

## SUSTAINABLE = GOOD, BETTER, OR RESPONSIBLE

Putz FE

Department of Biology, University of Florida, Gainesville, Florida, 32611-8526 USA; fep@ufl.edu

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The successful campaign to broaden the focus of sustainable forest management (SFM) in the tropics from being solely on timber to a vision that encompasses the full range of forest values somehow obscured or diminished the core principal of sustained timber yield (STY). While clean water, biodiversity, and human welfare are of undisputed importance, diminishing yields compromises forest industries and forests. That said, in light of on-going discussions about sustainable infrastructure and even sustainable mining, the author questions his previous insistence on STY as a core element of SFM.

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After decades of being a stickler about loose use of the word ‘sustainable’, especially in the phrase ‘sustainable forest management’ (SFM), I will henceforth cease employing it the way one might use ‘enlightenment’ or ‘nirvana’ to describe a state to which one should strive but never claim to attain. Instead, to justify the claim of SFM, I will only require that a forest remains forested and isn’t converted into a plantation, pasture, cropland or suburban subdivision. Okay, that’s going a bit far, so I’ll also insist on some environmental safeguards, but since stumbling across Elsevier’s Journal of Sustainable Mining (see Kirsch 2010 for a discussion of the dangers of this corporate oxymoron), I will no longer justify the requirement that timber yields be sustained (STY). But I must admit that there’ve been other threats to my enshrinement of SFM before it became *de rigueur* to discuss sustainable infrastructure, sustainable intensification, and even sustainable mining.

Challenges to my hardline concept of SFM really commenced in 1987 with publication of ‘Our Common Future’ (also known as the Brundtland Report) by the World Commission on Environment and Development. I agreed that for development to be sustainable, it needs to meet ‘the needs of the present without compromising the ability of future generations to meet their own needs’. I admit to harboring concerns about what sustainable development meant for STY and SFM, but never questioned the principle of intergenerational equity.

My hardline conception of SFM was further shaken in 2005 by a paper entitled ‘Should sustained yield be part of sustainable forest management?’ (Luckert & Williamson 2005).

Although the ideas in that paper were long known to economists (e.g. Solow 1956), I was caught unaware by the concept of ‘weak’ sustainability. Whereas strong sustainability requires non-diminishing yields of timber and flows of ecosystem services, weak sustainability allows exchanges of these values for other forms of ‘capital’ (i.e. anything that enhances the capacity to perform economically useful work or any stock that can provide a flow of goods and services) as long as the overall sum of natural, economic, built, social and human capital does not decline. The authors argued that because timber stocks can usually recover after logging, STY might be dropped as a requirement for SFM as long as due attention is paid to avoidance of irreversible losses of natural capital and public goods.

I worried that my misgivings sprang from superficial understanding, but was flummoxed by the argument that nature is replaceable. For example, if a biodiverse natural forest is profitably logged, cleared and replaced by an even more profitable oil palm plantation that provides many more jobs and results in the strengthening of a research institution, might the sum of capitals actually increase and the conversion qualify as sustainable intensification or sustainable landscape management? If the concern is about the carbon consequences of this conversion, what if the harvested timber replaced concrete, steel and aluminum—all carbon-intensive products, and the waste wood was used instead of coal to generate electricity? I hesitate to run the numbers, but I suspect that the carbon balance from that approach to deforestation might actually be positive.

Luckert and Williamson (2005) were careful to differentiate between renewable/recoverable capitals (e.g. timber stocks) and losses that are irreversible. The latter category would obviously include species extinctions, but I believe that local extirpations should also be considered insofar as they are not easily reversed. Based on the admittedly meagre results from my decades invested in on-the-ground ecosystem restoration, I believe that the lofty expectations for biodiversity recovery through restoration are unjustified, at least where ecosystems need to be re-created and not just restored after modest degradation.

The next blow to my core beliefs in the importance of STY, SFM and the sanctity of nature was a publication that posited that while global environmental conditions deteriorated over the past few decades, human well-being increased, at least on average (Raudsepp-Hearne et al. 2010). This so-called “environmentalist’s paradox” elicited a flurry of responses (e.g. Ang & van Passel 2012) from which I derived some solace insofar as they clarified that the weak-strong sustainability dichotomy was too simple for our complex world. The critics of the apparent paradox also stress that by commodifying nature and thereby condoning a ‘cowboy economy’, ethical considerations in general and inter-generational equity in particular are being thrown under the wheels of the bus.

