Sustainability, capitalism and evolution

Nature conservation is not a matter of maintaining human development and welfare in a healthy environment

Valenti Rull

Humans are exploiting the Earth in an unsustainable manner, which is accelerating both environmental degradation and loss of biodiversity. Moreover, owing to global climate change, the rates of deterioration and extinction will probably increase in the near future. The scientific community has been highly sensitive to this alarming development and increased the number of baseline and ecological studies on the impact of humans on the biosphere and proposed various strategies to alleviate the environmental and biotic crisis. This has triggered vivid discussions about the potential risks and benefits of measures such as adaptation and/or mitigation actions, ecosystem restoration, the assisted migration of species or triage conservation (Mooney, 2010).

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One constant in these proposals is a sense of urgency, as the pace of change seems to outstrip our capacity to react to it. There are various crucial issues that limit said capacity: the incomplete inventory of biodiversity—we still do not know how many and which species live on Earth; our deficiency in understanding the relationships between biodiversity and ecosystem functioning; and the inertia of the planet itself—even if we immediately stopped using fossil fuels and reduced CO₂ emissions, global climate change would continue for decades or even centuries (Matthews & Weaver, 2010). Finally, but maybe most damaging, our social and economic systems are too recalcitrant to even

acknowledge, let alone abandon or reduce their destructive practices.

A popular remedy for the deterioration of nature is ‘sustainability’—commonly defined as meeting “the needs of the present without compromising the ability of future generations to meet their own needs” (WCDE, 1987)—which would harmonize human development and the conservation of nature. This classical notion of sustainable development argues inexplicitly for caring for our natural environment, because it is the primary provider of resources to sustain human life. Elkington (2002) introduced a social element to this by recognizing that sustainable development involves “the simultaneous pursuit of economic prosperity, environmental quality and social equity”. Baumgärtner & Quaas (2010) define sustainability as “a matter of justice at three levels: between humans of the same generation, between humans of different generations, and between humans and nature”. Many other forms, definitions and interpretations of sustainability exist—strong, weak, technological, economical, social, environmental, ecological, and so on—but, in all cases, the ultimate objective of sustainability is to preserve biodiversity and ecological functions for the benefit of present and future human generations. In short, our concern for nature is essentially anthropocentric (Rull, 2010a).

Our understanding and definition of nature conservation is largely guided by our concept of ‘naturalness’

The concept of sustainability has become the paradigm for conservation and environmental studies, to the extent that many

consumer products, technologies and developments now claim to be ‘sustainable’, whatever that means. The same happens at the popular level, as the term ‘sustainable’ is often considered a synonym of good whereas ‘unsustainable’ is used in a pejorative sense for what is considered intrinsically bad. Curiously, these notions are widespread in different societal sectors—politicians, economists, scientists, journalists, the general public—independent of their social condition and political and economic orientation. The terms ‘sustainable’ and ‘sustainability’ are in danger of losing their original meaning to become merely rhetorical elements or advertising slogans.

Our understanding and definition of nature conservation is largely guided by our concept of ‘naturalness’. But nature has always been in flux; after billions of years of biological evolution and ecological change—with and without human involvement—it is impossible to define the ‘natural’ state of the environment. In addition, human actions have an impact on ecosystems; thus, the maintenance of a pristine state of the Earth—however one would define this—does not seem to be compatible with basic human needs. A more practical approach to sustainability and the preservation of a ‘natural’ state would be to require that any modifications of nature leave ecosystems as diverse and ‘healthy’ as possible. More pragmatically, the best we could hope to achieve, even from an ecocentric point of view, is to stop further ‘spoiling’ of nature and preserve the current ‘unnatural’ state.

Given this inherent conflict between conservation and human needs, conservation organizations struggle to propose practices that “balance the needs of people with the needs of the planet that supports

us" (IUCN, <http://www.iucn.org>), or "protect Earth's most important natural places for you and future generations" (The Nature Conservancy, <http://www.nature.org>), in order to "build a future where people live in harmony with nature" (WWF, <http://www.wwf.org>). In other words, conservationists advocate sustainable development of human societies, but their activities can only be palliative. Sustainability will only be attained after drastic reorientation towards steady-state or de-growth economic models (Lawn, 2010; Schneider *et al*, 2010), which would involve profound changes not only for societies, but also for every individual.

