Third Jack Westoby Lecture: The tropical forests dilemma

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The challenge

Jack Westoby's writings have inspired me and countless others to strive for solutions to the challenges of forest-based development in poor countries, and it is an honour to speak in a forum that bears his name. I am also pleased to be at the ANU Forestry Department which has produced so many outstanding foresters over the years, many of whom have gone on to work in the tropics; one such is Dr Freezailah, my predecessor as Executive Director of the International Tropical Timber Organization. Australia's experience in tropical forest management and conservation has provided important inputs to the work of ITTO and other organisations throughout the tropics, and now is a good time to express my appreciation for that.

I have some claim to speak on tonight's topic, the tropical forests dilemma, if only because my home country, Brazil, contains the largest tract of tropical forests on the planet. I lived in the heart of the Amazon for seven years, and I have also served for 13 years at ITTO. But I don't claim to have all, or even any, of the answers. My hope is that we can engage in a dialogue on the wide range of issues facing tropical forests and tropical countries today, and that somehow we can learn a little bit more about them in the process. Rather than answers, I have some questions to put to you.

I will start by presenting some information on two large forest states — the state of Mato Grosso in Brazil, and the province of British Columbia in Canada — and posing my first question: which one do you to think is likely to still have most forest cover in 100 years time?

Both have about 40–50 million ha of forest; Mato Grosso's is tropical rainforest, British Columbia's is temperate conifer forest. I have chosen these two political entities because their total land areas are comparable and they have a comparable percentage of land under forests — around 50%. But there are of course major differences, and these might be instructive. Compare, for example, annual log production: 3.1 million m^3 in Mato Grosso and 72 million m^3 in British Columbia (Table 1).

Don't answer my question on future forest cover right now; I will return to it later. Now I want to ask another simple question: the title of this lecture is 'the tropical forests dilemma', but do we, in fact, have a dilemma? *Is there a problem with tropical forests?*

Table 1. Forest area and log production, British Columbia and Mato Grosso

	Total area (M ha)	Productive forest (M ha)	Annual log production (M m^3)
British Columbia	95	49	72
Mato Grosso	91	40	3

Will they disappear?

Most of you, I am sure, will say yes, there is a problem. Tropical forests are a valuable resource, and they are being lost at an annual rate of 10–15 million ha. These two assertions, when put together, constitute a problem: if they are true.

The tropical forest estate is certainly decreasing in size. This is an undisputed fact, even though forest cover data are notoriously unreliable and the latest FAO figures, which indicate a 10% reduction in deforestation in the last 10 years, have been disputed in some quarters.

Nevertheless, estimates of 10 million ha or more of forest lost each year, even if overstated, are much too high to ignore. Moreover, they don't take into account forest degradation and fragmentation, which are also occurring and which hasten decline and reduce forest values.

What about the assertion that the tropical forests are valuable? Here are some of the most commonly used arguments. Tropical forests are valuable because they provide valuable timber and non-timber products; they are home to over 50% of the earth's terrestrial biodiversity; and they are important for ethical and religious beliefs and for the maintenance of traditional cultures of hundreds of millions of people. As forest is lost so too is cultural diversity, because forest-dwelling peoples are increasingly absorbed into the mainstream. Like biodiversity, cultural diversity adds to our quality of life and, in its own way, acts as a buffer

against the depressing prospect of mass homogenisation. A final commonly-used argument for the high value of tropical forests is that they provide life-sustaining services, such as climate, air and water purification, and drought and flood control.

Most people are probably familiar with these arguments. But now let's look at arguments supporting the view that tropical forests are *not* valuable, or at least are not valued in terms of society's willingness or ability to pay for the goods and services they provide:

(i) Natural tropical forests most often are not efficient producers of timber or of income from timber:

- They provide a low yield compared to plantations, (e.g. 1–2 $m^3\ ha^{-1}\ y^{-1}$ vs 30–40 $m^3\ ha^{-1}\ y^{-1}$ from plantations).
- Heterogeneity — this has implications for both sustainable forest management and marketing, because maintaining biodiversity becomes extremely complex, and steady supplies of preferred species are difficult to ensure.
- Many other forests for timber production are supported by subsidies. Identifying these subsidies is often difficult, but a recent report by the World Resources Institute found that developed countries subsidise their forests and forestry to the tune of several billion dollars annually.
- Subsidised forests keep prices low. Therefore, the prices obtainable for tropical timber are too low to cover sustainable production costs.

