Could wood combat climate change?

And could this help sustainable development?

Duncan Macqueen, James Mayers and Hannah Reid
2004



Key points:

- Wood is better for the climate than a range of alternatives
- More wood use, and improved wood use would help mitigate climate change
- European wood has strong sustainability credentials – but there is still much room for improvement
- Elsewhere, sustainable forest management is often an elusive goal
- If carefully done, forestry can play a part in mitigating climate change whilst furthering the cause of sustainable development

iied

International Institute for Environment and Development
3 Endsleigh Street
London WC1H 0DD
Tel: +44 20 7388 2117
Fax: +44 20 7388 2826
E-mail: info@iied.org
Website: www.iied.org

ECCM The Edinburgh Centre for Carbon Management

Combating human-induced climate change is a key challenge of our age, and requires a wide range of concerted actions. Preferential use of wood products can make a positive contribution – both in terms of mitigating the negative effects of climate change and fostering sustainable development. But as citizens and consumers we need to get our facts straight. This briefing paper helps do this.[1]

1. Forests are able to store significant quantities of carbon…

Forests and trees absorb up to 25% of global fossil fuel emissions of CO_2, an important greenhouse gas. The science is simple enough: trees convert CO_2 into solid carbon, in the form of wood, and they do so particularly effectively when they grow rapidly – and when that carbon is locked up in durable or recycled products. Expansion of fast-growing plantations for a range of wood products results in a net storage of approximately 0.2 billion tonnes carbon per year and rising (Figure 1).[2] Sustainable management of slower growing natural forests could also store carbon, but continuing deforestation, mainly in tropical regions, is currently thought to be responsible for annual emissions of 1.1 to 1.7 billion tonnes carbon per year, or approximately one fifth of human CO_2 emissions.[3]

…but only if wood products are valued and used

Deforestation is caused primarily by a lack of demand for wood products – not the reverse. The key problem is that forests cannot generate as much profit as land use alternatives (such as oil palm, soybean and ranching). Substituting or boycotting wood to 'save the forest' has almost entirely the opposite effect. As consumers refrain from buying timber, timber prices fall and the value of forests falls in comparison with land use alternatives. Since producers are no longer able to make a competitive income from forestry, the obvious alternative is to deforest the land and use it for something else.

Logging by itself rarely leads to deforestation. In temperate / boreal plantations and semi-natural forests, trees are normally 'clearcut' – leaving a large area of temporarily denuded land. But in most European countries replanting is obligatory and enforced. For most plantation companies, replanting is also a commercial imperative. In diverse natural tropical forests, companies generally log a tiny number of commercially valuable species (e.g. normally less than 15 out of 2,500 woody species in the Amazon). Logging is therefore 'selective' and, where it is done well, leaves between 50-70% of the large trees untouched.[4] Where it is done badly, logging may degrade the quality of the forest resource, but rarely does it remove forests altogether. It is what happens outside the forest sector that is critical to the long-term fate of the forest, e.g. settlement, ranching and conversion to cash cropping.

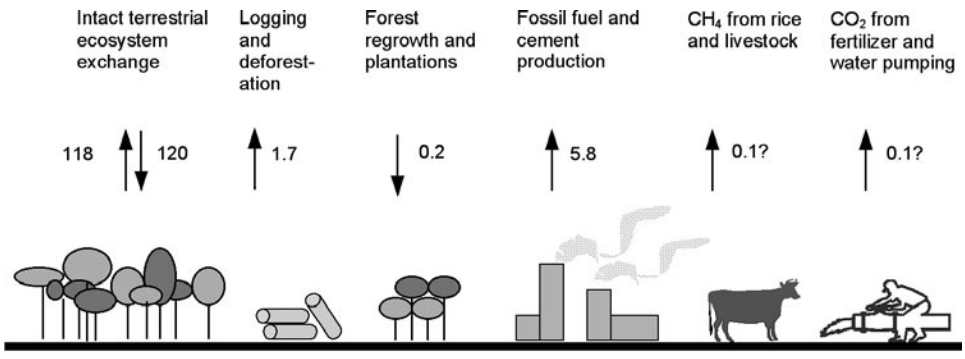
Furthermore, critical forces that affect the forest generally derive from domestic markets, not international ones (e.g. 86% of Amazonian timber is consumed within Brazil).[5] International boycotts thus cannot stem domestic pressures on forests. Instead, international consumers can play a positive role in pressing for improved management sustainability – by valuing and using wood and by demanding it comes from legal and sustainable sources.