The main obstacles to such broad socioeconomic change towards sustainable development are the high number of environmental problems that clamour for attention (seeing trees but not the forest) and the intransigence of social and economic systems. It is naive to pretend that representatives of the dominant economic and political systems will renounce capitalism; this has been repeatedly demonstrated at Kyoto or Copenhagen, where the international community was unable to agree on even small changes to slow global climate change.

Even worse, scientists and conservationists could become trapped in the very system that they are trying to change. A good

example of this risk comes from attempts to assign monetary value to biodiversity and ecosystem services and use market rules to manage them (Rull, 2010a). A simple economic analysis is enough to demonstrate the fallacy of this economic approach to sustainability, even from a pragmatic perspective.

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The appeal of this concept is that any ecosystem service could be submitted to a cost-benefit analysis, that would incorporate natural capital into current economic models. It also makes possible a general definition of comprehensive wealth, which includes not only reproducible capital such as buildings, machinery, roads and so on, but also natural capital. In this context, sustainable development has been redefined as 'the accumulation of comprehensive wealth', which requires that each generation should bequeath the next one at least as large a productive base, including both reproducible and natural capital, as it has inherited (Dasgupta, 2010).

However, submitting natural resources to economic analysis does not guarantee

sustainable practices. The first thing to bear in mind is that comprehensive wealth is finite and limited by the carrying capacity of the Earth. If certain planetary systems—such as climate, ocean acidity, freshwater and biodiversity—change beyond a certain limit, it could trigger nonlinear and catastrophic consequences on a global scale (Rokström *et al*, 2009). Second, the components of comprehensive wealth depend on each other: for example, building a road through a forest is done at the expense of the forest, that is, natural capital. Building the road might increase comprehensive wealth but it has a price: natural degradation, including resource exhaustion, loss of biodiversity and increased pollution. If human growth continues, these costs could become so high that systems—both ecological and economic—collapse. Sustainable practices could therefore aim to minimize the loss of natural capital, but if human development continues unabated, the carrying capacity of the Earth will nonetheless be reached sooner or later.

Rokström *et al* (2009) argue that humanity has already transgressed three of nine critical planetary boundaries, namely climate change, biodiversity loss and interference with the nitrogen cycle through industrial and agricultural fixation of atmospheric nitrogen, the combustion of

fossil fuels and biomass and the pollution of waterways and coastal zones. This means that nature is subsidizing the capitalist mode of development. For a quantitative estimate of natural costs, the LPI (Living Planet Index) of global diversity has declined by nearly 35% in the past 30 years (WWF, 2008); hence, the cost during this period has been about 1.2% of species per year.

Even if capitalism, as the dominant economic model, incorporates natural capital into its cost–benefit analysis, nature still loses out; unlimited human growth—the central tenet of capitalism—and sustainable development are incompatible (Rull, 2010b). Some alternative modes of human development exist (Costanza, 2009; Schneider *et al.*, 2010), but these also rely on sustainability.

How then would nature benefit from sustainability? In other words, how would sustainability guarantee nature conservation? To answer this question, we must realize what nature is, beyond its role in fulfilling human needs. Our planet has mostly existed without humans since the first forms of life appeared around 3.8 billion years ago. *Homo sapiens* appeared around 200,000 years ago (Tattersall & Schwartz, 2009), but it was only during the past 10,000 years that humans began to change their environment on an increasing scale. Before this time, biodiversity gains and losses were the results of natural evolution; extinction patterns were more stochastic and were not determined by the needs of one species. The key question is whether humankind will endure, or be just another chapter in the history of the Earth.

From an evolutionary perspective, sustainability is therefore not enough, given its intrinsic anthropocentric focus

Despite claims that cultural evolution has replaced biological evolution in humans, natural selection is still shaping our biology in response to environmental change. Humans in their current form are therefore not necessarily the last word in evolutionary terms, nor is there a guarantee that *Homo* will be around in the future (Rull, 2009). If we take a strictly anthropocentric view and only worry for future humans, the preservation of the planet beyond the next few generations should not be a matter of concern. However, if we worry for the fate

of the biosphere in general, nature conservation would imply not only the preservation of the current status, but also its safe evolutionary continuity.

