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Are we approaching 'peak timber' in the tropics?

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ABSTRACT

Over the past few decades, tropical timber production in many Asia–Pacific countries has been akin to the symmetric logistic distribution curve, or 'Hubbert Curve', observed in the exploitation of many non-renewable resources—a rapid increase in production followed by a peak and then decline. There are three principal reasons why logging of native tropical forests resembles the mining of a non-renewable resource: the standard cutting cycle of 30–40 years is too brief to allow the wood volume to regenerate; tropical logging catalyses considerable deforestation; and the bulk of logging is undertaken by multinational corporations with little interest in long-term local sustainability. Unless something fundamental changes, we believe tropical forests will continue to be overharvested and cleared apace, leading to an inevitable global decline in tropical timbers of non-plantation origin. It has become common these days to speak of 'peak oil'. In the tropics, we suggest that we should also begin to discuss the implications of 'peak timber'.

Contents

1. Is tropical logging sustainable?

Tropical timber is often regarded as a renewable resource (FAO, 2011). Arguments in favour of logging tend to emphasize that long-term timber management is one of the few realistic strategies for many tropical nations to develop economically while retaining large areas of native production forest, instead of clearing the forests for agriculture or plantations (Laporte et al., 2007a; Putz et al., 2008; Merry et al., 2009). Such arguments are generally predicated on the notion that, with the correct application of laws and regulations, native tropical forests can be managed for timber production in perpetuity. Whether or not this is the case is crucial given the large area of tropical forest that is being selectively logged: at least 20% of global humid tropical forests are currently allocated to selective logging operations (Asner et al., 2009a), and this figure is likely to rise in the future (e.g. Verissimo et al., 2002; LaPorte et al., 2007b). Here, we critically examine one of the key tenets of the pro-logging argument, that sustained timber yields from particular regions or countries are realistically attainable in the tropics.

At the outset, we consider the case of the Solomon Islands, which in some respects is a microcosm of the challenges facing sustainable forest management elsewhere in the tropics. The Solomon Islands is a small tropical nation in the South Pacific with a modest forest estate and, where the logging industry has been the major source of government revenue over the last decade. In 2008 export earnings from forest products accounted for 59% of to-

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tal export receipts (CBSI, 2008), down from 65% in 2002 (and up from 31% in 1999) (CBSI, 1999, 2002). For nearly a decade, the nation has been warned that the volume of timber annually harvested from native forests was too high and, if unchecked, that timber stocks would be seriously depleted by 2015 (URS, 2003; Wairu, 2007). In 2009 the Central Bank of the Solomon Islands (CBSI, 2009) asserted that exhaustion of timber stocks had arrived even earlier than predicted and that its economic consequences were likely to be severe:

> "*Round log production has peaked and production is predicted to decline in the future . . . this decline could have long term impacts on both the foreign reserves and the ability of the government to provide services, if no action is taken*"

The ongoing trajectory of timber production in the Solomon Islands—a rapid increase in production followed by a peak and then decline—is akin to the symmetric logistic distribution curve, or 'Hubbert Curve', observed in the exploitation of many non-renewable resources (Gallagher, 2011). It is occurring in the Solomons because timber extraction has occurred at a rate far in excess of the capacity of its forests to regenerate commercial timber stocks.

The logging industry in the Solomon Islands follows the Malaysian model of logging, in terms of the mode of its operations and indeed in the nationality of most of the logging companies. The primary focus of this model is raw-log production, especially large commercial logs greater than 30–60 cm in diameter at breast height. Such logs are generally absent from secondary forests. Other categories of forest product such as pulp or other forms of lower-grade wood might also be harvested after the initial log extraction; they are not the main target, however, and can generally be obtained from plantations or secondary regrowth, whereas the bigger logs cannot.

Compared to the Solomon Islands, the historical trend of timber production in Malaysia shows a similarly rapid rise, peak and steep decline. At a regional scale, comparable trends are also apparent in Thailand, the Philippines, Laos and Indonesia (Fig. 1) (FAOSTAT, 2011). Such rapid timber exhaustion echoes the boom-and-bust pattern of timber overexploitation and economic decline seen in many Amazonian frontier communities (Rodrigues et al., 2009). Other nations with active timber industries, such as Papua New Guinea, are likely to follow similar trajectories if current trends of overharvesting continue unabated (Shearman et al., 2009; Laurance et al., 2011, in press).

