

Tropical forest sustainability: A climate change boon

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Improved management of the world's tropical forests has major implications for humanity's ability to reduce its contribution to climate change, according to a paper published today in the international journal, *Science*.

The authors – Dr Pep Canadell from CSIRO and the Global Carbon Project, and Dr Michael Raupach from CSIRO – say the billions of tons of carbon dioxide (CO₂) absorbed annually by the world's forests represents an 'economic subsidy' for climate change mitigation worth hundreds of billions of dollars.

However, concerns about the permanence of forest carbon stocks, challenges in quantifying changes in the size of those stocks, and concerns about the environmental and socio-economic impacts of reforestation programs, have limited the adoption of policies designed to foster forestry activities.

"With political will and the involvement of tropical regions, forests can contribute to both climate change protection through carbon sequestration and also enhanced economic, environmental and socio-cultural benefits," Dr Canadell says.

"Forestry activities have the economic potential to offset 2-4 per cent of projected CO₂ emissions by 2030, with tropical regions accounting for nearly two thirds of the total offset".

"A key opportunity is the reduction of carbon emissions from deforestation and degradation in tropical regions," he says.

An estimated 13 million hectares of the world's forested areas – almost exclusively in the tropical regions – are deforested annually. Dr Raupach says, however, reducing rates of deforestation by 50 per cent by 2050, and stopping further deforestation when countries reach 50 per cent of their current forested area, would avoid emissions equivalent to six years of current fossil fuel emissions by the end of this century.

"This estimate shows that even with significant continuing deforestation, the mitigation potential is large, although major changes in governance and price incentives are required to realize this potential," Dr Raupach says.

They authors also note, however, that efforts to mitigate climate change by increasing both the overall area and volume of biota in those forests, does carry the risk that events such as bushfires and insect outbreaks can release massive amounts of sequestered carbon back into the atmosphere.

"Since 2000, for example, increases in the areas of Canada's forests affected by bush fires and insect outbreaks have transformed them from a 'CO₂ sink' to a 'CO₂ source' – a situation which is expected to continue for the next 20-30 years," Dr Canadell says.

"Forests also affect biophysical properties of the land surface, such as sunlight reflectivity and evaporation, and that climate models suggest large reforestation programs in the boreal (colder) regions of the world could have limited benefits due to the replacement of large areas of reflective snow with dark forest canopies.

"Conversely, the climate benefits of reforestation in the tropics are

enhanced by positive biophysical changes such as cloud formation which further reflect sunlight," he says.

Source: CSIRO Australia

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