

Convergence of food, fuel and fibre markets: driving change in the world's forests

Don Roberts, Andy White and **Sten Nilsson** set out the main factors responsible for the growing pressure on land, and forests in particular.

Converging demand, converging markets

The converging global demand for land to produce food, fuel and fibre will likely lead to a large-scale land grab, and forest lands are likely targets. Indeed, forests will increasingly be converted to industrial agricultural use to meet these burgeoning demands. Using conservative estimates, future demand for land will equal at least 515 million hectares: 200 million hectares for agriculture, 290 for bioenergy production (including fuelwood), and 25 for industrial tree plantations. This is far more than is available. After accounting for built areas, cultivated lands, forests, non-vegetated areas, parks, mountains and grasslands for meat production, there are only between 250 and 300 million hectares of land available for producing biomass. The additional 200 million hectares required to meet future demand can only come from forests (see http://cofi.org/library_and_resources/annual_convention/2008/pdf/Don%20Roberts%20-%20CIBC%20World%20Markets.pdf).

The global expansion of biofuels is driven by increased concerns about environmental, economic, national and political security. These concerns are also behind the ambitious targets for biofuel use being set by many countries, including some of the largest economies. China, for example, is aiming to put into place some 30,000 MW of biomass-fired power generating capacity by 2020. The Chinese government, conscious of the need not to let biofuel production displace food production, is supporting cellulosic ethanol production – i.e. using wood or grass-based feedstock, rather than say maize or sugar cane. The government has also targeted 13.3 million hectares of

marginal lands to be devoted to supporting the bio-energy sector. For Brazil, some analysts forecast that annual ethanol output from sugar cane will grow from roughly 18 billion litres in 2006 to over 40 billion litres by 2015. In Indonesia, the palm oil industry already has 6.5 million hectares of plantations across Sumatra and Kalimantan. Some observers predict this area will reach 16.5 million hectares by 2020. And finally, following rapid expansion stimulated by a combination of subsidies and minimum renewable fuel content targets, the US is now the world's largest producer of biofuel, principally from maize.

Because food and fibre are now converted into fuel on such a large scale, one way to understand what the 'biofuel boom' means is to consider the convergence of markets for these three commodity groups.

These three markets will converge in the sense that their primary feedstocks will tend to trade on the basis of their 'energy equivalency'. Thus, as substitute feedstocks for biofuel production, maize and woodpellets will move towards being similarly priced on the world market. For the forest sector, biofuel represents a new meaningful user of wood, particularly lower quality wood. This increase in demand will put upward pressure on wood prices until, as expected, they reach a price floor which reflects the wood's energy equivalency. In most parts of North America, the price of sawdust/shavings approximately doubled between 2005 and early 2007.

As well as feedstock costs (which account for up to 80 percent of biofuel production costs), the other key variables driving the economics of biofuels are the price of oil



(the main substitute), regulations (which stimulate demand) and the conversion technology. At present, all of these variables are in a state of flux, notably the price of oil. Historically, the observed pattern has been that when crude oil prices fall below \$60/barrel, interest in building biofuel plants falters in most countries (except for Brazil), and sparks when oil hits \$70/barrel and above. The rocketing oil prices of recent months thus go a long way in explaining the rapidly growing interest of governments in both developing and developed countries in setting targets and providing subsidies for biofuel production.

The use of wood in biofuel production has the disadvantage of more expensive processing costs, relative to other feedstocks such as sugar and maize. However, those costs are coming down. Wood has other advantages, including longer and cheaper storage, lower transportation costs, less intensive use of inputs, and established collection systems.



Eucalypt plantation in Brazil. Wood-based biofuel production could boost developing country economies – but at what price?

It is estimated that an additional 20–25 million hectares of land will be required for intensive industrial plantations to meet global demand in 2020

Although the capital costs are still higher for processing wood, the variable costs may be lower, thus making wood a competitive feedstock.

What does this mean for forests?

Price increases in wood feedstocks should stimulate increased production and, as mentioned above, it is estimated that an additional 20–25 million hectares of land will be required for intensive industrial plantations to meet global demand in 2020. However, due to possible decreases in the supply of land for forestry, the effects will be most felt in the southern hemisphere where lower land costs combine with higher crop yields and lower labour costs. This is a

potential opportunity for nations that have a natural biological advantage, which has not been realizable in traditional agriculture due to trade restrictions.

There is already ample evidence for this shift. In the last several years, the pressure to develop biofuels and non-food oils has resulted in an explosion of foreign-owned plantations in developing countries. A Chinese company, ZTE International, has committed to investing US\$1 billion to establish a three-million-hectare biofuel plantation in the Democratic Republic of Congo. In Tanzania and Mozambique, the Swedish companies Atlas Copco and Sekab have announced plans to develop over 400,000

hectares of land for bioenergy production. A similar project is underway in Ethiopia as the German company, Flora EcoPower, begins investing US\$77 million in the Oromia regional state as part of a purchase of over 13,000 hectares of land for biofuel production. In Lao PDR, Stora Enso, the international paper and packaging company, recently commissioned a feasibility study for establishing 35,000 hectares of Acacia and Eucalyptus plantations in Savannakhet and Salavane provinces. Such large investments indicate that these corners of the world are now valuable places for foreign companies, despite the distances and potential political risks involved. As a result, rural and forest land prices in many parts of the developing world are increasing dramatically.

New carbon markets and their influence on forestry will also present a number of risks, including: renewed and even increased state and ‘expert’ control over forests; support for anti-people and exclusionary models of forest conservation; violations of customary land and territorial rights; unequal and abusive community contracts; and land speculation and land grabbing. As land becomes an increasingly scarce commodity, it is questionable whether natural forest management will be competitive when matched against the fuel and food sectors.

These problems may be exacerbated as biofuel feedstock (wood-based or otherwise) production is likely to be at the ‘extensive margin’ of forested areas as harvesting and planting is extended into more remote regions in response to higher absolute wood prices. This may not be such good news for forest dependent peoples, who are often amongst the poorest, particularly those with weakly defined property rights. Shifts to biofuel production will leave them vulnerable to displacement.

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