(ii) Biodiversity is not remunerated by the markets: most often biodiversity becomes a cost — because of the extra management required to maintain it — rather than a cashable asset. Potential income-earning, biodiversity-based industries such as ecotourism and pharmaceuticals have not been realised to any great extent in the tropics due to a lack of infrastructure and, in the case of pharmaceuticals, mechanisms to capture the value of the goods.

(iii) There is little financial remuneration for the environmental life-supporting services provided by tropical forests, such as water production, climate regulation and carbon absorption.

(iv) In large parts of the tropical world, forest conversion to other land uses such as rubberwood and oil palm plantations as well as annual agriculture crops, including soy beans and cotton, is much more profitable. This is not a new phenomenon: as we have seen in many developed countries, forests have been cleared for agriculture for centuries because agriculture is more profitable or a more economically imperative landuse. Even when too much deforestation leads to environmental problems, considerable profits can still be made in the lag time between clearance and the appearance of the environmental problem.

All this adds up to one fact: in the face of economic pressures at the local level — where subsistence farmers must farm if they are to feed their families — and at the regional or national level — where governments must pay for basic infrastructure, schools, hospitals and so on — most tropical countries cannot afford to conserve tropical forest.

So at the moment, then, forests don't seem to be valuable enough. In an ITTO assessment of the financial resources needed to achieve sustainable forest management made in 1995, Alf Leslie concluded that 'regardless of land use sustainability considerations, poverty is going to force or result in much of the tropical forest resources being lost'.

But…

Let us now step back and take a broader view. Our planet faces an increasingly uncertain future, particularly with respect to environmental changes. Many people are predicting rapid climate change; our diverse activities continue to impact on our water catchments, our agricultural lands and our atmosphere. Many foresee ecological disaster. Under this scenario, apart from anything else, biodiversity is an insurance policy against unforeseen — and sometimes foreseen — ecological catastrophe.

Most people outside the tropics will therefore agree that we need to maintain most of the remaining tropical forests, because they contain half the world's terrestrial biodiversity. A precautionary approach is surely needed: we should not destroy biodiversity before we even know what we've got, and we should leave open as many 'options' as possible, because the future is so uncertain.

Biodiversity is therefore globally important. Since most concern for its disappearance is apparent outside the tropics it seems fair that a large part of the financial burden for conserving it must also fall outside the tropics. The world wants and needs its insurance policy: it therefore needs to pay the premium.

My thesis, then, is simple: money can save the tropical forests. Consider an example that tests the thesis: if my view is confirmed, then the question is, are those who are in a position to pay, willing to pay?

A Brazilian case study

Brazil's Amazonian region comprises nine states covering about 500 million ha, of which 360 million ha — dark grey areas in Figure 1 — are forests with potential for timber production. Non-forest areas are light grey, and areas already modified by human activity, including deforested land, are mid-grey.

Figure 2 shows the distribution of municipalities in the region. Figure 3 is a map prepared using satellite data showing 'hot' spots, indicating the use of fire for land clearing. People use fire to make forest land available for other uses which are or are perceived to be more profitable or immediately useful. The correlation in Amazonia between population density, forest burning and forest loss is clear.

The largest Amazonian state is the state of Amazonas. It contains some 135 million ha of magnificent tropical rain forest. For the last 33 years, the state government and population have shown no interest in promoting forest industries, agriculture or pastoralism.

This makes it an interesting case. Do the local people want to remain poor? Of course not. The Amazonas authorities and the population they govern have chosen the conservation option almost by default, because the state was granted tax-free status

