

## Science and biodiversity: the predicament of Sri Lanka

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As Sri Lankans working in the biodiversity sciences, we read with interest and empathy the concerns expressed by our Indian colleagues on the widening divide between scientists and biodiversity regulators in India<sup>1-3</sup>. The situation vis-à-vis biodiversity research they outline for India could indeed apply almost word for word to Sri Lanka as well, with only the names of the countries and their institutions being interchanged. We endorse *mutatis mutandis* their recommendations and look forward to their adoption also by the Sri Lankan government.

The rationale behind Sri Lanka's Fauna and Flora Protection Ordinance, Forest Ordinance and other conservation-relevant legislation has been largely the need to curb illegal activities such as poaching and commercial exploitation of threatened species, and extraction of timber from and encroachment of protected areas. These involve protection of biodiversity resources, not their conservation: the latter entails active scientific management interventions<sup>4,5</sup>, whereas the former is largely an issue of policing. As is the case in India, the Sri Lankan legislation contains no enabling provisions for scientific research: permission for research is the arbitrary prerogative of the respective regulatory agencies.

Despite the many similarities in their overall effect, the causes of the restrictions on biodiversity research in Sri Lanka may be different from those in India. One reason for poor appreciation of research by the government's conservation agencies could be that their scientific capacity is limited. For example, the staff of the Department of Wildlife Conservation, the regulatory authority for access to biodiversity, while numbering almost 2000, contains only a handful of graduates in biological sciences, and no Ph Ds. The Department's lack of capacity for regulating research therefore requires sympathetic appreciation and demands increased government focus on strengthening its scientific capacity. A further striking difference between the situations in India and Sri Lanka is the low scientific capacity of the latter's conservation

NGOs. A consequence of this has been that many of the island's NGOs have a poor appreciation of scientific research and broadly support the anti-science stance of the regulators.

At the same time, increasingly complex threats to biodiversity (e.g. habitat fragmentation and loss, environmental pollution, climate change, invasive species) demand scientifically designed management interventions based on large arrays of data accumulated over long periods of time. Restrictions on research are preventing the accumulation of such data and thwarting the development and implementation of urgently needed science-driven recovery plans for threatened species and management plans for key conservation sites<sup>6</sup>. At no time in history has it been more crucial for biodiversity scientists to engage with conservation managers in designing such plans.

As part of the community of scientists in developing countries with restrictive conservation regimes, however, perhaps we need to acknowledge also our own contribution to the predicament in which we find ourselves. For the most part we stood idly by as the legal instruments that countries drafted in the wake of the 1992 Convention on Biological Diversity (CBD) were enacted. In many cases, these unwittingly left room for alienation of scientists and in some cases, criminalization of science. In addition to Sri Lanka's 1993 amendments to its Fauna and Flora Protection Ordinance and India's 2002 Biological Diversity Act, many of these laws serve unintentionally to distance biodiversity scientists from the very resources they seek to study and help conserve. Examples include the 1995 Philippines Executive Order 247 (which treats 'research, collection and utilization of biological and genetic resources, for purposes of applying the knowledge derived therefrom for scientific and/or commercial purposes' as 'bioprospecting') and Brazil's 2001 Provisional Measure 2.186-16/01 (which in effect forbids Brazilian scientists from conducting even purely academic biodi-

versity-related research in their personal capacities). In many cases, we failed also to educate legislators on the meanings of key concepts in these regulatory frameworks: e.g. the difference between 'genetic resources' and 'biological resources'; and that 'type specimens' have only scientific—and not nationalistic or heritage-related—value.

While the simmering frustration of scientists in biodiversity-rich developing countries has been reflected on a variety of science websites<sup>7</sup> for some time, the three articles<sup>1-3</sup> cited above appear to be the first time these concerns have been expressed in formal scientific literature. They provide specific examples of the general concern expressed by Kate<sup>8</sup> that 'There is evidence that the anticipated bureaucracy, delay and expense of compliance with the first wave of access laws have deterred foreign and domestic scientists and thus have unwittingly stifled not only commercial research, but also essential conservation work'.

