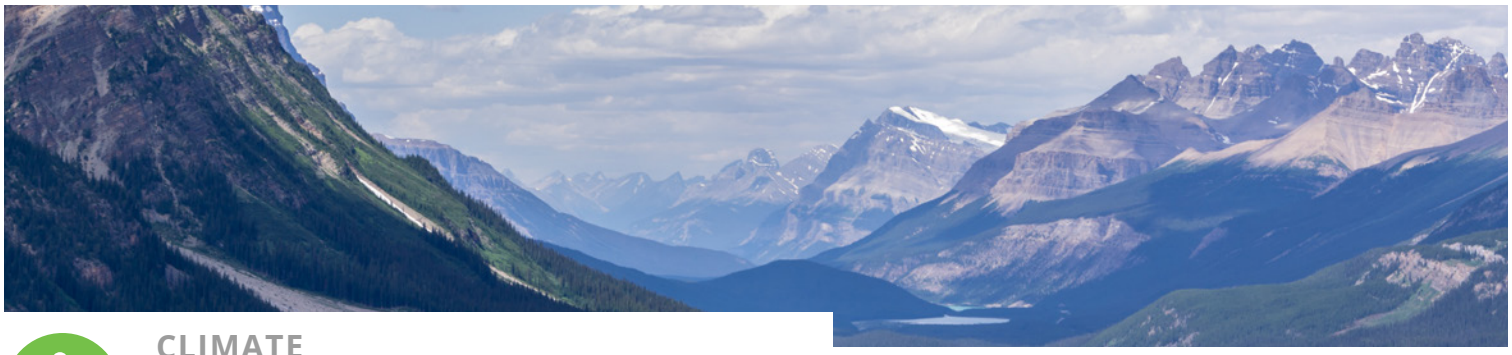
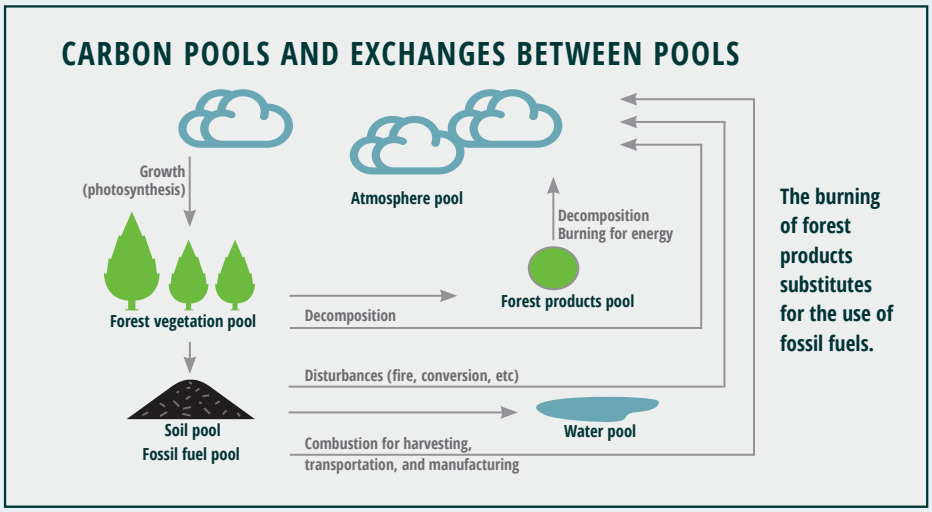


CLIMATE

Have climate issues been addressed?

Excerpts from the report: *Sustainable Procurement of Wood and Paper-based Products: Guide and Resource Kit*

Climate and forests are intrinsically linked (see figure). As a result of climate change, forests are stressed by higher mean annual temperatures, altered precipitation patterns, and more frequent and extreme weather events. At the same time, forests mitigate climate change through uptake of carbon, and the loss of forests through land-use conversion and forest degradation causes carbon dioxide emissions that contribute to climate change (IPCC, 2014).



Climate Change Mitigation

Forests remove carbon from the atmosphere (carbon sequestration) and store it as trees grow. Global forest carbon stocks are estimated at 861 billion tons, more than half of which is stored in tropical forests (Pan et al. 2011). When trees are harvested, they stop absorbing carbon from the atmosphere, but the resulting wood products, including solid wood and paper-based products, continue to store carbon through their lifetime (inset on carbon neutrality).

