Extensive consultations with pension funds, the insurance sector and the World Bank indicate that there is an opportunity to create an innovative public-private financing partnership that would benefit both governments and investors, while providing immediate large-scale funding for the conservation of tropical forests.

2.7.1 Bond design

There are many ways in which a Rainforest Bond could be designed. Four key elements need to be taken into account; credit risk, term or maturity, repayment schedule, and yield versus similar securities.

2.7.1.1 Credit risk

A Rainforest Bond would need to obtain the highest credit risk rating (AAA) from major credit rating agencies in order to access large pools of institutional investment capital. Institutions such as the World Bank and the IFC carry AAA-ratings, as do most developed country governments. A bond backed by such parties would therefore earn a similar rating.

2.7.1.2 Term

Bonds are issued with anything from one-year to 40-year maturities. A Rainforest Bond would probably use a term of 10 or more years, because of the financing needs of the Emergency Package and the likely demand from institutional investors.

2.7.1.3 Repayment schedule

Most bonds offer a fixed annual interest payment, or coupon, to investors: over the past five years, 99% of AAA-rated bond issues offered a coupon. Although much less common, it is also possible to issue a 'zero coupon' bond, which does not make annual payments – instead the principal plus interest is paid out at maturity.[33] Another option is an amortizing bond, which repays a portion of the principal together with the coupon each year.

[33] Source: SDC database

The effect of these different options is to change the schedule of liabilities of the bond issuer. An amortizing bond involves relatively large, equal payments each year over the term of the bond. A coupon bond requires small, annual interest payments until the time of maturity, when the full principal will be due. Zero coupon bonds shift all the liabilities back to the time of maturity.

A Rainforest Bond could be designed to generate the type of repayment schedules that are most attractive to investors and to the governments backing it. In practice, the burden of interest payments can be shifted across time by issuing multiple bonds and paying coupons out of a sinking fund.

Trading floor of New York Stock Exchange
Private capital markets could be a source of finance for the Emergency Package.
© Frances Roberts / Alamy

2.7.1.4 Yield

A Rainforest Bond would need to offer investors a yield that is competitive to other AAA-rated fixed income securities. This will typically be expressed as a 'spread' over securities issued by sovereign entities, for example the US Treasury or HM Treasury in the UK.

Recent bond issues by multi-lateral institutions can give some indication of spreads. For example, in 2006 the International Finance Facility for Immunization (IFFIm) sold a US$1 billion bond (rated AAA) with an annual yield of 5.019%, 31 basis points above the benchmark five-year US Treasury bond. In 2007 the World Bank issued a €1.5 billion three-year bond that had a yield of 4.25%, five basis points above the underlying government benchmark.

Recent market turmoil has tended to increase the spread of World Bank and other supra-national bonds over government securities. The exact pricing of a Rainforest Bond could only be determined close to the issue date. Because of its innovative nature, a Rainforest Bond would probably have to offer some sort of spread above government securities, but it is hoped that this financing 'cost' can be minimized.

2.7.2 Likely market demand

The PRP has held extensive discussions with pension funds and the insurance industry through The Prince of Wales' P8 and ClimateWise initiatives respectively. The feedback from these consultations is that there would be substantial demand from institutional investors for long-dated, AAA-rated fixed income bonds, offering a small spread over government securities. These sorts of stable, secure investments would provide a good match for their long-term liabilities. Other potential purchasers include Central Banks, which are active in the market for supranational bonds. There may also be an opportunity to offer a retail product to individual investors, who could be attracted by the stable, competitive returns together with the ethical aspect of helping to combat climate change and biodiversity loss.

Bond markets represent enormous pools of liquidity. For example, governments and government-backed entities issued over US$3 trillion in bonds in 2008. A Rainforest Bond would fit naturally into the sub-category of Sovereign, Supranational and Agency Bonds. This classification includes bonds issued by government treasuries in foreign currencies, by multi-lateral agencies such as the World Bank or the European Investment Bank, and by specialist government agencies such as development banks or national infrastructure providers. In Euros and US dollars alone, this market was over US$400 billion in 2008; it has averaged over US$300 billion each year since 2004. Therefore, the issue of US$10 billion or more of Rainforest Bonds each year would be easily digested by the markets.

2.7.3 Possible issuing agencies

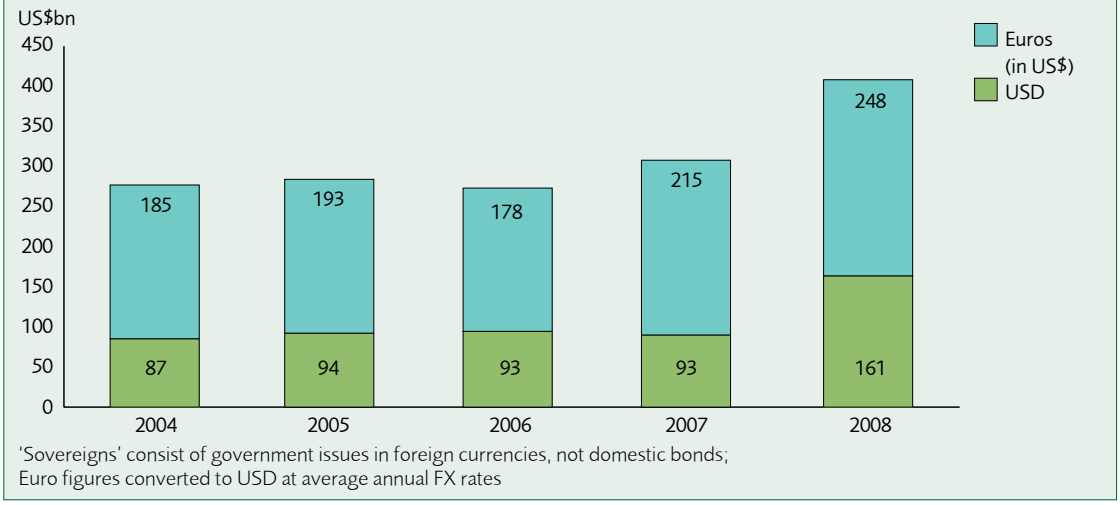
Although multiple governments may guarantee the repayments of a Rainforest Bond, the bond would need to be issued by a single agency. Either the World Bank or the Tropical Forests Facility itself could do this. Both approaches have precedents.

2.7.3.1 World Bank as issuer

The World Bank could issue the bonds using its balance sheet and its existing AAA-rating. Under this model, developed country governments would enter into special commitments with the World Bank to transfer funds over a multi-year period to cover the Bond repayments. If any of the governments did not honour their commitments, the World Bank would be liable to make up any shortfall in the bond repayments. But this would be a small risk and therefore manageable.

