

FOREST ECOSYSTEMS IN NATIONAL ECONOMIES AND CONTRIBUTION OF REDD+ IN A GREEN ECONOMY TRANSFORMATION: THE CASE OF PANAMA

[Policy Briefing]

Key points:

> Forests of Panama are being cleared at an alarming rate. Between 1992 and 2008, the country's forest cover decreased by 14 %.

> Forest exploitation provides timber to the forestry sector which contributes to the economy of Panama by supporting the production of many other sectors. Between 2001 and 2011, the forestry sector generated 80,590,000 US\$ of value added in downstream sectors, including the three most important sectors of the economy of Panama: the financial sector, the trade sector and the transportation sector.

> Forest conservation also contributes to human well-being through the provision of ecosystem services. But, since financial incentives to clear forests are stronger than incentives to conserve, deforestation occurs and these services are lost.

> Among the non-marketed services valued, regulating ones, and in particular carbon storage services (which contribute to climate change mitigation) and water regulation services, are among the most valuable. One hectare of deforestation in Panama releases around 436 tonnes of CO₂ in average, which corresponds to 3,224 US\$, following the price of carbon on the market.

> Deforestation between 1992 and 2012 generated net economic losses of 3,476 US\$ millions for the whole period. Forest conservation and sustainable forest management would have prevented such losses.

Introduction

Forests provide many goods and services, known as forest ecosystem services, which contribute to human well-being locally but also globally. They include the provision of marketed commodities such as timber, which impact directly the economy, and non-marketed services such as carbon storage, which contributes to climate change mitigation, water regulation in watersheds, soil erosion control, biodiversity provision, pollination, and provision of non-timber forest products, among others. While timber extraction and the conversion of forests to agricultural lands generate cash benefits, the maintenance of non-marketed services through forests conservation is not financially rewarded. Incentives to deforest are therefore stronger than incentives to conserve and the world's forest ecosystems are being cleared at an alarming rate of 13 million hectares per year (FAO 2012).

In Panama, forest cover losses have increased since the 1990s. Between 2000 and 2008, the annual deforestation rate in the country was around 1.46%, compared with 0.43% between 1992 and 2000 (data from UN-REDD). As a result, the area deforested between 1992 and 2008 amounts to around 586,000 hectares, which represents a loss of forest cover of more than 14%. Due to this process of forest clearing and degradation, most of the forest ecosystem services provided by Panamanian forests are being lost, including the carbon storage service.

A new international program called REDD+ is being developed to reduce emissions from deforestation and forest degradation worldwide. It also aims at enhancing carbon stocks and promoting sustainable forest management. This program, funded by industrialized countries (annex 1 countries from the Kyoto protocol), will provide financial compensation to developing countries to implement specific measures and policies to reduce their level of deforestation, enhance their carbon stock and manage forests sustainably. This way, it will not only maintain or increase the carbon storage service provided by forests, but also secure the provision of other ecosystem services: the REDD+ program will generate multiple benefits.

This Policy Brief reports the main results from a report produced by the Basque Centre for Climate Change (BC3) and the United Nations Environmental Program on the value of forests in Panama and their contribution to the Panamanian economy (UNEP 2013). The aim is to describe and value the full range of services provided by forests in Panama. It also presents key results about the current costs and benefits from deforestation in Panama and a number of policy implications.



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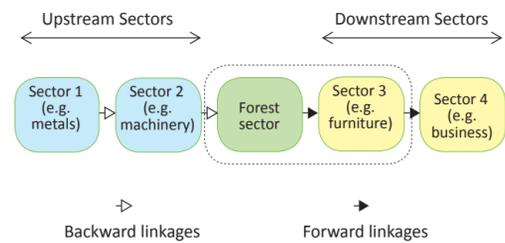
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The contribution of forests to the Economy of Panama

Some of the benefits provided by Panamanian forests, specifically those related to timber extraction and commercialization, are accounted for in the Gross Domestic Product (GDP) through the impact of the forestry sector. To estimate this impact it is necessary to understand that this sector is part of a chain of production in which each link is a sector. This is illustrated in figure 1 below.