Although I worried about over-emphasising timber among the multiple goals of SFM, I formerly stuck with my belief in the core value of STY. In defense of this position, I argued that unlike existence value or ecosystem integrity, at least STY was clearly defined and readily measured. My belief in the clarity of STY was shaken when a group of us reviewed some of what was known about STY in the tropics (Putz et al. 2012). What we found was a mess due to analytical ambiguities, data deficiencies and variable definitions of STY. For example, for estimating future yields, some analysts allow the number of marketable species to increase with each harvest or include lower quality logs in their calculations. We then struggled with the more fundamental question of whether the timber harvested from a primary forest, which accumulated over centuries, is the appropriate benchmark, i.e. the volume that needs to recover to qualify for STY. Unfortunately, we found no clear insights into how to address the ‘primary forest premium’ issue.

These debatable details about yield calculations render claims of STY difficult to interpret, but we also uncovered various examples of what seemed to be intentional obfuscation of over-harvesting. For example, it seems wrong to claim that yields have not diminished when to secure those yields, smaller trees or larger areas need to be harvested. Similarly, it is patently misleading to use overall forest volume increments to set harvest quotas for species that grow more slowly than the mean.

There’s an obvious need for clarity about STY to inform discussions about how it might be achieved, at what costs, and to whom, but also more fundamental concerns about its centrality to SFM. There seem to be conditions under which, in the interest of industrial well-being, national development or other socio-economic considerations, standing stocks of valuable timber species might be allowed to diminish, but in manners that maximise the benefits to society-at-large and minimise irreversible damage. Given that no forest certification schemes seem to require demonstration that yields are being sustained (Romero & Putz 2018), it appears that in those circles STY has already been dropped as a criterion for responsible forest management. The challenge of finding financially viable approaches to STY is particularly acute for forests managed principally for slow-growing heavy hardwoods such as Bornean ironwood (*Eusideroxylon zwagerii*), Papuan merbau (*Intsia palembanica*), African blackwood (*Diospyros melanoxylon*), Brazilwood (*Paubrasilia echinata*), lignum vitae (*Guaiacum sanctum*), Guyanese greenheart (*Chlorocardium rodiei*), Zambezi teak (*Baikiaea plurijuga*) and any of the rosewoods (*Dalbergia* spp.).

Despite the case I’ve built for at least temporarily abandoning STY as a criterion for SFM, I want to stress that even slow-growing tree species can be managed for the sustained yield of timber. Achievement of that admirable goal will require unprecedented discipline, restraint, control and financial compromises coupled with silvicultural interventions beyond reduced-impact logging (Bulkan & Palmer 2016).

Now that I’ve compromised my principles enough to back away from a cross-the-board requirement for STY, I might venture to extend this line of reasoning to forest conversion. At least in the interests of geo-political equity and sustainable development, there may be

conditions under which it is justifiable to replace natural forest with land uses that are more financially remunerative and otherwise socially beneficial. I would of course expect deforestation to be carefully planned, responsibly executed and appropriately mitigated. While zero deforestation is a great campaign slogan, as revealed for STY and SFM, the devil is in the details, and some of the fundamental assumptions deserve close scrutiny. I worry, for example, what is meant is zero ‘net’ deforestation if fiber farms and oil palm plantations are allowed to masquerade as forests, and if naturally non-forested ecosystems (e.g. savannas) are threatened by well-intentioned but misplaced and ill-informed restoration endeavors. In any case, I don’t want the world’s diminishing natural ecosystems to suffer behind smoke screens of even good intentions but bad logic.

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**Jack Putz** is a Distinguished Professor of Biology and Forestry at the University of Florida where he has been on the faculty since 1982. He started his research career in 1973 as a Peace Corps Volunteer at the Forest Research Institute of Malaysia where he was supervised by Tang Hon Tat and Francis SP Ng. After receiving his PhD from Cornell University, he was a NATO Post-Doctoral Fellow at Oxford University where he worked under the tutelage of Tim Whitmore.