The advantage of this model is that the Bond could use the existing structures and risk-rating of the World Bank; it therefore should be quicker to issue and should benefit from the relatively low pricing of World Bank bonds. On the other hand, the use of funds would have to follow the rules and procedures of the World Bank. Depending on the institutional framework chosen for the Tropical Forests Facility, this could constrain the implementation of the Emergency Package.

FIGURE 24
Bond markets represent huge pools of capital. In 2008, over US$400 billion of Sovereign, Supranational and Agency Bonds were issued. This is the market segment that a Rainforest Bond would target.
Source: Euromoney Bondware



2.7.3.2 Tropical Forests Facility as issuer

It would be possible for the Tropical Forests Facility to issue bonds itself, through some sort of Special Purpose Vehicle. This vehicle would need to have legally binding commitments from developed country governments for the repayment of the bonds. The World Bank could act as adviser and treasurer to the bond issue and could help to distribute the Bond in the market, but the Bond would not be backed by the World Bank and would not be priced at World Bank risk. It would probably be priced against the credit ratings of the governments committing to the repayments, with a premium because of the novelty of the institution and the approach. This is similar to the model used by the Global Alliance on Vaccines and Immunization (GAVI) when it raised over US$1 billion by issuing bonds through the International Financing Facility for Immunization (IFFIm).

FIGURE 25

The International Financing Facility for Immunization (IFFIm)

The International Finance Facility for Immunisation (IFFIm) was created as a funding vehicle for the Global Alliance on Vaccines and Immunization (GAVI). It is a UK-registered charity whose sole assets are legally binding payments obligations from sovereign donors.

The IFFIm was launched in 2006 following an initiative of the United Kingdom Government and is also supported by France, Italy, Spain, Sweden, Norway and South Africa. Together, these countries have pledged to contribute US$5.3 billion over 20 years. This strong financial base enabled IFFIm to gain an AAA-rating from the three major rating agencies. For the European donors, the European Statistical Agency has ruled that pledges to the IFFIm will not be classified as government debt, so the obligation is off-budget.

The IFFIm's first US$1 billion bond was sold on November 7, 2006 with an annual yield of 5.019% (31 basis points above the benchmark five-year US Treasury bond). The IFFIm expects to issue such bonds to finance a total of US$4 billion in disbursement over the next 10 years, using pledges as collateral.

The advantage of this approach is that it gives flexibility in how funds are raised and used. It would be particularly useful if it was decided to establish the Tropical Forests Facility as an independent foundation or multi-lateral agency, outside the World Bank structure. On the other hand, this may be a more expensive way of raising funds because the issuing entity would be new and would have a weaker balance sheet. It may also take time to set the vehicle up and satisfy regulatory requirements.

The decision on which option to use will depend on the institutional arrangements of the proposed Tropical Forests Facility and how market attitudes are likely to affect the pricing of a bond. Analysis will also be required of the upfront costs of issuing the bond and the ongoing costs related to treasury management and auditing under alternative approaches.

2.7.4 Role of governments

In order to achieve an AAA-rating, the payment of the interest and repayment of the principal of a Rainforest Bond will need to be guaranteed by the governments of developed nations. This will be the case even if the World Bank is the issuer; the Bank is unlikely to be able to finance the repayments from its normal operations and will therefore need additional capital commitments.

It should be possible for governments to treat these commitments as annual ODA-type payments, rather than additions to national debt. Special arrangements were made by the International Financing Facility for Immunization (IFFIm) to ensure that participating governments could account for their obligations in this way. The European Commission, when developing a similar Global Climate Financing Mechanism, concluded that this would be the case under the rules of the OECD's Development Assistance Committee (DAC).[34]

[34] EC, 'Towards a comprehensive climate change agreement in Copenhagen' (Jan 2009), Annex 23

Man-made fires, Amazon, Brazil
Fires are set to clear land for cattle or crops.
© Daniel Beltrá / Greenpeace

The size and schedule of the liabilities undertaken by developed country governments will depend on a number of factors. The most important is the amount and timing of the bonds issued. This will depend on the rate at which Rainforest Nations participate, the size of the payments negotiated as part of multi-year agreements, the availability of other sources of funding for the Emergency Package, and the speed at which alternative funds start to flow under a UNFCCC forest carbon mechanism. The other main determinant will be the design of the bonds, specifically, the number of years to maturity, whether there is a coupon or no coupon, when principal is repaid, and the overall yield or pricing.

Figure 25 shows a potential repayment schedule on US$74 billion of Rainforest Bonds issued over a 10-year period. The size of bond issues increases over the first five years as Rainforest Nations sign up to agreements and payments rise; bond issues then decrease as funds start to flow to the countries under a UNFCCC forest carbon mechanism. The analysis assumes that the bonds have a 15-year maturity and a 5% yield. The different repayment schedules are shown on an annual coupon, zero coupon and amortizing basis.

2.7.5 Options for reducing liabilities

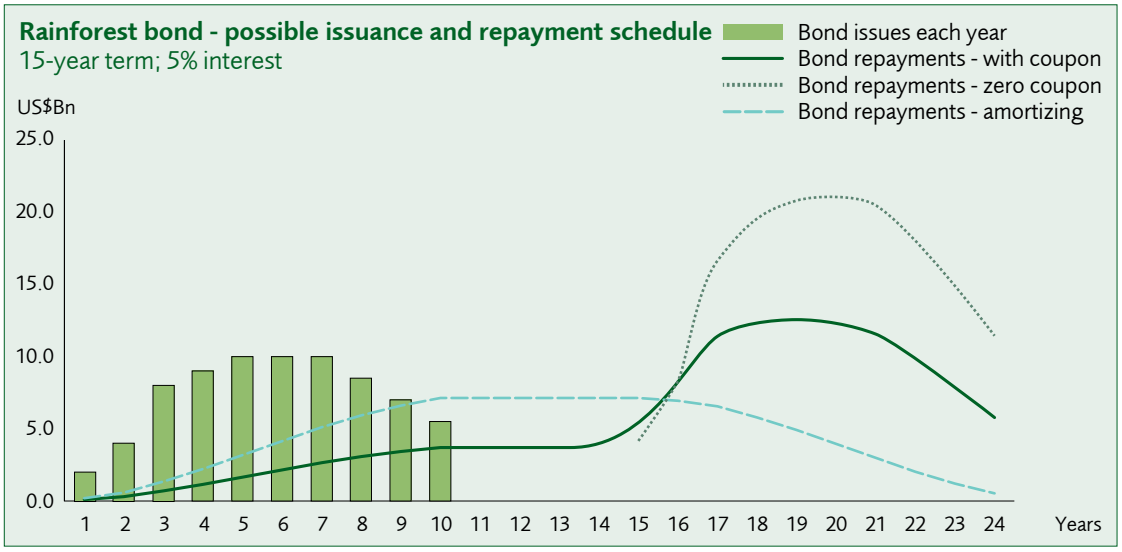
Governments will need to underwrite the Rainforest Bond in order for it to achieve the necessary credit rating and therefore attract large-scale investment. However, the PRP is exploring ways in which revenues could be generated to reduce, or possibly remove, the liabilities of the underwriting governments. Two proposals have been put forward. The first relates to future REDD payments and the second to broader investment in clean development.