Some of the concepts related to the role of forests in climate change mitigation include:

- **Carbon neutrality** – In general, 'carbon neutrality' is achieved when the amount of carbon released from the production process is offset by an equivalent amount captured in new growth, thus resulting in net zero emissions. Wood harvested from forests with stable or increasing carbon stocks can be considered carbon neutral (WBCSD, 2013). In contrast, wood from forests that are being converted to non-forest land use would not be carbon neutral. However, because greenhouse gas emissions are released along the wood products production process, wood products might not be carbon neutral if such emissions are not offset (Lippke, Wilson, Meil, and Taylor, 2009).
- **Forest restoration –** Establishing new forests on suitable land and replanting on formerly forested areas can store additional carbon. The rate at which trees and forests recapture atmospheric carbon depends on the interplay of several factors.

- **Age of trees:** A young stand with small trees will absorb carbon as the trees grow. The amount of carbon stored is initially small, however, because the trees are small and organic matter decomposes more rapidly under an open canopy. An old stand with big trees results from a long period of biomass accumulation. The carbon accumulation rate generally increases with older and bigger trees, though the rate of growth for individual trees does not equate to the overall growth of the stand (Stephenson et al., 2014).
- **Supply and use of resources:** Trees depend on resources, such as sunlight, water, and nitrogen, to grow. As a forest stand develops, the trees increasingly compete for these resources. A tree's ability to compete for resources depends on its size and age (Caspersen, Vanderwel, Cole, and Purves, 2011; Stephenson et al., 2014).
- **Efficiency of resource use:** The efficiency of resource use depends on size and species of trees. Larger trees are generally more efficient in absorbing resources than smaller trees, though this changes over various stages of stand growth (Binkley, 2003).

Reducing Emissions from Deforestation and Forest Degradation (REDD) – REDD is a global effort to create financial incentives for reducing carbon dioxide emissions from forests by decreasing conversion of forested land for other uses.

Contributions to Climate Change

When forests are logged, destroyed, or burned at a faster rate than the rate at which they regrow, they can contribute to climate change. Additionally, while logging of tropical hardwoods is sometimes the primary purpose of forest clearing, it can also trigger and enable other drivers of deforestation by providing other users with access roads. Other drivers of deforestation include expansion of large-scale agricultural production such as palm oil, cattle ranching and coffee; small-scale subsistence farming; and urban sprawl.

However, logging does not necessarily have to lead to deforestation. In a sustainably managed forest area, the growth of new trees can compensate for the carbon lost through annual logging within the area. In contrast, a forest that is subjected to land-use change or over-harvesting that leads to permanent forest cover loss will release more carbon than it takes up.

Factors to Consider Regarding Climate Change

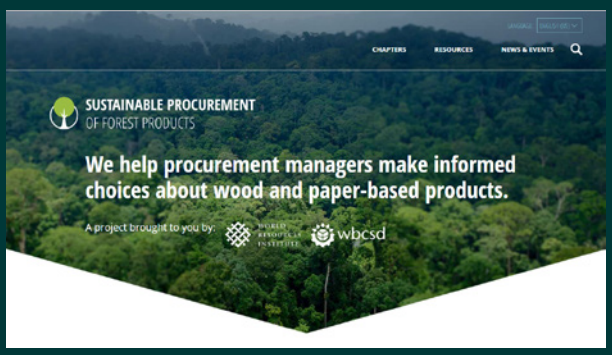
Some argue that old-growth forests with stable carbon stocks should be replaced with stands of young, vigorously growing trees as a way to increase carbon uptake. However, this would reduce the amount of carbon stored on the land, and it would take decades, or even centuries, for the GHG benefits of the newer stands to overcome the loss of carbon from the original forest. Furthermore, old-growth forests, particularly in the tropics, are important to preserving the world's biological diversity, and therefore should not be considered on the basis of carbon stocks and flows alone.

For more information on these issues and to download a copy of the guide, Sustainable Procurement of Wood and Paper-based Products: Guide and Resource Kit, visit **www.sustainableforestproducts.org**.

For more information, please contact **sustainableprocurementguide@wri.org**.

wbcsd
E-mail: **info@wbcsd.org**
Web: **www.wbcsd.org**

WORLD RESOURCES INSTITUTE
E-mail: **info@wri.org**
Web: **www.wri.org**



For a complete list of references, please visit www.SustainableForestProducts.org/references