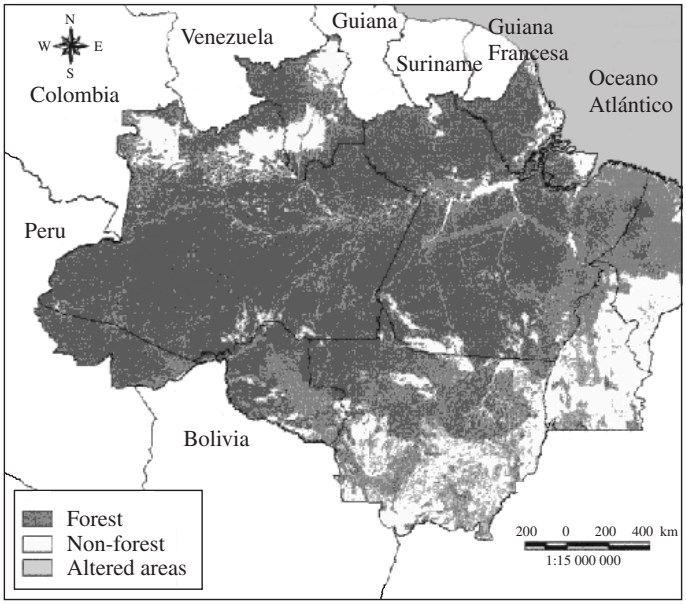

Figure 1. Forest cover, Amazonia

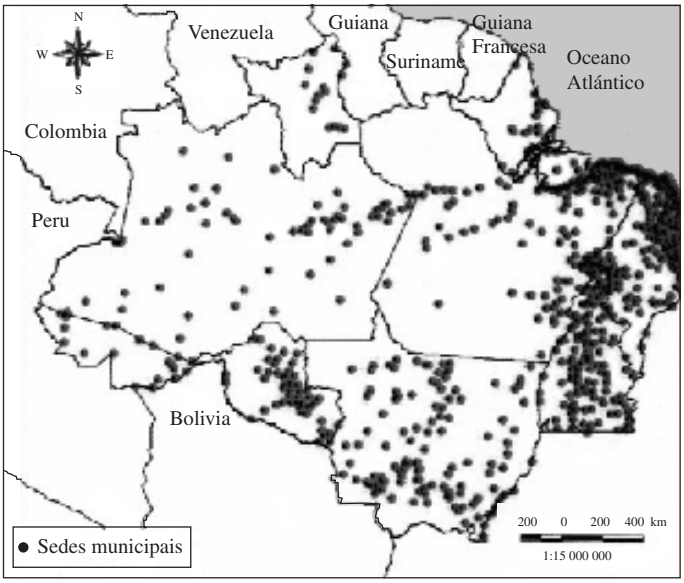

Figure 2. Municipalities, Amazonia

by the federal government in 1968. The state's central capital, Manaus, is now home to more than 400 industries, most importing and assembling parts into manufactured goods, including 90% of the electro-electronic consumer products traded in Brazil. The tax-free industry, which annually benefits from incentives and subsidies reaching US$3 billion, is the only development engine in the state. It is the major employer of local people, who flocked to Manaus, where 60% of the state's two million inhabitants now live. Of course, forest conservation was not the original reason for granting tax-free status: the federal government wanted to establish a presence in its northern regions for security reasons. Nevertheless, the outcome has been the maintenance of the forest estate in pristine condition. Development has concentrated in Manaus, which is a prosperous and vibrant city. And the state government has not encouraged forest development, rural settlement, agriculture and pastoralism because it hasn't needed to.

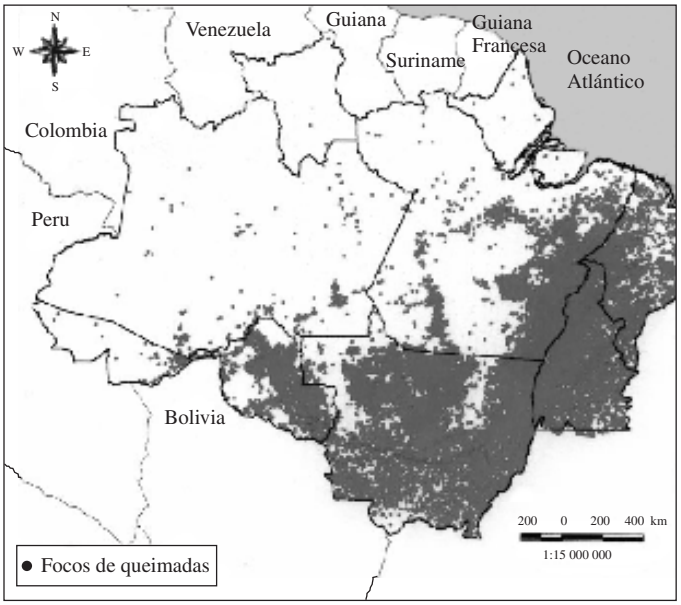

Figure 3. Fire hotspots, Amazonia

Is the Amazonas case the ideal situation? Have we found the solution to conserving a substantial share of remaining tropical forests? It would seem so; the local government, the population and forest owners are happy and there is no outside threat to the resource. But Brazil is a poor country struggling to alleviate poverty and develop and the governments and people (taxpayers) from the other states in the Brazilian Federation have decided they cannot afford the tax subsidies for much longer. In fact, the country's 1988 constitution states that the Manaus tax-free benefits will end in 2013. What will happen then? Manaus, in the absence of the tax shelter, cannot compete with the Brazilian industrial powerhouse states in the south, which also have 80% of the Brazilian market.