2.7.5.1 Sharing REDD payments

It may be possible for governments that fund the Emergency Package, acting through the Tropical Forests Facility, to negotiate a sharing of future REDD payments with Rainforest Nations. This could provide revenue streams in later years that could go toward repaying the Rainforest Bonds.

Clearly, developed country governments can have no general claim on the REDD revenues of developing countries (especially as REDD is likely to be funded by emissions offsets from these same developed countries). Countries that underwrite the Emergency Package would only have a legitimate claim to any additional

FIGURE 26
This analysis shows the potential repayment schedule on a series of Rainforest Bonds, issued in different quantities over a 10-year period, either with coupons, with no coupons or as amortizing instruments. It assumes a maturity of 15 years and a 5% yield.



Red and green Macaw (Ara chloropterus), Cristalino State Park, Mato Grosso, Brazil
© Daniel Beltrá / Greenpeace

REDD revenues that accrue to a Rainforest Nation because of the assistance they have received through the Emergency Package. For example, a Rainforest Nation may be able to receive REDD revenues sooner than would otherwise have been the case because the Emergency Package has allowed it to put in place REDD-readiness measures (monitoring systems, reference levels, etc); or a Rainforest Nation may receive larger REDD payments in the future because the Emergency Package has allowed it to preserve a much larger forest area than would have been the case.

Although logically this idea has some merit, in practice it may be impossible to negotiate REDD-sharing agreements with Rainforest Nations. There is no clear view about what a future UNFCCC forest carbon mechanism will look like or when it will come into effect. It will therefore be difficult to assess in the short-term the extent to which a Rainforest Nation would benefit, in terms of REDD revenues, by participating in the Emergency Package. It is unlikely that Rainforest Nations would commit to share a future revenue stream, the nature of which is so uncertain.

2.7.5.2 Creating a 'sister' Green Investment Fund

Another option would be to link the rainforest payments to a 'sister' Green Investment Fund that makes investments in clean development projects and generates sufficient financial return to cover its own capital costs and to contribute towards the principal and interest costs of the rainforest payments. This would not only offer a way to reduce, or possibly eliminate, the liabilities of developed country governments; it would also help deliver broader climate change mitigation and technology transfer goals.

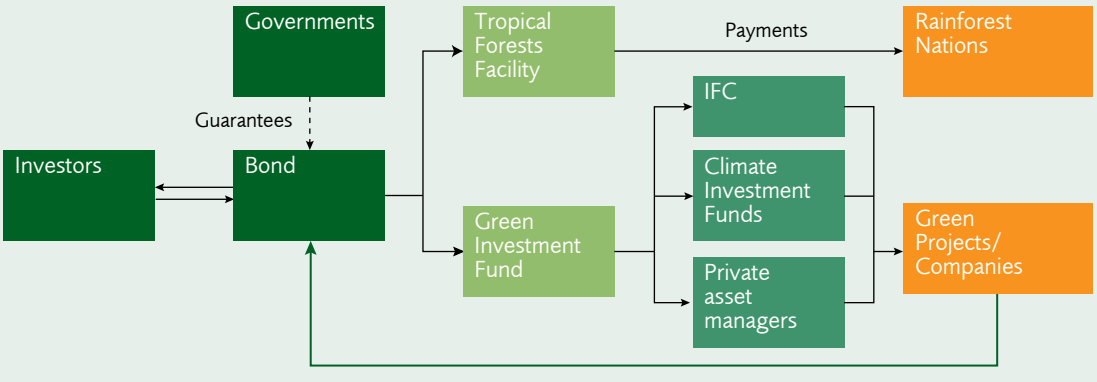
Under this model, more bonds would be issued than would be needed for the rainforest payments. For example, if in one year US$10 billion was required for the rainforest payments, bonds amounting to US$15 billion could be issued. The surplus US$5 billion would go into the Green Investment Fund. It would then channel the funds to institutions that invest in green businesses and projects: these could include the IFC, the World Bank's Climate Investment Funds and private fund management companies around the world.

The money would be used to invest alongside private capital in renewable energy, energy efficiency, low emission transportation and other clean development activities that reduce carbon emissions and have a positive investment return. Investments would be made in private enterprises and/or government projects, in the form of equity or high-yielding debt. Geographically, the funds could be earmarked for developing countries only (including, but not limited to, Rainforest Nations), or for all countries that offer opportunities.

The attraction of this model is that it could reduce the liabilities of the developed countries that underwrite the Bond, while channelling large amounts of investment capital into clean development, catalyzing additional private capital flows and contributing to climate change mitigation and adaptation. However, its effectiveness would depend on the risk/reward profile of the investments. The Green Investment Fund would need to produce Internal Rates of Return, after all costs, of over 5% per year, and preferably above 10%, to generate sufficient surpluses to cover the rainforest payment 'component' of the bonds. It would need to do so at low risk, as negative investment returns would increase the repayment burden on the underwriting governments.

FIGURE 27
A Green Investment Fund could be used to generate financial returns that would help pay the coupon and principal of the bonds.

A Green Investment Fund could help repay bonds



Although there may be some businesses and projects that offer the right risk/reward profile, it is not clear how much capital they could absorb. The key issue, therefore, may be scale. The PRP is conducting further research with its partners to understand the likely size and returns of investment opportunities related to clean development.

2.7.6 The rationale for bonds

The PRP believes that Rainforest Bonds, issued to private capital markets, are an attractive way to fund an Emergency Package for reducing deforestation. Because of the size and liquidity of the bond markets, there is the potential to raise large amounts of financing quickly to address the funding needs. This is a relatively cheap source of capital, with a small spread above sovereign national debt. Developed country governments will need to underwrite the interest and repayment of the principal of the bonds, but, as discussed above, there are some ways in which these liabilities can be reduced.

