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News and Views

Interpretation and application of the Ecological Footprint: A reply to Fiala (2008)

We appreciate Nathan Fiala's critical engagement with the Ecological Footprint in a recent commentary in this journal (Fiala, 2008). While we agree that Ecological Footprint accounting methodology can always be improved (Kitzes et al., in press), we also believe that in several key points, Fiala has misunderstood the intended purpose and accepted appropriate use of Ecological Footprint accounts. While the majority of Fiala's comments have been previously discussed in this journal and elsewhere (e.g., George and Dias 2005; Schaefer et al., 2005; Giljum et al., 2007), we would like to comment on four of Fiala's opinions directly.

First, we do not share Fiala's view that Footprint accounts "arbitrarily assume... zero greenhouse gas emissions" and that we could choose to define a different threshold for sustainability that allowed net positive fossil carbon accumulation in the atmosphere. By definition, no resource consumption beyond the planet's regeneration rate or waste emission beyond the planet's absorption rate can be considered sustainable (that is, able to be sustained) in the long term. Footprint accounts do not assume zero greenhouse gas emissions, but rather demonstrate that, like any waste product, zero net accumulation of fossil carbon in the biosphere is a necessary condition for long term sustainability.

Second, Fiala misunderstands the relationship of the Ecological Footprint to the notion of "sustainability". Since our earliest publications, having a global Ecological Footprint lower than the global biocapacity has been proposed as a *minimum criteria* for sustainability, not a guarantee of it. A global Ecological Footprint higher than global biocapacity (i.e., harvesting resources or emitting wastes faster than the planet can produce or absorb them, respectively) ensures unsustainability, but many other human activities, such as systematic degradation of cropland or emissions of long-lived toxic materials, can also lead to unsustainability. In our most recent paper that forms the basis of Fiala's argument (Moran et al., 2008), we clearly state that nations such as Cuba have met the "minimum condition for sustainability", not that they are sustainable. Other constraints such as those Fiala cites may further narrow the conditions for sustainability (WWF, 2008; Kitzes et al., in press).

Third, while we agree with Fiala on the importance of addressing land degradation and greenhouse gas emissions individually for management purposes, we do not agree that

we should abandon composite indicators entirely because they can never capture every aspect of sustainability. Compound indicators reflecting complex interactions are often essential in decision making processes (Pulselli et al., 2008) and have found important uses as educational and "big picture" contextualizing tools amongst many current users (Global Footprint Network, 2008).

Fourth, and most importantly, Fiala does not acknowledge the difference between a *system of accounts* and a *predictive model*. Ecological Footprint accounts provide a static snapshot of consumption, production, and biological capacity in a given historical year. Footprint accounts do not make projections and are not designed to do so, although forward-looking scenarios may be constructed by making assumptions about future changes in population, technology, and ecological supply and demand (WWF, 2008; Kitzes et al., 2008). There is also nascent body of work using dynamic models to project future Ecological Footprint and biocapacity (Lenzen et al., 2007). Accurate accounts are critical to decision making and model construction, and should not themselves be faulted for failing to address actions or consequences that may or may not occur in the future.

We thank Fiala for his thoughtful comments and look forward to his continued engagement with Ecological Footprint research and methodology.

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