2. Wood products are significantly better for the climate than alternatives….

One of the quickest and lowest-cost options for reducing CO_2 emissions is to replace non-renewable fuels such as coal or oil for renewable fuels such as biomass wastes and residues. Biomass plantations will promptly store again the amount of carbon released by burning biomass fuels – the net effect is close to zero.

For short life-cycle packaging materials, substituting one tonne of virgin card for glass, plastic, steel or aluminium results in an average saving in excess of 1.1 tonnes of CO_2 savings (e.g. 1.1 tonnes of

Figure 1. Carbon flows between the land and the atmosphere (billion tC yr–1)



Source: Edinburgh Centre for Carbon Management (ECCM)

CO_2 for glass, 2.8 tonnes of CO_2 for PVC, 2.9 tonnes of CO_2 for steel and 4.1 tonnes of CO_2 for aluminium). Substitution with recycled card also makes considerable savings (e.g. 0.1 tonnes of CO_2 for glass, 1.8 tonnes of CO_2 for PVC, 1.9 tonnes of CO_2 for steel and 3.0 tonnes of CO_2 for aluminium).[6]

For long life-cycle construction materials (Figure 2), substituting a cubic metre of wood for substitutes (concrete, blocks or bricks) results in an average of 0.8 tonnes of CO_2 savings. For example, substituting light concrete blocks with wood saves 0.725 tonnes of CO_2 or substituting heavy concrete results in savings of 1.01 tonnes of CO_2. Substituting red brick with wood results in savings of 0.922 tonnes of CO_2.[7]

Strategies to improve the effectiveness of wood as a carbon store should aim to achieve a greater proportion of wood products, a longer useful life, and increased recycling.

…but current policies still disregard the climatic benefits of wood

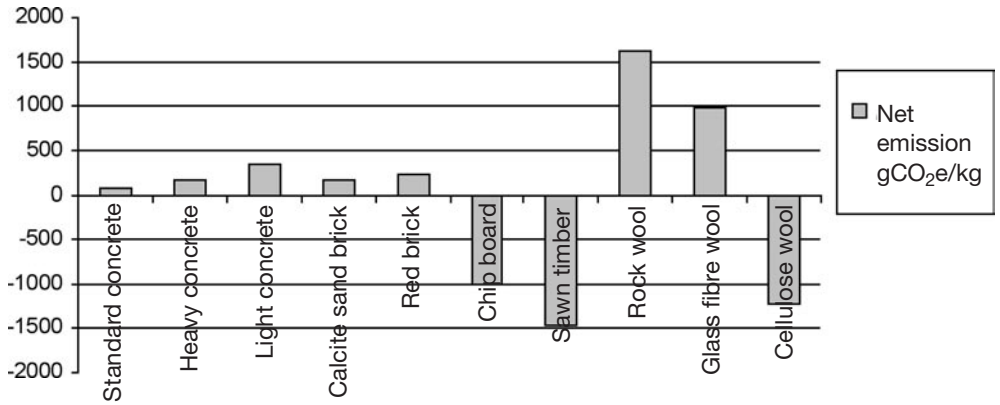
In spite of the overwhelming evidence to the contrary, the use of wood substitutes, and the belief that these substitutes are better for the environment than wood, are both increasing. Greenhouse gas emissions reporting under the United Nations Framework Convention on Climate Change unjustifiably favours non-wood alternatives (as harvested forest products are classified as emissions as soon as they leave the forest site). Building and packaging standards also place barriers in the way of wood use – often despite technological advances which might overcome structural or hygiene concerns. Recycling and recovery programmes for wood are often dismissed in favour of incineration and landfill due to prevailing attitudes and lack of political will. Each of these policies has the perverse effect of favouring more carbon intensive wood substitutes. The development of a workable carbon intensity labelling system, pro-wood building and packaging standards and invigorated recycling programmes would help to maximise the climatic advantages of wood use.

