



Response to Van Vliet *et al.* 2015. “Managing hunting under uncertainty: from one-off ecological indicators to resilience approaches in assessing the sustainability of bushmeat hunting”

Assessing sustainability is just one component of many in the quest to achieve sustainability

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ASSESSING SUSTAINABILITY IS JUST ONE COMPONENT OF MANY IN THE QUEST TO ACHIEVE SUSTAINABILITY

Classical approaches to assessing the sustainability of bushmeat hunting in tropical forests have serious limitations, according to van Vliet *et al.* (2015); they therefore suggest that “resilience approaches” are needed in order to incorporate complexity in such sustainability assessments. As examples of such approaches they list companion models, fuzzy-logic cognitive mapping, and multi-agent-based models. The authors, however, fail to distinguish between *assessing* sustainability and the much broader quest of *achieving* sustainability. According to the authors, companion modeling and fuzzy-logic cognitive mapping are, respectively, methods for supporting collective decision-making and for collaboratively building conceptual models. These methods may well have a potential to contribute to achieving sustainability, but assessing sustainability is something else.

Sustainability as a scientific concept dates back over 200 years, when it was described in German forestry literature (e.g., Hartig 1804) as the capacity of any level of timber extraction to endure in time. During the 20th century, this concept also became widely adopted within wildlife and fishery sciences and management. However, as described by Salo *et al.* (2014, pp. 32–36), towards the end of the 20th century the term sustainability entered the arena of political discourse, where it often lost its original meaning related to durability in time and instead often became a normative concept, synonymous for anything “good”, “desirable”, or “morally right”, particularly when used in compound terms such as “social sustainability” and similar. Unfortunately, this practice also spilled over into the academic literature. The paper of van Vliet *et al.* is, thus, just one more of many papers where this loss of clarity of concepts leads to a corresponding loss of clarity of thought.

Research on bushmeat hunting can have a wide variety of specific focuses. The call of van Vliet *et al.* for increased attention to social and economic aspects of tropical forest hunting is pushing on open doors. In their review of the literature, the authors themselves provide numerous examples of research that has related hunting practices to, for example, bushmeat markets, prices, demographic change, changing livelihood opportunities, household size, nutrition and food security, and culture. The list could be made much longer, including, for example, the costs of supplies and labor (Hofer *et al.*, 2000, Sirén and Wilkie 2015),

income and wealth (Wilkie *et al.* 2005; Sirén *et al.* 2006; Godoy *et al.* 2010; Vasco and Sirén, submitted to *Animal Conservation*), changes in hunting technology (Hames 1979, Alvard 1995, Koster 2009, Sirén 2014), and common property governance (Osemeobo, 1991, Barrett *et al.* 2001, Bremner and Lu 2006, Sirén 2006).

Furthermore, van Vliet *et al.* paint a false picture of what wildlife management efforts in tropical forests are all about. In fact, maximum sustained yield (MSY) is seldom, if ever, the goal. This is not only because harvesting at MSY is economically suboptimal when search costs are significant (Milner-Gulland and Mace 1998, Clark 2010, Salo *et al.* 2014), but also because the focus is not at all on “seeking optimal states”. Usually it is even less a realistic option to “ban hunting altogether” according to “precautionary principles”. This is because the societal context in these regions typically is such that resource *governance* constitutes a far harder challenge than resource *management* (see Salo *et al.* 2014, chapters 15 and 16). Therefore, a reasonably realistic goal in the short and medium terms must, in most cases, be to just make a bad situation a bit less bad.

For that purpose, such in-situ participatory processes and adaptive management processes that van Vliet *et al.* propose are indeed more likely to directly affect sustainability of hunting in the right direction than is research narrowly aimed at the production of journal articles. In order to know whether this actually happens, though, there will still be a need for *assessing* sustainability through quantitative empirical methods. The methods available are constantly improving. van Vliet *et al.* themselves list a wide variety of such methods—including comparisons of before and after, or between different sites subject to different hunting intensity—as well as demographic models, population trend methods, and harvest-based or market-based indicators, to which I would like to add methods based on evaluating spatial gradients of harvest (Sirén *et al.* 2004, Sirén and Parvinen 2015). Multi-agent models, as suggested by van Vliet *et al.* (2015), may also have potential; although, similar to many other methods, they suffer from the difficulty of estimating ingoing model parameters with the needed precision.

Responses to this article can be read online at:
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