So we might expect that most of the industries will move out. I do not need to tell you that land-based development (forest industries, agricultural crops, livestock production) will inevitably soon be very much in the minds and plans of the government and people of Amazonas, as they are now in the neighbouring state of Mato Grosso. In the absence of the de facto forest conservation subsidy, the challenge in both states is to create the conditions under which sustainable industries will be more competitive than the other land-use options that require deforestation.

Mato Grosso is the second largest state in the Brazilian Amazonia. In the last ten years it experienced spectacular growth in its agriculture sector. It is now the number one producer of soybeans in Brazil, with 3 million ha under this crop. It is also the second largest producer of rice and cotton and the fourth in cattle-raising. The Federal Agriculture Research Agency estimates that an additional 40 million ha are suitable for these land uses and the state is ready to expand the area under agriculture.

Of course, expansion of agriculture and livestock development requires land-clearing. And the Brazilian law stipulates that up to 20% of areas classified as forest land can be converted to non-forest ones. This fraction increases to 50% in areas classified as other wooded lands.

Table 2. Waiting time for government loans and gross revenue per hectare per year, timber production versus soybeans

Land-use options in Mato Grosso, Brazil	Average waiting time for official credit (months)	Gross revenue (US$ ha^{-1} y^{-1})
Timber production under sustainable forest management	18	30–50
Soybeans	2	300–400

The state also has a thriving forest industry sector, although it is expanding at a much slower pace than agriculture because of much lower profitability, and credit and finance constraints.

Table 2 shows the waiting time for government loans and gross revenue per hectare per year for land under sustainable forest management in comparison with land under soy bean crops.

It is clear that sustainable forest management for timber production is handicapped in Mato Grosso even before it starts, and we can expect more deforestation there.

A level playing field?

Low revenues are not the only hurdle facing sustainable forest management for timber production. Think, for a moment, about the sophisticated information and management systems that are required to run a sustainable forestry operation in the tropics — with its high levels of biodiversity and rainfall — so that biodiversity is not lost, catchments are not damaged, and so on. More than that, increasingly such operations are required to provide proof of their environmental standards. But clear the same land — destroy all the biodiversity and have a huge impact on the water catchment — and grow soybeans and you can sell the produce unfettered into every market in the world. Moreover, as long as your beans have all their original genes, you don't have Greenpeace breathing down your neck.

I hope that my views of the lack of competitiveness of tropical forest as a land use are not too discouraging, because despite all the foregoing I believe that eventually a large share of tropical forests will be placed under sustainable forest management. In the ITTO study I referred to earlier, Alf Leslie estimated that tropical forest areas would decline to about 500 million ha before deforestation runs its course. Although this number is little more than a guess, it is probably reasonable. Why, in the light of the preceding arguments? Because I am convinced that national governments will increasingly absorb the costs of maintaining these forests, even when they have other things on which to spend their money, such as hospitals and schools. Already, we see governments in many tropical countries putting funds towards the management and conservation of totally protected forest areas. Malaysia, a fast-growing economy, is a notable exemplar of this. This eventual permanent tropical forest resource will probably comprise:

- conservation reserves and other totally protected areas;
- the lands of indigenous people with low intensity use; and
- production forests.

If this conjecture turns out to be even remotely true, it perhaps diminishes the tropical forests dilemma a little — from concern over the fate of today's tropical forest estate of about 1.2 billion ha to concern over the difference between that and the eventual permanent forest estate of 500 million ha. So we're down to worrying about what happens to 700 million ha of tropical forests.

Essential support

The scenario in which 500 million ha of tropical forests is 'saved' is not a 'do nothing' scenario, because it is predicated on the fact that tropical countries will develop. Their economies will grow and their poor will find employment. As a consequence, both governments and people will eventually take more interest in forest conservation and be able to pay for it.