3. Within Europe, wood has particularly good sustainability credentials…

Most European wood comes from Europe! Trade in Europe's wood products accounts for approximately one third to one half of the global trade across various product categories but over 90% of imports of roundwood and sawnwood into Europe are from other European states:

- *Softwood – roundwood and sawn – is almost entirely sustainable* (and only 2% of imports in Europe are from outside Europe) – the few question marks extend to sources in the Russian Federation.
- *Hardwood – roundwood and sawn – is mostly sustainable* (only 9% of hardwood roundwood and 40% of sawnwood originates from outside of Europe) – of these, some imports from Africa and South America come from certified forests, but supplies from a number of sources in Africa, South East Asia and Latin America are strongly questioned.
- *Panels are mostly sustainable* – Europe imports just over 20% of its total panel consumption – the main concern is over tropical hardwood plywood from South East Asia where overcapacity is a major problem.
- *Pulp and paper is almost entirely sustainable* – if one accepts that sustainability can be applied to intensive plantations, from which most pulp and paper production are sourced. Europe is a net exporter of pulp and paper, but also imports approximately half of its apparent consumption, mostly from plantations in North and South America.
- *Secondary processed wood products are of questionable sustainability when sourced outside of Europe* – Some 50% of furniture and builders' woodwork, mouldings and other products are sourced from other regions. Many of these sources, ▶

Figure 2. Net emissions from building material life cycles in gCO_2e per kg material



Source: RTS (1998-2001)[8]

particularly from Asia have suspect social and environmental sustainability, for which chain of custody certification will be increasingly important.

…but sustainable development is a greater challenge – and consumers can play their part

In addition to timber and climate benefits, diverse natural forests provide multiple benefits to local populations: employment, foods, medicines, construction materials, crafts, water regulation, soil stability, biodiversity, cultural identity and landscape beauty. Yet sustainable forest management in these diverse forests is a complex (and costly) affair – with the result that natural forests are quickly being replaced by more lucrative plantations or other land use alternatives. Plantations are easy to certify as sustainable as they have a simple cycle of harvesting and replanting. Should the consumer wish to support the sustainable management of natural forests (rather than their conversion to plantations or other land uses) a good strategy is to pay premium prices associated with certified timber from such forests. Refusing to buy timber from natural forests, or switching to substitute materials will only exacerbate the problem while increasing greenhouse gas levels.

Constructive consumer support for the climatic benefits of the forest sector is also important because whilst the science of forest carbon storage may be simple, the politics are not. Many are opposed to forest orientated carbon sequestration projects on the grounds that any focus on forest sinks diminishes the focus on fossil fuel emission sources. Yet while at least 90% of the cuts will have to come from cleaner fuels and greater energy efficiency, forest expansion to a realistic maximum of 100 million hectares over 50 years could sequester up to 7% of the annual human carbon loading of the atmosphere.[9] However, many are fearful that forests planted to offset global warming will consist of genetically modified trees in plantations which also displace local inhabitants. These are legitimate fears, and carbon sequestration projects therefore need careful planning to ensure that additional sustainable development benefits are not sidelined.

Finally, there are many ways in which climate change mitigation and sustainable development can go hand in hand. For instance, improvements in energy efficiency, renewable energy, transport and sustainable land-use policies all have positive impacts on both. Consumers need to recognise these links, in addition to affirming the merits of wood products, especially from natural forests. Understanding that forests and wood products act as carbon stores and thus help mitigate climate change, and that significantly more carbon can be stored when wood products replace other construction and packaging materials, and when these wood products are re-used (for example if wood waste is used as an energy source rather than landfill), recycled and repaired, is key. Enlightened consumer support in making these links has never been more important.

Notes

1. This briefing paper is based on a more substantial IIED and ECCM report funded by the Nordic Timber Council: Reid, H., S. Huq, A. Inkinen, J. MacGregor, D. Macqueen, J. Mayers, L. Murray and R. Tipper (2004) *Using wood products to mitigate climate change: a review of evidence and key issues for sustainable development*. IIED, London, UK. 90pp.

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Design: Andy Smith (andymss@aol.com) Print: Russell Press Ltd, Nottingham UK. Pictures: Åke E:son Lindman