

Key results

The benefits from forest ecosystem services are presented in the table below (in US\$/ha/yr or US\$/ha). The color represents the uncertainty associated with each estimation: green refers to low uncertainty, yellow to medium uncertainty and red to high uncertainty.

Service	Minimum value	Average value	Maximum value
Timber provision without SFM ** (not per year)	266	419	572
Timber provision with SFM *	162	255	348
Fuelwood provision *	-	111	-
NTFP provision *	6	16	42
Pharmaceuticals provision *	0,1	5	16
Water regulation in the Canal watershed *	-972	-25	2462
Water regulation outside of the Canal watershed *	-269	-41	682
Soil fertility *	-	490	-
Sedimentation control in the Canal watershed *	46	76	106
Sedimentation control outside of the Canal watershed *	40	70	100
Pollination *	0	0,3	151
Carbon Storage ** (not per year)	1,068	3,224	7,784
Ecotourism in protected areas *	15	-	16

* in US\$/ha/yr, ** in US\$/ha

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.

Forests also provide environmental services. 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.

Deforestation between 1992 and 2012 generated net economic losses of 3,700 US\$ millions on the whole period. Forest conservation and sustainable forest management would have prevented such losses.

The REDD+ program to finance forests conservation

An international program to reduce deforestation in developing countries (REDD+) is currently under development. It is an initiative aimed at:

- > reducing emissions from deforestation and forest degradation in developing countries,
- > promoting forest conservation and sustainable management of forests and
- > enhancing carbon stock through reforestation.

The main aim of the program is climate change mitigation but forest conservation would also secure the provision of other goods and environmental services.

With REDD+, the amount of funds available for forests protection may increase substantially. In Panama, REDD+ funds could finance an increase in the control of illegal logging and permits compliance, sustainable forest management plans, reforestation and afforestation policies, agroforestry promotion and acquisition of new information.



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



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What do forests give us?

Forest ecosystems provide considerable benefits to human well-being. They include both goods and environmental services.

- Forests provide raw materials, especially timber, to industries thus contributing to the economy.
- Through fuelwood, forests provide a source of energy for local people, especially for cooking. They also provide many non timber forest products that are widely used by local people and indigenous communities as food, medicine, handcraft materials, etc...
- Forests can help to regulate water flows in watersheds by reducing the frequency and strength of drought and flood events.
- Forests prevent soil erosion therefore limiting loss of soil fertility and sedimentation in downstream rivers and reservoirs.
- Forests provide habitats for more than half the known species in the world, including wild insects such as native bees that pollinate two-thirds of the world's crop species.
- Forests play a key role in climate regulation by storing carbon. When forests are cleared, carbon stored above and below ground in leaves, branches, stems and roots is released into the atmosphere. As a result, forest clearing is a major source of CO₂ emissions and contributes to climate change.
- Forests offer beautiful landscapes which attract tourists and generate economic benefits for the local communities.
- Forests have spiritual and cultural values for local communities.

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The deforestation problem

The destruction of forests is one of many environmental problems with local, regional, national and global implications. Global deforestation, although showing signs of decline in some regions, is still alarmingly high at 13 million hectares per year, which is about 0.33% of global forest cover. This corresponds to losing an area the size of England every year.

In Panama, the forest area decreased by 586,000 hectares between 1992 and 2008 (an area bigger than the Coclé province), which represents a loss of more than 14% of 1992 forest cover. This corresponds to an annual rate of 0.95% (almost three times the global rate). This process of forest clearing and degradation has been driven by a variety of factors depending on the regions, including the growing demand for timber products, the competition with more lucrative land uses such as cash crops and cattle ranching, and the development of roads and infrastructure. As a result, deforestation differs between areas, some being more strongly affected than others.

The consequences of forest destruction on the people and economy of Panama are enumerated below:

- > Forests goods are not provided anymore. For instance, timber, wood fuel, and non timber forest products are no longer available for local populations.
- > Forests services are lost, so that the frequency and strength of drought and flood events increases, soil fertility decreases, sedimentation increases, habitats and biodiversity are lost and more CO₂ is released into the atmosphere, thereby contributing to climate change. This impacts local populations, the economy of the country (for instance the transportation and the energy sectors) and the global economy through climate change adaptation costs.
- > Economic benefits from ecotourism decrease.

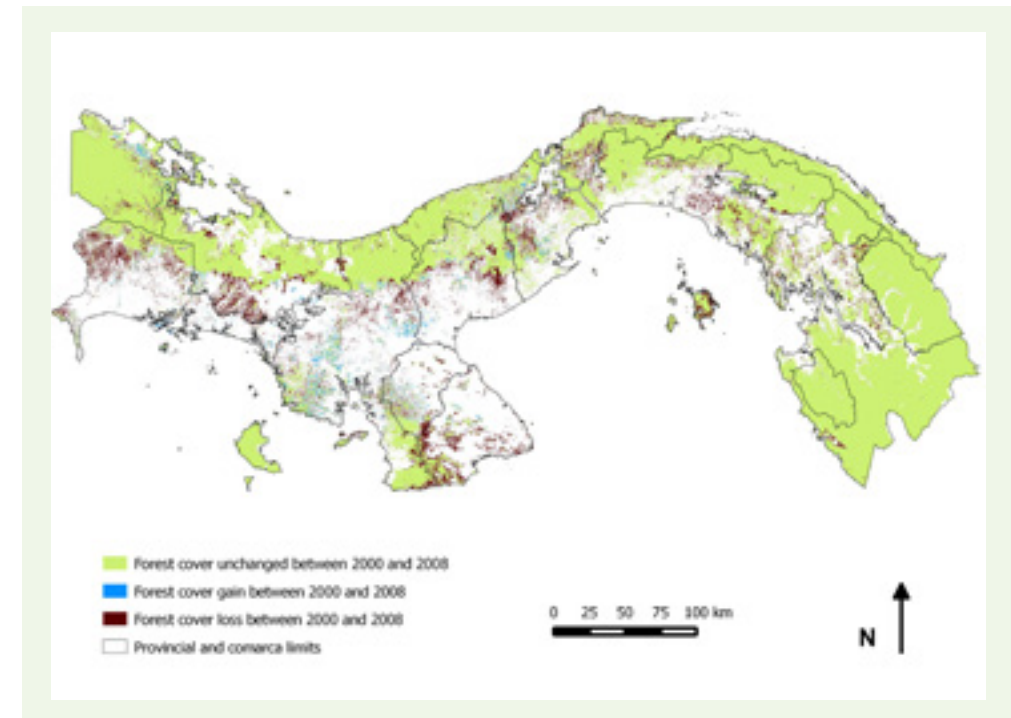
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Deforestation and land degradation in Panama. Source: *The Smithsonian Tropical Research Institute*

The aim

The United Nations Environment Program (UNEP), in collaboration with the UN-REDD program in Panama, initiated a project whose key objective was to generate the factual evidence showing the net benefits to Panama from embracing sustainable forestry. This evidence included comparing the benefits to Panama of cutting down its forests (in terms of timber supply and agricultural income) against all other forest benefits that would be lost forever as a result of such decisions.



Forest cover change between 2000 and 2008 in Panama