Figure 1: The forest sector, downstream sectors and upstream sectors in the economy



First, the forest sector has a direct impact on its downstream sectors because timber is used as an input in different manufacturing and transformation industries such as wood products, paper and paper products and furniture manufacturing (dotted line box in figure 1). All of these industries provide financially tangible contributions to the economy of Panama. Their contribution to the GDP, together with the contribution of the forest sector itself is summarized in figure 2 below. As can be noted, this contribution is small as it represents less than 0.9% of the GDP. Also, between 2001 and 2010, the GDP of Panama more than doubled while the production remained constant in the forest sector. As a result, the contribution share of the forest sector to the GDP decreased since 2002.

Second, the production of these manufactures also enters into the productive process of other sectors such as the business

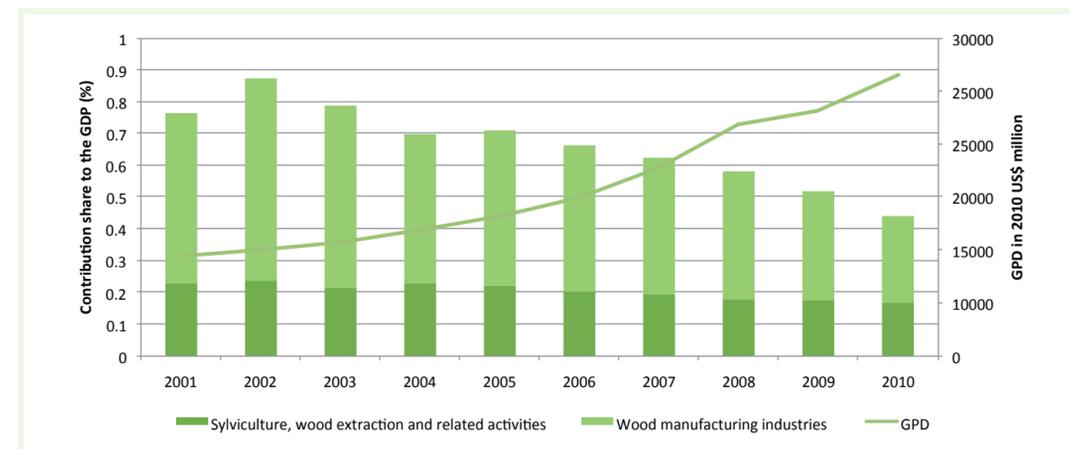


Figure 2: GDP and contribution share of silviculture and related industries in Panama between 2001 and 2010

sector, among others (sector 4 on figure 1). Therefore, the forest sector indirectly supports the production of various other sectors of the economy. These are called forward linkages. Similarly, the forest sector also uses products from upstream sectors, machinery for instance. These linkages to upstream sectors (sectors 1 and 2 on figure 1) are called backward linkages. However, since the forestry sector is a primary sector, it is mainly associated to other sectors through forward linkages and has relatively few backward linkages.

It is possible to estimate the forward and backward linkages that each sector has with the rest of the economy. This led to a typology of the sectors as shown in figure 3. In this graph, the horizontal axis tells how much any given sector supports the production of downstream industries. The higher the value on this axis the stronger the forward linkages are. The vertical axis tells how much any given sector employs outputs from upstream industries as inputs in its own productive processes: the higher the value, the stronger the backward linkage is. The size of the circle corresponds to the gross value added created in any given sector and as such it indicates the direct contribution of the sector to the Panamanian GDP.

As illustrated by figure 3, the three most important sectors of the economy of Panama in terms of their share in the total GDP of the country are the financial sector, the trade sector and the transportation sector. The forestry sector (indexed 21 on figure 3) is a relatively small sector but it strongly supports downstream economic sectors, more than any other sector. On the contrary, forestry is not dependent on other sectors' production.