The sixth mass extinction might be in progress, manifested in the ongoing loss of biodiversity caused by human activities

From an evolutionary perspective, sustainability is therefore not enough, given its intrinsic anthropocentric focus. Still, it would be a significant improvement on the unfettered exploitation of natural resources. To progress from sustainability to nature conservation would require a less anthropocentric and more evolutionary perspective. This might look like renouncing our status as the assumedly superior species on Earth but, as intelligent creatures, we should be able to embrace conservation of nature. So far, we have used our intelligence to try to understand our own existence, prolong our lives and develop new technologies to rule the Earth. When it comes to environmental issues, however, we are just stupid (Meffe, 2009). We must realize that the ‘real world’ is not the transitory socioeconomic scenario in which we live, but the Earth that is evolving at a pace and magnitude that exceeds our capacity to understand and appreciate it. So far, proponents of sustainability have emphasized social equity and justice for future generations, whereas nature is still viewed as a service provider that should be maintained for practical reasons.

To make the argument more complicated, evolution does not seem to be a linear process. On the basis of the geological and palaeontological record, the palaeontologist Peter Ward (2009) has proposed the Medea hypothesis: life—rather than contributing to the habitable condition of the Earth as proposed by the Gaia hypothesis (Lovelock, 1979)—can become self-destructive and has caused nearly all the mass extinctions that have occurred since the origin of life. So far, there have been five mass extinctions in the history of life on Earth (Courillot, 1999). The last one, 65 million years ago—the demise of the dinosaurs—was probably triggered, at least in part, by a meteorite impact and is the only exception to the actions of Medea.

The other mass extinctions were probably the result of biology (Ward, 2009):

the proliferation of methane-producing microbes in the early days, which poisoned the biosphere and triggered a significant temperature decrease; the oxygenation of the atmosphere, caused by the evolution of photosynthetic organisms; a global glaciation of the planet (the Snowball Earth hypothesis), probably caused by a decrease in atmospheric greenhouse gases; and the eutrophication of coastal waters.

The sixth mass extinction might be in progress, manifested in the ongoing loss of biodiversity caused by human activities (Wake & Vredenburg, 2008). This time, we would be the executors of Medea. The geological record, however, shows that each mass extinction was followed by a spectacular burst of diversification, which created new species. It seems that Gaia takes over after each of Medea’s annihilations; evolution on our planet is therefore imagined as the result of a capricious game between the goddess of Earth (Gaia) and the killer enchantress Medea.

If Ward is right, there is little we can do to avoid the next catastrophic extinction and we can only delay it for the sake of a few generations

If Ward is right, there is little we can do to avoid the next catastrophic extinction and we can only delay it for the sake of a few generations. This could lead to a contemplative attitude, given the inevitability of the looming destruction, combined with some efforts to preserve certain species for the sake of temporary human needs and pleasure. After all, Gaia will take care of life again. If this cycle is the ‘natural’ state, more radical ecocentrists should accept it: we have no reason to prefer the current state of life to the future result of Gaia’s creativity after the inevitable extinction. To maintain the *status quo* would be, according to this view, an unnatural attitude.

In conclusion, any proposals aiming to achieve sustainability, owing to their intrinsic anthropocentric nature, can help to promote intra- and inter-generational social justice, but they are not sufficient to achieve real nature conservation. This goal would require even more profound societal change than is acknowledged. Replacing capitalism with a new economic system is necessary for sustainability, but real nature

conservation also requires a less anthropocentric attitude and the adoption of an evolutionary perspective. Scientists would have a key role in triggering and guiding these changes, provided that they are able to analyse and communicate the appropriate knowledge and maintain their independence from political and economic influences. Scientists must also leave their laboratories and begin to interact with society on a larger scale (Johns, 2009). One relevant lesson is that natural systems have their dynamics, guided by evolution, so there is no single 'natural' state as a preferred conservation target. Naturalness, on the contrary, is constant change.

In the light of the long-term cyclical nature of destruction and creation, it could become a frustrating exercise to argue for conservation, given that the next major extinction and subsequent rise of a different biosphere is unavoidable. However, much remains to be done. Even if the cataclysm is inevitable, a reasonable target for conservation is to delay it as much as possible by passing on the responsibility to forces and processes beyond human control, biotic or not. In other words: let the next major extinction event be a natural one.

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CONFLICT OF INTEREST

The author declares that he has no conflict of interest.

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