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Planet human versus planet Earth—time for some win-win evidence

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Recent evidence on the Earth's carrying capacity, and on the loss of global environmental resilience, suggests that we are on a path to planetary overload, and perhaps planetary destruction, if we continue our current development model of overconsumption and over-exploitative resource extraction [1].

In terms of biological diversity of the planet, there are now 7 billion humans on the planet, but almost all other species are declining or disappearing [2]. In terms of our role in climate change, environmental damage and biodiversity loss, the human species now seems to be the main threat to the planet and its survival. This is not a new idea, but the magnitude and acceleration of the human population and its exponential consumption of global resources is a phenomenon that has not been seen before [3]. Evidence indicates the imminence of a planetary-scale critical transition in ecosystems, leading to mass extinction of a great number of species. In terms of biodiversity loss, deforestation is a major problem. The UN reports '*Deforestation is not only a serious threat to achieving sustainability, but also to progress towards hunger and poverty reduction and sustainable livelihoods, as forests provide food, water, wood, fuel and other services used by millions of the world's poorest people*' [4].

In this context, it is always good to hear of new evidence on the potential for both ecological restoration and improved human well-being, and it is perhaps particularly welcome to have evidence from China—a country with a population approaching 1.4 billion, and massive demands on natural resources.

Cao *et al* [5] provide this evidence from a fascinating and detailed longitudinal study of an intervention project which evolves to combine both ecological restoration and socio-economic improvement in ecologically fragile Changting County, Fujian Province, in Southern China.

The study is, in the best sense of the word, opportunistic—looking over time at a living policy experiment to restore a degraded landscape, and the

researchers are able to evaluate multiple parameters of environmental restoration and social improvement over time. To do this, they chose a range of natural and socioeconomic indicators that could affect ecological restoration in the study area, and then, using multivariate analysis, identified the relative influence of each social, economic, or environmental factor on the dependent variables (vegetation cover, soil erosion, number of plant species). They also had the opportunity to compare their findings both to areas outside the intervention zones of the project and to previous approaches in the same project areas.

In essence, Cao *et al* have been able to track changes in ecological and social parameters in the project areas during a first intervention (focused on environmental restoration alone), from 1884 to 1999; and then to track changes with a new policy of ecological restoration and social improvements from 1999 to 2014. Without repeating the detail of their findings, their core evidence shows that there is a strong positive feedback loop between improvement of socio-economic indicators such as net income, with improvements in vegetation cover, decreases in soil erosion, and increases in the number of plant species. There is also evidence that protecting the livelihoods of residents in the long term (e.g. environmental friendly livelihood options such as fruit tree orchards, and methane generation) also contributed to the project's success.

The value of this study is perhaps most strongly located in its approach. The authors provide a fascinating insight into medium-term changes in social and ecological parameters associated with different policy approaches. Their evidence also highlights the marked effects that different policy approaches can have, and the importance of long term monitoring of the environmental and social impacts of government and international policies and projects.

The authors argue that ecological degradation (including biodiversity loss) and poverty are linked

problems that must be tackled together. Their evidence supports this, and supports the hypothesis that, in the short term at least, this is possible. There is evidence internationally that this is also true in other contexts, particularly when local and indigenous communities are involved in conservation and ecological restoration [6].

Perhaps the authors' most tricky assertion, and our biggest challenge, is that '*residents of ecologically fragile areas need to survive and that their right to survival supersedes all other rights*'. That these people need to survive may be true, but that their rights supersede all other rights? With 7 billion humans on the planet (and rising), will we really be able to argue always that human rights to survival supersede all other rights—over the rights of all other species, and perhaps the rights of the planet itself?

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