Even if governments remain liable for the full interest and repayment costs, a bond allows developed countries to spread funding commitments over a long period of time – 10, 20 or 30 years. This will give governments more time to find ways to generate revenues for climate mitigation from their domestic economies. For example, governments would be able to put in place any of the mechanisms described in the previous section: auctioning or taxing carbon emissions, placing a levy on insurance premiums, taxing commodity markets, etc. Such measures may be politically or technically unfeasible now, but practical in one or two decades as public concern about climate change increases. A bond instrument helps bridge the gap between action now and future sources of revenue.

Rainforest Bonds will create liabilities for future governments and future generations. There are also costs associated with this type of financing – private investors will require a yield on their capital. It could be argued that it is wrong to push the burden onto those who come after us. Yet, it can also be argued that taking action now to stem deforestation will produce great benefits for future generations, as without these measures it will be difficult, if not impossible, for the world to stabilize atmospheric carbon at a level that will avoid the worst impacts of climate change. It is also a time-bound opportunity; if action is not taken now, there will be few rainforests left in 20 years, a situation that cannot be reversed. Thus, there is a strong justification for 'front-loading' government funding for climate mitigation through a bond mechanism. The costs of financing would be more than outweighed by the costs of doing nothing.

2.8 Rainforest Nations Participate when Ready

The Emergency Package would be open to all Rainforest Nations. However, the speed with which countries engage would depend on their political will and implementation capacity. Some Rainforest Nations would be in a position to sign multi-year agreements with the Tropical Forests Facility quickly. Others may require time to study the opportunity cost of not deforesting, to consult with stakeholders on an alternative economic development plan and to initiate policy changes. Some countries may require more fundamental institutional capacity-building. In a small number of cases, the state apparatus and civil society institutions are so weak, especially in rainforest areas, that it may be difficult to implement a national-level approach which successfully tackles the drivers of deforestation.

Together with other international agencies, the Tropical Forests Facility would assist Rainforest Nations to pass through the different stages of engagement with the Emergency Package. The first 'Pre-Engagement Phase' would involve securing political agreement and building the basic capacities in Rainforest Nations to allow them to engage with the Emergency Package process. Much of this work could be done by existing bi-lateral and multi-lateral agencies active in these countries. In the second 'Preparatory Phase', Rainforest Nations would assess their net opportunity costs and develop an alternative economic plan that addresses the drivers of deforestation, assisted by the Tropical Forests Facility where necessary. At the end of this phase, Rainforest Nations would be in a position to negotiate an agreement with the Tropical Forests Facility. They would then move into the 'Multi-year Agreement Phase', when payments would be made first on the basis of process targets and then on the achievement of forest results.

The PRP has consulted widely with Rainforest Nations to gauge their willingness and readiness to engage with the type of proposal set out in this report. It is confident that a large number of countries in Latin America, Africa and Southeast Asia are either ready to engage with the Emergency Package now, or could be helped through the preparatory stage within one or two years. These countries contain over two-thirds of the world's rainforests and represent an even greater share of current deforestation.

2.9 Facilitating and Accelerating a Long-term UNFCCC Agreement on Forests

The PRP proposal is intended as a short-term, interim mechanism that will address tropical deforestation over the next 5-10 years. It is not a replacement for, nor an alternative to, REDD or any other avoided deforestation scheme formulated under the UNFCCC. Instead, it would act as a bridging mechanism. It will help to fill the gap, while a long-term UNFCCC solution is agreed and rolled out, and to increase countries' ability to participate.

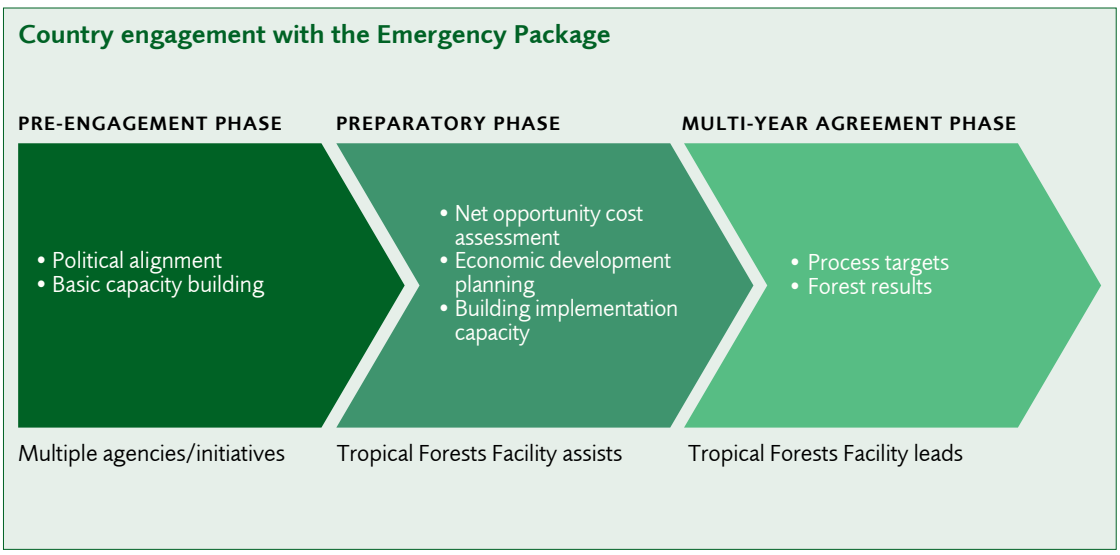
Oil palm plantation, Sumatra, Indonesia
Through their purchasing decisions, consumers, businesses and governments in commodity-importing countries can help Rainforest Nations conserve forests.
© Wolfgang Kaehler / Alamy

The Emergency Package would be designed to facilitate and accelerate the transition to this long-term solution. For example, the monitoring systems, the reference level research and the forest conservation strategies implemented by Rainforest Nations as part of the Emergency Package would also help to generate measured, verified carbon emissions reductions under a forest carbon scheme. The Tropical Forests Facility, although designed so that it can be wound up easily, could also evolve into a global institutional framework for forests under the UNFCCC – its global verification system, using remote sensing technology, would certainly be valuable. Thus, the actions taken under the Emergency Package would help a UNFCCC forest carbon mechanism to scale up quickly.

More broadly, it could be argued that reducing deforestation through the Emergency Package will support the success of the entire UNFCCC process. The latest research demonstrates that, on current trajectories, it will be effectively impossible to achieve climate stability without including the conservation of forests in the near-term.[35] It should also be remembered that mature forests continue to absorb carbon from the atmosphere: if no progress is made on reducing deforestation for ten years, then in addition to the sequestered biomass lost, the capacity of the remaining rainforest to absorb carbon will have been permanently diminished. The world will find it easier to agree and achieve carbon emission reduction targets if action is taken on tropical deforestation now. The longer it is left, the harder and more expensive the task becomes.