ITTO believes that it can help the process of development by promoting the growth of a tropical timber industry. But I have spent the last little while trying to convince you that timber grown on a sustainable basis in natural tropical forests is not competitive with that grown in other forests, including the expanding global plantation estate. If production forestry is not competitive in its own right, it will have to be subsidised, either by payments for non-timber products or services, or directly.

So why even bother with it? For a start, if it is coupled to downstream processing it can generate considerable employment and promote the development of infrastructure, both essential for development. It seems to makes sense for poor countries with a large part of their land still covered by forest to develop a timber-based processing sector, provided that it can be competitive in the global marketplace. For biodiversity's sake, it would be better to base such an industry on natural forest rather than to clear the natural forest and establish plantations.

What is sustainable forest management likely to cost? In 1995, the ITTO Council realised that a priority list of actions was required if we were to achieve significant progress towards sustainable forest management. A list of seven key actions for countries was agreed. These were:

(1) adopt a forest policy and apply legislation;
(2) secure the permanent forest estate;
(3) apply reduced impact logging;
(4) train the workforce in reduced impact logging;
(5) limit timber harvesting to the sustained yield capacity;
(6) raise public awareness that timber harvesting can be consistent with the sustainability of tropical forests; and
(7) focus forest research on the analysis and use of existing data and knowledge.

ITTO has undertaken several studies on the financial resource flows necessary to implement these actions and to achieve sustainable forest management in its producer member countries. In the most recent study, it was estimated that implementation of sustainable management of natural tropical forests and enforcement of the various regulations would require the strengthening of institutional infrastructure and development of skilled manpower, involving substantial additional costs. ITTO's studies estimated that in order to implement these priority actions, about US$2.2 billion per year would be required over an initial period of four years. I should point out that this estimate was simply the cost of raising the capacity for good forest management

to an adequate standard: it did not include the subsidies that will be needed to make such management financially viable. But under prevailing economic conditions, most ITTO producer member countries could not be expected to make even these minimal investments. This responsibility, as agreed at the Rio Summit, is supposed to be shared with developed countries, who have agreed to provide new and additional financial resources to assist in such efforts. After all, the benefits are global.

But overseas development assistance is, in fact, falling. At this point I would like to mention as an example ITTO's Bali Partnership Fund, which is fundamental to the Organization's ability to fulfill its mandate. The fund was established for the specific purpose of assisting producing members to achieve sustainable forest management. Regrettably, only about US$15.5 million has been made available to it since the Agreement came into effect in 1997, well under US$1 million for each ITTO producer member country. I cannot help contrasting this with the estimated US$360 billion dollars provided each year in government subsidies to farmers in OECD member countries. A couple of years ago this amount included an average US$19 000 subsidy for each full-time farmer in the USA and European Union and a US$21 000 subsidy for each farmer in Japan.

Conservation in practice

Despite being severely constrained by the lack of adequate funds, ITTO and its Members are making progress, mainly in the adoption of appropriate forest policies and legislation. There is, however, a world of difference between the adoption of policies and legislation and their implementation on the ground.

A very specific priority area in which ITTO is increasing its efforts is the application of reduced impact logging techniques and training of the workforce in reduced impact logging. Although ITTO has financed a few projects designed to improve harvesting in producer countries, there has been no concerted effort to provide ongoing assistance. I want ITTO to support the establishment of one reduced impact logging training centre in each of the producing regions. The planning of such centres is already under way in Africa and here in the Asia–Pacific region.

By improving logging techniques and practices, we will overcome many of the technical constraints hampering progress towards sustainable forest management in producer countries. But as I have been pointing out, achieving sustainable forest management is not really a technical question.

As long as sustainable forest management is economically uncompetitive, the prevention, control and monitoring actions needed to protect and secure tropical forests will demand resources far beyond those available in producer countries, or in multilateral or bilateral funding agencies.

There are a few options to make sustainable forest management financially feasible. One is to take advantage of the market for high-value timber. Tropical forests grow a few timbers with decorative or durability qualities of sufficiently high appeal (e.g. mahogany, greenheart and teak) to give them an effective demand with relatively high and inelastic price ceilings. Not many of them can, as yet, be grown in plantations to the same quality standards as in natural forests, and the fast-grown commodity timbers of the existing plantations are no substitute for them, even allowing for the technological advances in sight. Competitive advantages of this calibre offer a strong base on which to develop end-markets having a high degree of natural monopoly for the foreseeable future.

