The candid approach

Scientists should insist on a purely scientific approach to preserving biodiversity

Valenti Rull

Justifying scientific research to the public and funding agencies is not always an easy task. Policy makers and the public frequently ask whether the research is useful, by which they mean whether it is useful to humans. For medical and technological (M&T) research the answer is obvious: the work is geared towards improving health, quality of life or economic growth. For less applied, or at least less immediately applicable research, the justification can prove harder to explain. As a result, research funding—both public and private—tends to be predominantly funnelled into M&T research. Indeed, the mass media and the public often implicitly associate science with M&T research; favourite topics include cancer, AIDS, genetic engineering, robotics and nanotechnology. Even the scientific literature is dominated by M&T research, which is reflected, for instance, in ISI's annual Journal Citation Report: medical journals reign supreme in the Impact Factor stakes.

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By contrast, research into biodiversity and conservation is granted a lower status and funding priority. Scientists who work in fields such as ecology, biodiversity or conservation are often confronted with questions about the value of funding and conducting research in these areas, even to the extent of asking why we should conserve biodiversity at all. This essay analyses

common responses to these questions from different perspectives—those of ethics, sustainability and mercantilism—and proposes an additional 'candid' answer.

The first justification for research into biodiversity emphasizes the need for preserving the biosphere because it guarantees the future of humankind (Rolston, 1996). This strategy did not have the expected societal effect of garnering more support or funding, probably because the relationship between ecological health and personal health is not straightforward. However, the recent realization and acceptance that humans are responsible for global warming—several decades after scientists discovered this relationship (Weart, 2008)—and an aggressive media campaign seem to have revitalized this argument. Recently, conservationists have highlighted a more practical reason for supporting and funding biodiversity research; one which stresses the ability of ecosystems to provide basic goods and services, such as food, clean water and air, wildlife habitats and other benefits (Daily, 1997). In this context, many ecologists and ecological research programmes have focused their efforts to demonstrate that the preservation of biological diversity is essential for adequate ecosystems and, as a consequence, for the services these provide (Isbell *et al* 2009; Naeem *et al* 2009; Palumbi *et al* 2009). According to this so-called 'insurance hypothesis', for example, high biodiversity is required for ecosystem persistence because it guarantees that some species will be able to fulfil key ecological functions if others disappear (Hummel *et al* 2009).

In this way, biodiversity research and conservation have become part of the so-called sustainable development strategy. An implicit risk of this approach is to value the

biosphere just in terms of the goods that it provides for human societies (Bruce, 2008). This anthropocentric perspective has been complemented by the proposal to assign a monetary value to natural products, thus fixing a price for each good or service so it can be managed according to the rules of the market (Costanza *et al* 1997). Thus, both society and its official authorities might understand better the potential impact of biodiversity research and conservation, as well as the need for high-priority funding. However, the mercantilist approach could lead to the commercialization of biodiversity research and biodiversity itself, which is both dangerous and scientifically inappropriate, as I will discuss further.

From an ethical—and to some extent moral—point of view, we should preserve biodiversity simply because we should respect nature and naturalness (Angermeier, 2000); because nature has an intrinsic priceless value (McCauley, 2006); and because anthropogenic extinction of species is unacceptable (Jachowski & Kesler,

2009). Such arguments are commonly referred to as 'intrinsic or inherent value' and fall within the 'eco-centric' approach of Bruce (2008). The concept of intrinsic or inherent value, however, has been elusive and is not sufficient to guide practical conservation strategies (Justus *et al*, 2009).

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Instead, instrumental values, defined as "those considered valuable by valuers" have been proposed as a better tool for managing biodiversity (Justus *et al*, 2009). The concept of instrumental value includes consideration of economic aspects but also of others such as beauty, scientific curiosity, or our obligation to preserve the planet for future generations; all of which fall in the ambit of the so-called 'cultural services' (McCauley, 2006). Despite these ethical arguments, sustainability, either market-based or not, is becoming more and more the dominant tendency; therefore, the increasingly accepted argument to preserve biodiversity seems to be human survival, which is easily understood by society and policy makers.