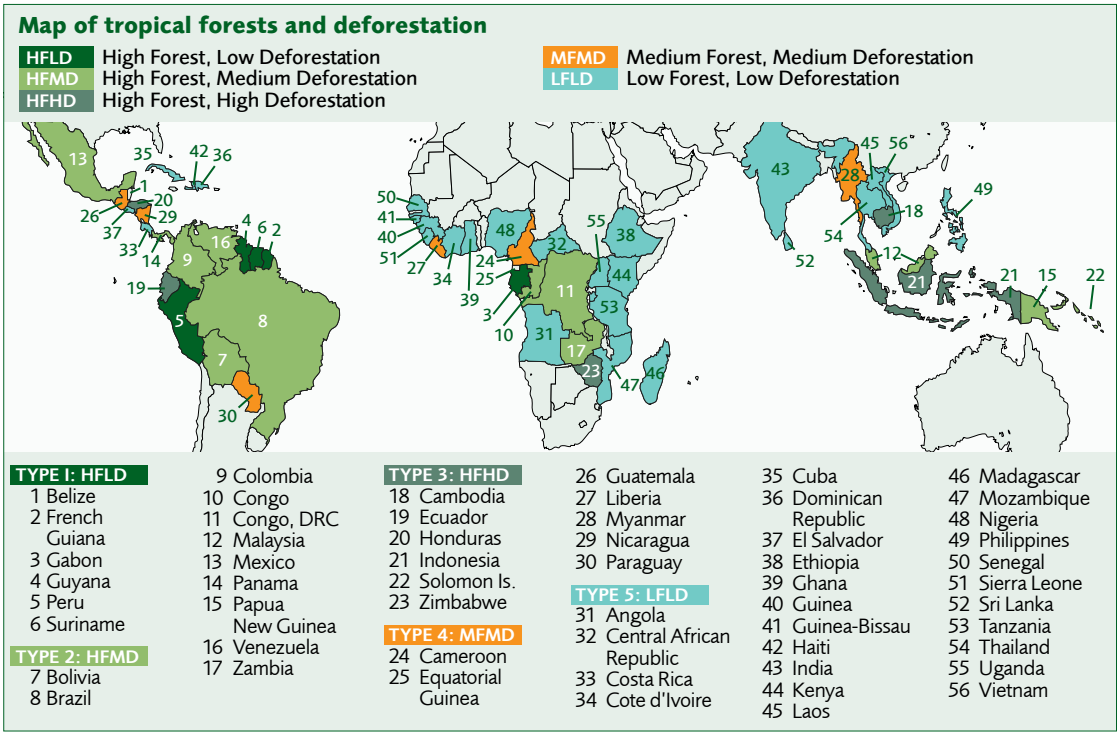
Preparations for the UNFCCC meeting in Copenhagen in December 2009 are intensifying. The PRP recognizes that this proposal, along with other suggested schemes aimed at reducing deforestation, should be studied within the context of this key conference.

FIGURE 28
Rainforest Nations would engage with the Emergency Package in three different phases.



[35] McKinsey & Company, 'Global GHG Abatement Cost Curve v2' (2009)

FIGURE 29
Tropical forests are found in at least 56 countries, but the vast majority is found in just 30. These countries experience varying levels of deforestation.



2.10 Global Action to Address the Drivers of Deforestation

One of the most important underlying drivers of tropical deforestation is the global demand for commodities – wood, food, animal feed and minerals. Many of the commodities produced on deforested land are exported to the developed countries in Europe or North America, or to the rapidly developing economies of Asia. Action could be taken in these consumer countries to support the forest conservation programmes of Rainforest Nations.

Even if acceptable to Rainforest Nations, simply banning or taxing products grown on deforested land in the tropics may be unfeasible for practical and legal reasons. Developing countries often oppose the introduction of sustainability criteria into national and international trade regimes as they regard such measures as restrictions on their trade. Instead, consumer countries, working in conjunction with Rainforest Nations, could take steps to create positive incentives for producers in Rainforest Nations by offering price premiums for goods produced on non-forested lands. This sort of price signal would encourage private actors in tropical countries to expand production outside forest areas and would support and strengthen efforts made by governments to reduce deforestation.

A number of schemes are already in operation or being developed. Producers and commodity-trading companies are coming together to develop sustainability criteria for their products. There are longstanding certification programmes for timber, such as that of the Forest Stewardship Council (FSC). Standards are now also being developed for agricultural commodities. For example, a Roundtable on Sustainable Biofuels has been established to harmonize the multitude of emerging principles, criteria and indicators and to provide a global benchmark.[36] Sustainability criteria have also been established for the production of palm oil, and are being developed for soy and beef.

Individual consumers can provide the initial impetus to positive incentives by demanding and choosing certified products. This will influence the purchasing decisions of retailers and manufacturers, something that is already starting to happen. For example, retailers such as B&Q in the UK and Staples in the US have used their purchasing power to encourage sustainable suppliers of timber and paper. Sainsbury's, Unilever and the Body Shop have set targets to eliminate unsustainable palm oil from their supply chains.

Governments may also provide positive incentives to producers through national procurement policies. Government purchasing represents on average 15-20% of timber and can provide an important demand pull for certified timber products.[37] At least eleven governments have issued sustainable timber procurement policies.[38]

Providing positive incentives to producers could weaken some of the drivers of deforestation and help Rainforest Nations implement their alternative, low-deforestation economic development plans. In this way, consumers, businesses, and governments in commodity-importing countries can all play a role in saving the world's tropical forests, alongside Rainforest Nations.

[36] *http://cgse.epfl.ch/page65660.html*
[37] ITTO, *http://www.itto.or.jp/live/Live_Server/400/E_AR_07.pdf*
[38] UK, France, Germany, Belgium, Netherlands, Denmark, Switzerland, Austria, Norway, Japan and New Zealand ITTO (2007)

Next Steps: from Proposal to Action

There is growing consensus within the global community that the funding required to conserve the rainforests will generate an economic, environmental and societal return and is, therefore, a good, and indeed vital, investment. This is evidenced by the number of proposals and initiatives that have recently emerged from all parts of the world.