For forests in the tropics without high-value timbers, the sale of the global public services such as biodiversity conservation will be needed to supplement income derived from sustainably harvested timber and non-timber products, and to implement whole-of-landscape conservation strategies. The task ahead, therefore, is to foster facilitating mechanisms and certification systems whereby this could be done.

One such opportunity could have emerged through the ability of forest management to capture and conserve carbon; this could have become bankable through the Clean Development Mechanism of the Kyoto Protocol. Most people here are no doubt aware of the latest developments in the negotiations on this. In fact, some transfers have already been made (outside of the Protocol) between power companies in developed countries, and plantation development and reduced impact logging projects in the tropics. Regrettably, there has been no agreement for such transfers for natural forests of developing countries under the Protocol, and thus an opportunity was lost for developed countries to share more equitably in the payment for environmental services provided by tropical forests while helping to make sustainable forest management financially feasible.

A development related to services payment has been initiated by Conservation International, a major international NGO and our partner in important transboundary conservation projects in Ecuador and Peru. This NGO has established a new market-based tool for the conservation of forests and biodiversity by leasing nearly 100 000 ha of pristine tropical forests in one of ITTO's member countries, Guyana. Through this new mechanism, dubbed a 'conservation concession', Conservation International pays market rates for the area to be protected. Conservation International plans to use this new market mechanism to protect millions of hectares of tropical forest over the next several years. This mechanism is not much different to the one that has kept Amazonas relatively free from deforestation over the last few decades.

Conclusions

In this lecture I have presented the tropical forest situation as a dilemma. The dictionary defines 'dilemma' as a situation that requires one to choose between two equally balanced alternatives, most often unattractive ones. And our two equally balanced alternatives, as you probably can figure out by yourself, are either to accept continuation of deforestation and loss of much of the tropical forest resource, with the associated unsatisfactory loss in biodiversity and other services, or to assist tropical countries to create, develop and finance socio-economic opportunities which are consistent with maintaining their land under natural forest (Table 3). Unfortunately, this second alternative currently seems to be an equally unsatisfactory alternative to donors, judging by the resources that have been brought to bear on these problems to date. If my thesis is true that money — and perhaps

Table 3. The tropical forest dilemma

Alternatives	Unsatisfactory aspect
Continue deforestation	Irreversible loss of biodiversity and life-supporting services
Subsidise sustainable forest management and/or pay for non-marketable values and services	Cost

only money — will save up to 700 million ha of tropical forests, then we might expect most of those to be lost over the coming decades.

Most farming and forest subsidies provided by developed countries are seen by many as perverse, distorting the economy and often having negative environmental effects. While agreeing with arguments to remove forest and forest industry subsidies in developed countries when they distort prices and encourage excessive use of natural resources, I *do* support subsidies for sustainable management of production forests in the tropics in order to make up for their lower productivity (in regard to marketable timber), to compensate for lack of direct payment for their environmental life-supporting services, and to implement minimum impact logging, which is essential to maintain biodiversity. These are legitimate and desirable subsidies because it is in the global public interest to arrest the conversion of tropical forests to other land uses, by enabling people to use and benefit from a continuous flow of desired forest products and services without undue reduction of inherent forest values and future productivity, and without undue undesirable effects on the physical and social environment.

You have probably reached a conclusion by now with regard to the question I raised at the beginning of this presentation. Table 4 summarises the situation.

The British Columbian forest sector, with huge investments, huge exports, a low-diversity resource and government support, will undoubtedly keep the majority of its forest cover in perpetuity, albeit perhaps with decreasing biodiversity. I regret to say that the future of the tropical forests of Mato Grosso and Amazonas is much less certain. It will depend in no small part on the willingness of the international community to play a role in remunerating tropical countries for the goods and services that arise from their sustainable management and conservation.

Table 4. Comparison between Amazonas state, Mato Grosso and British Columbia

	Total area (M ha)	Productive forest land (M ha)	Annual forest loss (ha)	Forest products exports (US billion dollars)
Amazonas	150	135	>50 000	0.02
Mato Grosso	91	40	660 000	0.2
British Columbia	95	49	0	10.6