However, there is a great potential danger lurking behind the concept of cultural services: within this frame of reference it is reasonable to ask whether we really need the current levels of existing biodiversity if the same ecosystem services could be maintained with fewer, well selected, organisms. It would be useful to know the amount and nature of the biodiversity that the proponents of this option estimate could be sacrificed for human development, but it is difficult to escape the idea that such a strategy could lead, intentionally or not, to

attempts to manage the whole biosphere only for human benefit. This is unacceptable from an ethical point of view—and probably also from an economic one, because of the enormous cost involved—and might be difficult to implement owing to our lack of the necessary ecological knowledge.

McCauley (2006) pointed out this incompatibility between the market economy and biodiversity conservation: "If we oversell the message that ecosystems are important because they provide services, we will have effectively sold out on nature." Moreover, the submission of biodiversity research to market rules would transform researchers and research institutions into inexpert actors and instruments of the global economy, which is dominated by companies and market economists. Scientists and institutions adhering to such a market-oriented form of biodiversity research would undoubtedly be more successful in obtaining funding and social recognition in the short term, but their research would become totally dependent on market needs in the medium to long term. As a result, the knowledge accumulated, independent of its volume, would be incomplete and biased towards dominant economic interests. Some might even think that such involvement is almost inevitable, given the worldwide prevalence of the capitalist market economy.

The potential consequences of using the laws and rules of the market to guide biodiversity research and conservation would be fatal. One example is the over-exploitation of non-renewable resources, such as crude oil. The main concern of the oil industry is not how to manage its extraction in a sustainable way, but how to replace it once exhausted to the point that many oil companies redefine themselves as energy companies and conduct research on alternative forms of energy production. One of these is the production of biofuels from crops grown specifically for that purpose, which directly competes with food production (Muller, 2009) and can create additional environmental damage (Laurijssen & Fraaij, 2009). It shows how the inevitable conflict between sustainability based on the continuity of natural services and mercantilism, which is primarily aimed at increasing financial gains, is solved in favour of the latter, and how company interests prevail over basic human needs. There is no reason to believe that the case would be different for biodiversity once it was commercialized. It

could be argued that, other than crude oil, many natural services are renewable, but this argument loses its strength in the light of the rate at which natural resources are destroyed compared with how long it takes them to recover.

Moreover, the global economic system is not robust enough to guarantee the durability of any value introduced to it. As the recent collapse of financial markets demonstrated, the system is largely unpredictable and can break down within days as a result of a few 'wrong' decisions or stock market operations. The lesson from the financial crisis is that the laws of the free market do not necessarily reflect the true value of the economy, which is dominated by other, more obscure and fluctuating interests. Furthermore, the encroachment of assigning monetary value to conservation might easily promote corruption, which is now seriously affecting the management of various biodiversity hotspots (Sodhi, 2008; Bradshaw *et al* 2009).

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Unfortunately, the first steps have been taken towards the commercialization of biodiversity and some scientists are willing to serve the highest bidder. Some of them defend the 'triage' option—choosing which species to preserve and which to let go—by claiming that biodiversity loss is inevitable given the limited resources for conservation (Bottrill *et al* 2008; 2009). This is an unconditional surrender to the market and implicitly accepts that some biodiversity will disappear owing to insufficient funds for conservation. Critics of

the triage option have argued that the cost for global biodiversity conservation is not beyond the current system's capacity as compared, for example, with the resources spent on space exploration (Balmford *et al*, 2002). Instead, they have proposed using a "carbon market" model to finance conservation (Parr *et al*, 2009). However, these are economic arguments too, and illustrate the difficulty of avoiding market economy, even for those who defend the 'zero extinction' option.