Why are examples of 'sustainable' forestry so difficult to find in the tropics? Three main factors are responsible. Firstly, tropical forests have surprisingly low rates of marketable timber production—on the order of just 2–5 m^3 per hectare per year (Kartawinata et al., 2001; Silva et al., 2002). This occurs because many tree species have unsuitable wood properties or fail to attain harvestable size limits, are rare or unknown to timber markets, or have inherently slow growth (trees in warm tropical environments expend considerable energy to maintain high respiration rates and invest in defensive compounds against pathogens and herbivores (Coley and Barone, 1996; Clark et al., 2010).

The recovery time taken for logged forest to resemble primary rainforest in biomass, timber volume and species diversity has been variously estimated at 45–100 years (Brown and Lugo, 1990; Richards, 1996; Blanc et al., 2009), 120 years (Pinard and Cropper, 2000) and 150–500 years (Enright, 1978; Riswan et al., 1985; Kartawinata, 1994). Larger rainforest trees can range in age from many

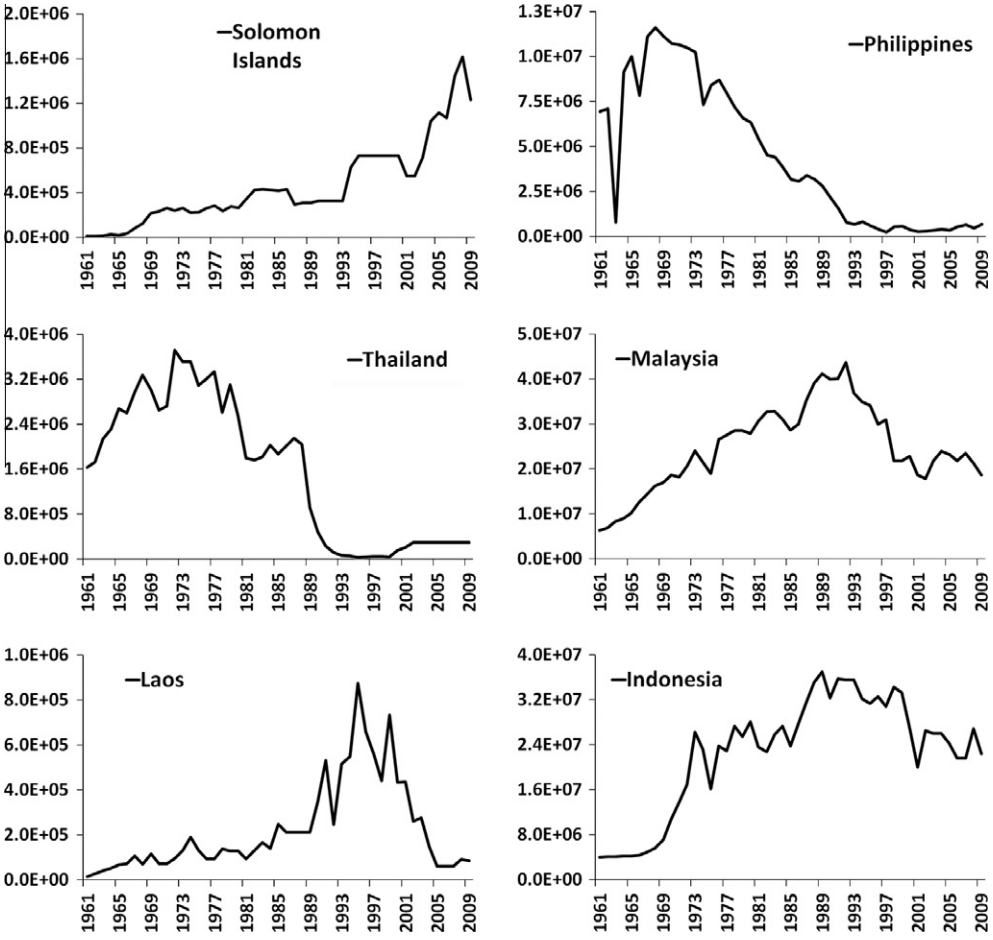

Fig. 1. Boom and bust. Sawlog and veneer-log production for the Solomon Islands and five key South-East Asian nations (derived from FAOSTAT, 2011).