The PRP will continue to work with policymakers and experts in this field to refine the proposals contained in this report and to integrate them with existing initiatives. In particular, the proposals set out in this report should be coordinated with other similar proposals, such as those of the European Commission and those that will emerge from the UK and Canadian government studies. To this end, it is suggested that developed country governments and representatives from Rainforest Nations form a working group to scrutinize the Emergency Package and other similar initiatives, and to recommend how they should be developed further. At this point, further work could be done to resolve some of the questions about the design of appropriate mechanisms.

Because of the urgency of the problem, it is hoped that sufficient consensus can be developed that core agreements will be in place to complement the debate at the UNFCCC Conference of the Parties (COP) in Copenhagen in December 2009. The initial implementation of the emergency plan could then start in early 2010.

The PRP hopes that this report can be a catalyst for concerted global action on tropical deforestation. The project team has been encouraged by the response from Rainforest Nations, developed countries and the private sector. Indeed, a number of countries have already expressed a willingness to implement the scheme as outlined in broad terms in this report, and institutional investors have expressed interest in purchasing the proposed Rainforest Bonds. Despite the scale of the challenge, the PRP believes that a real opportunity exists to agree a solution that can deliver rapid results.

Annexes

ANNEX A

Ecosystem Services Provided by Rainforests

SERVICE	DEFINITION/EXAMPLE
PROVISIONING SERVICES	
Food	Home to a set of unique plants, fish and animal species
Fibre	Selective logging from rainforests for timber; production of cordage (twine and rope)
Biomass Fuel	Use of material derived from plants or animals as a source of energy
Freshwater	Inland bodies of water for household, industrial and agricultural uses
Biochemical, Natural Medicines and Pharmaceuticals	Plant extracts used to develop cancer treatment drugs
REGULATING SERVICES	
Climate	Forests capture and store carbon dioxide
Air Quality	Extraction of other chemicals from the air
Rainfall Regulation	Role in cloud formation and storing moisture
Water Run-off	Decreased run-off, flooding and soil erosion
Water Purification and Waste Treatment	Filtration and decomposition of organic wastes and pollutants in water and soils
Diseases	Reduced standing water, which benefit diseases such as malaria
Pests	Consumption of pests by predators from the forest (e.g., bats, toads, snakes)
Pollination	Bees from the rainforest pollinate crops
Natural Hazard	Mangrove forests protect coastlines from storm surges
CULTURAL SERVICES	
Recreation and Tourism	Some areas make a living from visitors willing to visit the rainforest (e.g. canopy walkway in Costa Rica)
Ethical Value	Spiritual, religious, aesthetic, intrinsic values people attach to forest ecosystems, landscapes or species
SUPPORTING SERVICES	
Nutrient Cycling	Flow and recycling of nutrients (e.g., nitrogen, sulphur, phosphorus, carbon) through processes such as decomposition and/or absorption
Primary Production	Formation of biological material by plants through photosynthesis and nutrient assimilation
Water Cycling	Transfer of water from soil to plants, plants to air, and air to rain

Note: Adapted from Millennium Ecosystem Assessment (2005) and World Resources Institute's Corporate Ecosystem Services Review (2008)

ANNEX B

Suggested Levy on Insurance Premiums

The funding of the proposed Tropical Forests Facility could come from many sources. Different policymakers may choose different funding streams and that decision is theirs to make. One possibility is that part of the costs could be met from those industries that 'benefit' from the reduction of deforestation and degradation of forests. This annex argues that the general insurance industry is one such beneficiary over the longer term.

The general insurance industry is global and highly competitive. For many forms of insurance (for example homeowner property insurance) the product is effectively a commodity with customers very often opting for the cheapest available cover. In recent times this has been made all the easier by the availability of on-line price comparison websites. Therefore price is a critical determinant of market share. It may be possible for insurers to offer a product which contains a voluntary add-on rainforest donation, but experience shows that take-up of such policies is quite low. Whilst senior managers in the insurance industry may understand the benefits of avoiding carbon emissions from forests, it would be unlikely that they would increase premium rates across the board to raise funding for this. This is because policyholders are unlikely to see the long-term benefits preferring lower premiums in the short term and will be free to choose another insurer. Therefore if policymakers wished to raise significant funds from general insurers it appears they would need to mandate a levy on the premiums of relevant policyholders rather than looking to the insurance industry to do this independently.

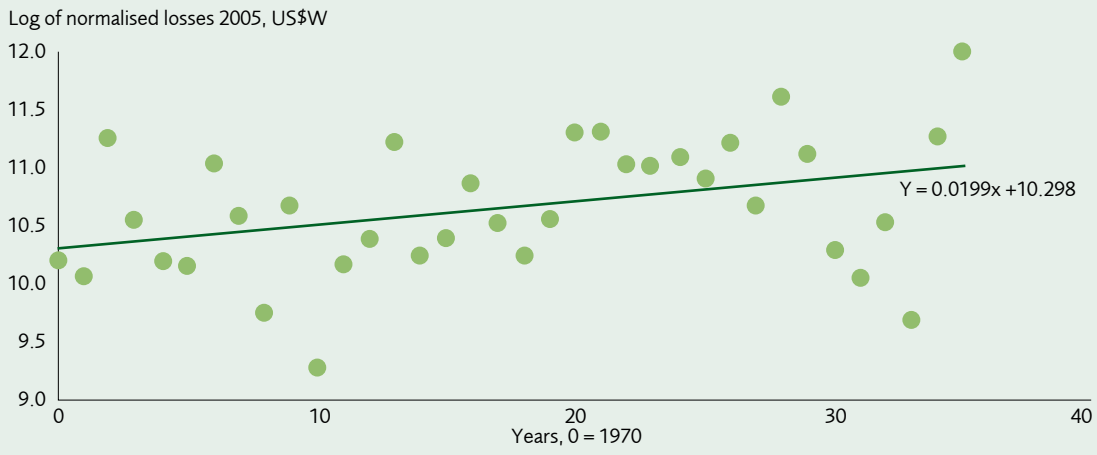
Those members of society living, in future, in areas that are exposed to catastrophes are clear beneficiaries of reduced greenhouse gas emissions. The economic and insurance losses arising from catastrophes have been increasing rapidly in recent decades around the world. Much of this trend is due to increases in property and contents values in exposed areas combined with a significant migration to coastal locations.

Nevertheless if these factors are removed ('normalised') we still see a trend. Figure 30[39] shows that a strong trend (around 2% p.a.) remains. Some commentators have suggested that 2005 was an outlier as it contained hurricanes Katrina, Rita and Wilma; they argue that data from this year should be removed. However our work shows that whilst removing data from 2005[40] does reduce the trend, until the 2000s it was running much higher at around 3% p.a. Therefore, on balance 2% p.a. appears defensible. It is an open question as to whether or not this trend is caused in full or part by climate change. However the public reports and statements from many insurers suggests that they believe it is a significant factor. Unless action can be taken to reduce the growth trend in damages, premiums will inevitably increase. This is because insurance simply shares insurance losses amongst society; it does not reduce their aggregate quantum.