Our silence also implicitly endorsed the wave of publicity in both the popular and scientific media that followed the CBD, which hyped the billions of dollars that biodiversity-rich but economically poor countries stood to make from the 'green gold'<sup>9,10</sup> that lay hidden in their genetic resources. With a few modest but charismatic exceptions, that has turned out to be a false promise: many of the world's pharmaceutical giants have turned away from exploring natural products and begun to look instead to combinatorial chemistry in their quest for new drugs<sup>8,11</sup>. Nevertheless, the idea has become entrenched in the minds of biodiversity access regulators and laypeople that biodiversity researchers (however pure and conservation-relevant their research) stand to profit materially from their work, justifying in the popular mind the iron curtain that has been placed between scientists and biodiversity. In many cases, applications for specimen collecting, e.g. for taxonomic research, are treated by regulators in much the same way as those for sport hunting or exploitative collecting for the pet or horticulture trades.

Both India and Sri Lanka have affirmed in their country reports<sup>12</sup> on implementation of the CBD, their commitment to the Global Taxonomy Initiative that strives to build national taxonomic capacity. However, taxonomy has been one of the main victims of the emerging regulatory regime in these countries: the loaning of type and other specimens for taxonomic research is now almost impossible, and taxonomic collection and inventory-building has come to a near standstill. Likewise, the International Coordinating Council of UNESCO's Man and Biosphere (MAB) Programme, under the United Nations Decade of Education for Sustainable Development, 2005–2014, has invited MAB national committees to work closely with relevant in-country public and private sector organizations and the civil society in order to encourage the use of biosphere reserves as 'learning laboratories for sustainable development'. Such objectives could only be realized through relevant regulatory agencies changing their traditional outlook to meet the modern-day requirements.

The analogy that Madhusudan *et al.*<sup>1</sup> draw to biodiversity being a library in which the librarian plays the role of a regulator is an apt one. We would add an analogy of our own. The crisis in which biodiversity now finds itself is so profound and acute that all available scientific expertise must be deployed to save it: mere policing of sites and species by

wardens and rangers, while essential, will not suffice. We compare Sri Lankan biodiversity to a critically ill patient being wheeled into an intensive care unit, whereupon the doctors are told to stand aside and well-meaning bystanders invited to treat the victim.

We congratulate our Indian colleagues for so candidly expressing their views and hope for the sake of our countries' largely shared, unique and imperilled biodiversity, that a new and constructive phase of engagement will begin between biodiversity, scientists on the one hand, and legislators and regulators on the other.

1. Madhusudan, M. D. *et al.*, *Curr. Sci.*, 2006, **91**, 1015–1019.
2. Prathapan, K. D. *et al.*, *Curr. Sci.*, 2006, **91**, 1006–1007.
3. Bawa, K. S., *Curr. Sci.*, 2006, **91**, 1005.
4. Rahmani, A. R., *J. Bombay Nat. Hist. Soc.*, 2001, **98**, 1–3.
5. Madhusudan, M. D. and Shankar Raman, T. R., *Conserv. Soc.*, 2003, **1**, 49–59.
6. Pethiyagoda, R., *Raffles Bull. Zool. Suppl.*, 2005, **12**, 1–4.
7. <http://www.scidev.net/content/features/eng/is-brazil-beating-biopiracy-or-biodiversity-research.cfm> [accessed 5 December 2006].
8. Kate, K., *Science*, 2002, **295**, 2371–2372.
9. Labrador, D., *Sci. Am.*, 2003, **289**, 17–18.
10. Pethiyagoda, R., *Nature*, 2004, **429**, 129.
11. MacIlwain, C., *Nature*, 1998, **392**, 535–540.

12. <http://www.biodiv.org> [accessed 5 December 2006].

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