

The earth's best health may be different from the ideal ecosystem.

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William F. Laurance et al. wrote an article entitled "Roads to riches or ruin?" (1). However, we have had a big problem where we don't know how to measure earth's health. There is an interesting article by Carolyn Wilke, entitled "Measuring earth's health" (2). She introduced a set of metrics for the earth's health from the paper of Will Steffen et al. (3). Will Steffen et al. proposed the empirical model based on the planetary boundary (PB) framework for measuring earth's health (3). They assume that three of the PBs (climate change, stratospheric ozone depletion, and ocean acidification) remain essentially unchanged from the earlier analysis (3). However, since the conclusion is not deduced by the rigorous syllogism (facts) but by empirical model/data, scientifically we are not sure whether their mathematical model is correct or not. In addition, we are not sure whether all assumptions in the model are necessary and sufficient, and are completely satisfied or not (3). An **ecosystem** is a community of living organisms in conjunction with the nonliving components of their environment (things like air, water and mineral soil), interacting as a system. The ideal ecosystem may be different from the earth's best health. Scientists must define what is the ideal ecosystem and show the relationship between the ideal ecosystem and earth's health including how to measure it because all technical terms used in their mathematical model (3) are fuzzy and not clearly defined. We must examine and justify whether the proposed mathematical model (3) is correct or not by using observed data. Otherwise, we cannot answer to William F. Laurance's question.

References:

1. William F. Laurance et al., Road to riches or ruin?, *Science*, 27 Oct 2017, Vol. 358, Issue 6362, pp.442-444
2. Carolyn Wilke, Measuring earth's health, April 10 2015, <https://helix.northwestern.edu/blog/2015/04/measuring-earths-health>
3. Will Steffen et al., Planetary boundaries: Guiding human development on a changing planet, *Science* 13 Feb 2015, Vol. 347, Issue 6223, 1259855