If carbon emissions led to immediate harm the case would be clearer. In this case policyholders that are exposed to catastrophes would have a clear benefit from paying to reduce their impact, provided the amount they paid did not exceed the value of saved premium increases plus any other benefits they may perceive. In practice, however, the climate system has significant inertia so that policyholders today are suffering from the emissions of the past. The Stern Review concluded that society should take a long-term

FIGURE 30

Trend in insurance losses since 1970



[39] Based on Robert-Muir Wood, Stuart Miller, Auguste Boissonade. 'The Search for Trends in a Global Catalogue of normalised weather-related catastrophe losses' (2006) which in turn uses Pielke, Roger A. Jr. and Christopher Landsea, 'Normalized Hurricane Damage in the United States: 1925 – 95' (1998). 'Weather and Forecasting' (September 1998) pp. 621 – 631

[40] See Maynard, Trevor 'A method for allocating a proportion of forestry abatement to the general insurance industry' (2009)

FIGURE 31

KEY ASSUMPTIONS

Real discount rate	2% p.a.
Lag to premium savings	20 years
CO_2 residence period	100 years
Total forestry emissions saved in year	50% of total
Project failure rate	10% of projects
Proportion of emissions due to forestry	17% of global total
Premium relating to catastrophes[4]	US$73 bn
Premium increase rate 1 years' emissions	2% for each year

view and pay now to avoid significant harm (and far higher cost) later. Other academics have argued that it is better to postpone action until our knowledge is better and our economy is stronger. However Professor Martin Weitzman at Harvard University has looked closely at whether traditional cost-benefit approaches make sufficient allowance for extreme climate risk. His work[41] seems to suggest early action is essential to mitigate the low, but not low enough, risk of extreme societal disruption. Our work assumes that policymakers have decided to act; as we firmly believe they must. In this case we believe a fair levy to apply to insurers each year would be the estimated present value of saved premium relating to those emissions avoided in the year. However, once a proper framework has been created to value the carbon arising from deforestation, the emergency contributions from this source should stop.

Many assumptions must be made to derive the value of saved future premium increases including: the discount rate, the premium growth trend, the period between carbon emissions and resulting premium increase, the time the greenhouse gas resides in the atmosphere, the failure rate for rainforest projects and critically the amount of emissions that can be saved. Our assumptions are shown in Figure 31.

Based on these assumptions, and in particular assuming that an overall saving of 50% of rainforest emissions can be achieved, we estimate that the current value of premium savings from a single year of forest carbon emissions is US$3.3bn (4.5% of the premium relating to catastrophes). Our work also makes a critical political assumption and that is that if deforestation rates are slowed in the current year then they do not increase in a future year to 'catch up'. In essence this assumes the success of the political process to include rainforests within the UNFCCC process in due course. We understand that many hurdles must be overcome to achieve this; but we believe we should 'plan for success' in our calculations.

It may be that we cannot achieve 50% savings because the level of contributions from other stakeholders are not sufficient for this. In this case the value of saved future premium increases will be lower. Figure 33 shows[42] that, in the absence of contributions from other stakeholders, a contribution from the insurance industry alone would not provide enough benefit in premium savings to justify the initial contribution. The figure also shows that for additional contributions up to a level of US$1.7bn, the value of premium savings would match these one for one. As the costs of abatement rise the rate of premium savings slows. Figure 32 shows how the value of saved premium behaves when the key assumptions are varied.

FIGURE 32

SENSITIVITIES

	BASE ASSUMPTION	SENSITIVITY[1]	CHANGE IN VALUE OF SAVED PREMIUM[2] US$ bn	PROPORTION[3]
Real discount rate	2%	1%	2.5	3.5%
Lag to premium savings	20	25	(0.3)	(0.4%)
CO_2 residence period	100	120	0.2	0.2%
Total forestry emissions saved in year	50%	40%	(0.7)	(0.9%)
Project failure rate	10%	20%	(0.4)	(0.5%)
Proportion of emissions due to forestry	17%	20%	0.6	0.8%
Premium relating to catastrophe	73	50	(1.0)	–
Premium increase rate 1 years' emissions	2%	1%	(1.6)	(2.2%)

Notes

1. Sensitivities are broadly symmetric, so that approximately a sensitivity with the opposite sign will lead to the opposite value.
2. Relative to the base assumptions which lead to a value od US$ 3.3bn and a proportion of 4.5%, so for example a real discount rate of 1% leas to an increased value do of US$5.8bn and hence a change of US$2.5=5.8-3.3. Brackets indicate negative numbers.
3. As a proportion of premiums relating to catastrophe (US$73bn)
4. Expressed as a proportion of US$50bn premiums the value of saved premium is still 4.5%

[41] See *http://www.economics.harvard.edu/faculty/weitzman/papers_weitzman* and in particular the paper 'On modelling and Interpreting the Economics of Climate Change' (July 7 2008)