As a further indicator of the key economic significance of the forestry sector, it is worth noting the extent to which the forestry sector contributes to the value added of other sectors. On average over the period 2002-2011, the total annual value added generated in downstream sectors by forestry reaches 80,590,000 US\$. The main sectors affected by the forest sector are the wood and paper sector, the construction sector, the fishing sector (due to boats' construction), the financial sector, the trade sector and the transportation sector.

However, the GDP indicator does not take into account all the benefits provided by forests. It focuses merely on timber provision while forest ecosystems provide many other services that contribute to human well-being. For this reason, a valuation of other forest ecosystem services gives a better appraisal of the important role of Panamanian forests.

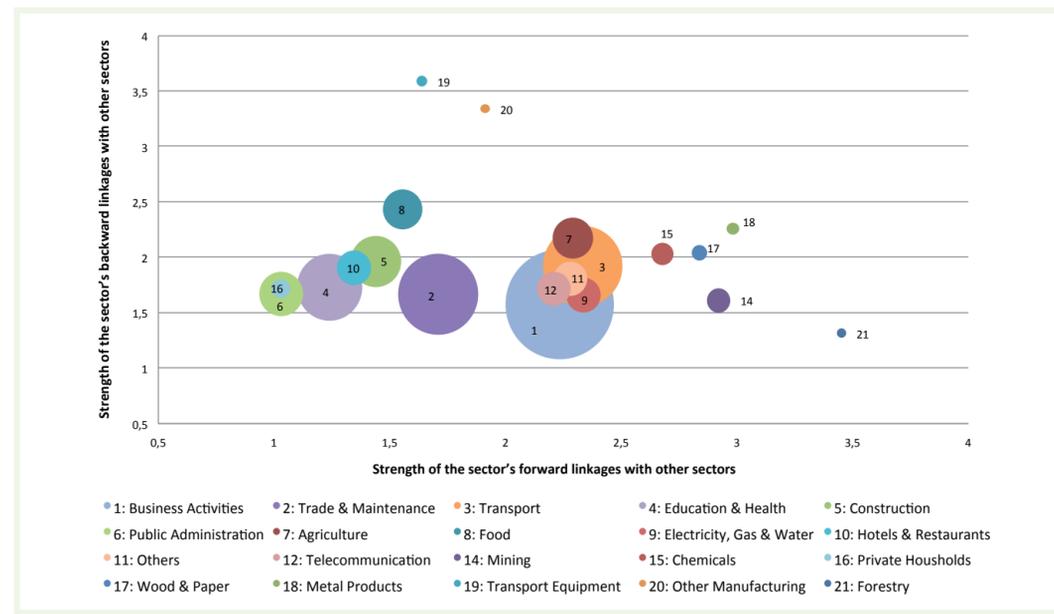


Figure 3: Typology of sectors of the Panamanian economy in average between 2002 and 2011.

The value of the forests of Panama for human well-being

Forest ecosystem services can be divided in three main categories: (i) provisioning services, (ii) regulating services and (iii) cultural services (MEA 2005, Kumar 2010). This classification is summarized in figure 4.

Provisioning services cover the provision of forest goods such as wood (timber and fuelwood), non timber forest products (NTFP) and pharmaceuticals. Regulating services are services that determine the functioning capacity of ecosystems. Cultural services capture many of the non-use values of forests, for instance more intangible existence, spiritual values and inspirational values associated with well-being. Finally, biodiversity supports the ecosystem functioning and therefore the provision of services, in particular the regulating services.

As can be seen, timber provision is only one of the many benefits provided by forests. Using data from existing studies conducted in Panama and other Latin American countries, it is possible to estimate the value of forests for other services, including provision of non timber forest products, soil protection, water protection, bioprospecting, pollination services, and carbon storage services. Nevertheless, non-marketed services' valuation faces several challenges, mainly due to social and ecological uncertainties. For this reason, the values estimated should be taken with due caution.