Where the nature of biodiversity research and scientific research in general are concerned, the ideological independence of scientists is of paramount importance to guarantee objectivity and must be maintained at all costs. Political, economic or religious forces must not control research; science is the only method by which humans are able to understand nature and it needs no further justification or external context to fulfil this role. However, as a social task that is supported by public and private investment, research needs to be explained in terms of human utility. In the case of biodiversity research, the maintenance of ecosystem services for human development is a powerful argument but, in addition to

being based on a flawed anthropocentric conception of nature, it is not the only one. The generation of knowledge—not just information—is another good reason. Today's culture and society are the result of scientific research, and it is the best tool we have with which to face future challenges. Human civilizations and their social, political and economic systems are ephemeral and have risen and disappeared, but knowledge has been constantly increasing, even during the European Dark Age. Against this background and to maintain their independence, scientists and institutions should evaluate seriously the pros and cons before getting involved in the biodiversity research market. At present, all options are still open, but the market machinery, once launched, quickly imposes its own laws.

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The acquisition of knowledge is a sound and consistent position, but this argument is often neglected owing to fears of being seen as romantic idealists, or political anti-capitalist activists. If the prevailing economic order finally takes control of biodiversity and biodiversity research, the only option for candid science is to wait for the next Renaissance. Meanwhile, however, the Earth's biodiversity will continue to disappear at an alarming rate. Governments and public institutions are probably the main hope if this situation is to be prevented. Non-governmental organizations devoted to conservation might also help. Concerning the question of why to preserve biodiversity, a candid answer would be that "we have no reason to destroy it". The long-term persistence of humans on Earth is not necessarily linked to the decline of biodiversity, unlike the short-term persistence of the present socio-economical model. We all know that it is not possible to preserve biodiversity without changing our standard of life at all levels, but the inertia in maintaining the social *status quo* is so prevalent that we prefer to play the ostrich and discuss what we call 'realistic' options that are not real solutions at all.

In the end, all the reasons analysed here for preserving biodiversity, whether commercial, sustainable, moral, ethical or candid, are still anthropocentric because humans assess the value of nature on the basis of their material and cultural needs. We feel responsible for the fate of humanity. However, we have a greater responsibility. We have no right to absentmindedly—or deliberately—destroy what evolution has produced over millions of years. This evolutionary argument, although powerful on its own, can be reinforced further. Our species, like others, is perennial and should not be regarded as dominant forever. We should accept that the future Earth could be a planet without humans, not because we have destroyed ourselves—the only possibility we seem to have seriously considered so far—but because we have done things well; because life on earth has continued and evolution has progressed to the point that our species as we know it has gone into extinction naturally (Rull, 2009). We are responsible for achieving this future and the only way to do so is to preserve biodiversity as it is.

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From this discussion, it follows that the adoption of market perspectives to manage biodiversity would accelerate its annihilation, and the sustainability perspective alone would be only palliative and probably temporary. Ethics and candidness are therefore necessary ingredients of the recipe for the future, but we also need a non-anthropocentric ecological and evolutionary perspective that considers the biosphere as is and its continuity as the primary objective. This is the evolutionary candid approach under which the

right question is not why we should conserve biodiversity, but how we should change ourselves in order to preserve it. Evolutionary candidness should not be confused with the 'intrinsic value' or 'eco-centric' approaches (Bruce, 2008), which consider that nature is something sacred or even divine, and therefore untouchable. The candid approach is based on the strict application of scientific criteria without any religious or pseudoreligious preconceptions.

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The candid approach, anthropocentric or not, provides more sound and permanent arguments for biodiversity research and conservation than sustainability, mercantilism or even human ethics. The main difficulty is that the candid approach involves profound changes to the global socio-economic order and to modern lifestyles and standards; it is both politically subversive and personally uncomfortable. It is time for scientists to adopt a definite and honest position on biodiversity based solely on scientific grounds, beyond any social, economic, political, religious or personal constraints. Such a candid posture is not only the best service we can provide to society as science professionals, but also the more suitable way to fulfil our evolutionary responsibility.

CONFLICT OF INTEREST

The author declares that he has no conflict of interest.

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Received 26 October 2009; accepted 18 November 2009; published online 11 December 2009

EMBO reports (2010) **11**, 14–17.
doi:10.1038/embor.2009.261