[42] Based on work by McKinsey and Company on abatement costs of forestry

FIGURE 33

Sum raised from insurance levy depending on the size of other contributions

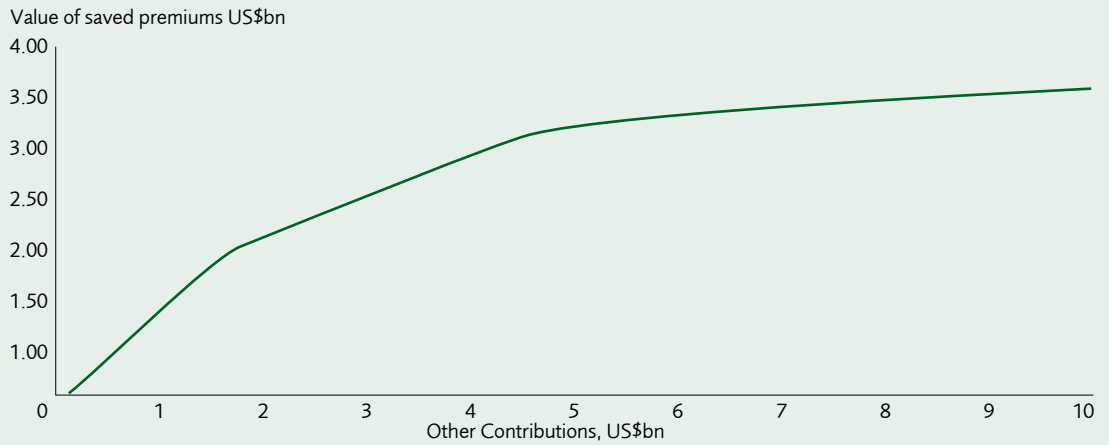


Figure 32 shows that, even for reasonable variation in the assumptions, an argument can be made to collect a significant contribution from the general insurance industry. Although the current generation of policyholders may not see an immediate reduction in their premium, it is arguable that they will still benefit from such a levy. This is because many of the material things people are likely to value in the future are currently owned by somebody in the form of assets. For example a house in Florida will most likely be of some value to somebody in fifty years time depending on the rate of sea level rise. It is perhaps obvious that the current owner of such a house should be willing to pay now for a reduction in their future insurance premiums. It is somewhat less obvious, but nevertheless arguable, that they should also be willing to pay now for a reduction in the insurance payments payable by future owners of the house. This second point comes about by the owner caring about the sale price of the house and realising that by investing now, they should be able to sell the house for a higher price in future. A house subject to high insurance payments is likely to be less desirable, and therefore command a lower price, than an otherwise identical house subject to low insurance payments. Policymakers may wish to use this argument and could describe the levy as an 'insurance' for the future viability of such exposed communities.

The global premium that relates to weather related natural catastrophes is estimated to be US$73bn, though this estimate is based on a simple method and the value should be checked further. Policymakers could chose to impose a levy on this premium component and hence target a narrow group of policyholders. Arguably this is fairest as those policyholders have the most to gain from the action. However, policyholders living in catastrophe exposed areas already pay significant premiums and imposing an additional cost may be politically difficult even if economically justified. In this case policymakers may feel it more appropriate to apply the levy to a wider group of policyholders, to share the burden. For example, at a levy of US$3.3bn expressed as a proportion of total general insurance premiums would be around 0.2%. We believe this is a small contribution to save the rainforests from an industry with much to gain from mitigating climate change.

ANNEX C

The Prince's Rainforests Project

Steering Group

1. **Mr. Tom Albanese,**
   Chief Executive, *Rio Tinto plc*
2. **Sheikh Khalid Alireza,**
   Vice Chairman and Executive Director,
   Xenel Industries Ltd
3. **Mr. Tom Boardman,**
   Chief Executive, *Nedbank Group Ltd*
4. **Sir Richard Branson,**
   Chairman, *Virgin Group*
5. **Dame Julia Cleverdon,**
   DCVO, CBE, Vice President,
   Business in the Community
6. **Mr. Kevin Conrad,**
   Executive Director,
   Coalition for Rainforest Nations
7. **Mrs. Polly Courtice,**
   Director, *Cambridge Programme for Sustainability Leadership*
8. **Mr. Jeremy Darroch,**
   Chief Executive,
   British Sky Broadcasting Group plc
9. **Mr. Steve Easterbrook,**
   President & Chief Executive,
   McDonalds Restaurants Ltd
10. **Mr. Neil Eckert,**
    Chief Executive, *Climate Exchange plc*
11. **Mr. Stanley Fink,**
    Chief Executive, *ISAM Funds,*
    (Former CEO of Man Group)
12. **Dr. Kristalina Georgieva,**
    Vice President and Corporate Secretary,
    The World Bank
13. **Mr. John Griffith-Jones,**
    UK Chairman & Senior Partner, *KPMG LLP*
14. **Mr. Steve Howard,**
    Chief Executive, *The Climate Group*
15. **Mr. Justin King,**
    Chief Executive, *J Sainsbury plc*
16. **Sir Nigel Knowles,**
    Managing Partner, *DLA Piper UK LLP*
17. **Mr. Caio Koch-Weser,**
    Vice Chairman, *Deutsche Bank Group*
18. **Ms. Sarah Lambert,**
    Acting Head of the European Commission representation in the United Kingdom
19. **Treasurer Bill Lockyer,**
    California State Treasurer
20. **Mr. Roland Rudd,**
    Senior Partner, *Finsbury Limited*
21. **Professor Domenico Siniscalco,**
    Vice Chairman and Head of Italy,
    Morgan Stanley International
22. **Mr. James Smith,**
    Chairman, *Shell UK Ltd*
23. **Professor Lord Stern of Brentford**
24. **Mr. John Varley,**
    Group Chief Executive, *Barclays plc*
25. **Mr. Tracy Wolstencroft,**
    Managing Director, *Goldman, Sachs & Co*
26. **Dr. Bruno Wu,**
    (Co-founder and Executive Chairman,
    Sun Media Investment Holdings)

Advisers

1. **Mr. Tony Juniper,**
   Independent Sustainability Adviser
2. **Mr. Andrew Mitchell,**
   Founder and Director,
   Global Canopy Programme
3. **Mr. Hylton Murray-Philipson,**
   Founder and Director, *Canopy Capital Ltd*

Project Team

Charlotte Cawthorne
Jillene Connors-Belopolsky
Anna Creed
Yalda Davis
Jim Douglas
Lucy Dunkerley
David Edwards
Jack Gibbs
Andréanne Grimard
James Heneage
Paul Holland
Rowena Ironside
Waleed Julier
Sammir Lingawi
Briony Mathieson
Trevor Maynard
Paul McMahon
Justin Mundy
Kerry Perkins
Simon Rietbergen
Sophie Wood
Matilda Woodford

Registered Charity No.277540

Contact Details

The Prince's Rainforests Project
The Prince's Charities Foundation
Clarence House
London
SW1A 1BA
United Kingdom

www.princesrainforestsproject.org
+44 (0) 20 7024 5677

CarbonNeutral® printing company

The Prince's Rainforests Project is committed to reducing the impact its activities have on the environment.

If you have finished with this report and no longer wish to retain it, please pass it on to other interested parties or dispose of it in your recycled paper waste, thank you.
Environmental data for the production of this document:

- Electricity: 90% renewable
- Paper fibre: 100% recycled fibre. Certified according to the rules of the Forest Stewardship Council and awarded NAPM Recycled Mark. Totally Chlorine Free
- Ink: 75% vegetable oil based
- Printing press solvents: 80% cleaned and reused
- Production waste: 85% recycled
- Isopropynol Alcohol: <5%

This report is printed on FSC certified paper by Royle Print Limited, a certified and registered ISO 9001: 2008, ISO14001:2004, and CarbonNeutral® company, holding Forest Stewardship Council (FSC) Chain of Custody TT-COC-002228 and PEFC Chain of Custody BMT-PEFC-0448

Designed and produced by The Smiths Partnership LLP