Results show that the regulating services are the most valuable ones. One hectare of deforestation in Panama releases around 436 tonnes of CO2 in average, which corresponds to 3,224 US\$, following the price of carbon on the market (Peters-Stanley & Yin

2013). Regarding water regulation, the deforestation of one hectare of forest could have either a positive or a negative impact depending on its location (Simonit & Perrings 2012). In some areas of Panama's canal watershed, it could cost up to 2,462 US\$ per hectare deforested. The impact of forests on soil fertility and sedimentation is also important.

Additionally, it is interesting to estimate the economic impact of deforestation. Using data on forest cover in Panama in 1992, 2000 and 2008, economic benefits and losses from 1992-2012 deforestation were estimated to answer the following questions: is deforestation economically profitable? The following table gives these gains and losses for the year 2012 only as well as the cumulated gains and losses for the whole period.

Table 1: Gains and losses caused between 1992-2012 due to deforestation in US\$ million

	2012	1992-2012
Gains from deforestation	334.6	2,927.7
Losses from deforestation	606.4	6,628.3
Net losses from deforestation	271.8	3,700.6

In 2012, deforestation provided cash revenue for Panama due to timber sales and agricultural revenues of around 335 million US\$. Nevertheless, deforestation also resulted in the loss of valuable ecosystem services that tradeoff with such provisioning services. In contrast, forest conservation would have secured the provision of these services. This economic loss reaches about 606 US\$ million in year 2012. As a result, the cumulative deforestation that happened between 1992 and 2012 in Panama led to an average net economic loss of about 272 US\$ million in the year 2012 only. In total, over the period 1992-2012, it generated 3,700 US\$ millions of economic losses.

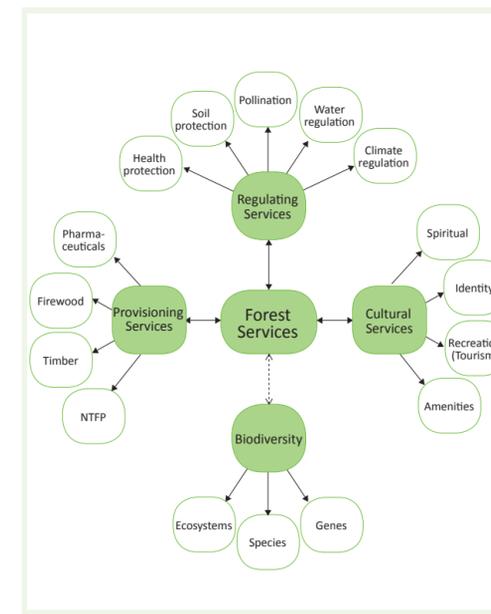


Figure 4: Typology of forest ecosystem services.

Policy implications

Following these results, Panama would benefit from forest conservation and sustainable forest management. With REDD+, the amount of funds available for forest protection is likely to increase substantially (Pascual et al. 2013). It might therefore help Panama to achieve a successful transition to a green economy by supporting the implementation of policies which reduce forest clearing (UNEP 2011). In particular, REDD funds could help:

- > Improving the enforcement of existing protected areas
- > Improving forest management through the development of sustainable management plans and certifications
- > Improving the control of illegal logging and the compliance with community permits
- > Favoring alternative land uses such as agroforestry systems, which are compatible with the maintenance of some ecosystem services
- > Improving the quantity and quality of information regarding forest assets in a way that explicitly accounts for the spatial heterogeneity of forests..

In addition, the portfolio of policies chosen to fight deforestation and increase carbon stocks should:

- > Take into account the risks of *deforestation leakage* within the country. It occurs when deforestation seems to stop in one area, while, in reality, it has been moved to another area. For this reason, no area should be ignored.
- > Include different types of measures to take into account the location and status of the forests. This is essential because drivers of deforestation differ according to the area considered (Mariscal 2012). In particular, these drivers are different in the north-west

of the country, in the Canal area and in the East. Furthermore, because some forested areas are located in indigenous territories, and, as such, managed by communities, and others are located in protected areas.

> Not be jeopardized by policy measures which favor competing activities, in particular cattle ranching activities which benefit from advantageous loans.

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