

## Global bodies won't save the environment: it needs grass-roots efforts ...

Sir — James, Gaston and Balmford in their Commentary provide confused arguments for a global conservation strategy<sup>1</sup>. The fault lies in their jump from an exercise in numerical estimation to a prescription for global economic policy. Their proposal — for global institutions to buy land in less-industrialized countries and turn it into nature reserves — overlooks the enormously dangerous mid- and long-term consequences it would have, both on the environment and on the people who live there.

The unrealistically low prices paid for land in developing countries would not provide the necessary economic basis for “the losers” to find “alternative employment opportunities”. Most of those “losers” (cultures and communities that have maintained biological resources over thousands of years<sup>2,3</sup>) do not consider their relationship to those resources as a job to be given up for money. Besides, we need only look at the failure of retraining and employment programmes in the United States to gain a sobering insight into the realities of such a proposition.

It seems more likely that the low-cost social programme James *et al.* suggest to compensate these people would increase the flood of migration to infra-urban misery belts around cities in the Third World, rather than causing a utopian transformation of rural and forest communities. Numerous studies have linked this migratory pattern to the loss of biological diversity in depopulated rural areas<sup>4</sup>.

James *et al.* dismiss community-based initiatives as not “encouraging... despite a decade of practice”. They favour instead a top-down programme directed by global institutions and carried out by national governments. Yet this approach, widely tested for several decades, has a dismal environmental track-record.

By contrast, there are numerous success stories of sustainable biological resource use grounded on community-based initiatives<sup>4,5</sup>. Many of these have disappeared in recent years, but are now being rediscovered by biologists and anthropologists<sup>3-7</sup>. Others still exist, but because they are adapted to their own sites they are small and hardly noticeable in a global analysis. However, their mere survival in the face of ineffective trickle-down approaches such as that advocated by James *et al.* testifies to their resilience and potential<sup>4</sup>. Indeed, given the spectacular failure of globalized, one-fits-all proposals during the past six decades, I would argue that any possibility

of developing an ecologically sustainable future will originate in small, community-based initiatives.

Many successful, small-scale purchase-for-protection programmes are limited to areas with relatively low cultural diversity and/or low levels of human interaction with diverse biological resources. But even here, buying a piece of land does not guarantee the conservation of the resources associated with it, especially in remote areas inhabited by marginal biological resources and human communities.

“Preserved” areas are damaged not only by chain-saws, but also by the introduction of alien invasive species, the accumulation of fuel in fire-protected areas, and the demise of human-adapted species and ecosystems. Human communities can protect biological diversity against these threats, using fine-scale management. This cannot be done by remote control from the boardrooms of the World Bank<sup>3-5,8</sup>.

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## ... or should private enterprise take over?

Sir — James *et al.*<sup>1</sup> call for the elimination of government subsidies that encourage ecologically harmful activities. This goal is admirable because it would remove government incentives that lead to resource abuse and would lessen the tax burden on the citizenry. However, proponents of this idea should be wary about redirecting the subsidies to protection of biodiversity.

Using subsidies to set aside a significant portion of a nation's land base in nature reserves can still have serious economic consequences if it means that other economic activities such as oil and gas development, timber production, or ranching are disallowed. Already suffering from impoverished conditions, Third World countries will not readily embrace the idea of reduced economic outputs. In addition, such a strategy ignores the possibility of

creating a profitable land base of enhanced biodiversity, and may also intensify development pressures on lands not included in the nature reserve system. As a consequence, species residing on these lands are likely to suffer a loss of habitat<sup>2</sup>.

Creating a land base that eliminates options for other economic activities does not necessarily protect species. Newmark found that national parks in western North America have lost 42 populations of mammals and are in danger of losing more<sup>3</sup>. Also in national parks, Wagner *et al.* found declines in “genetic diversity within species populations, species diversity, ecosystem diversity, and habitat of landscape diversity”<sup>4</sup>.

There are better options for enhanced biodiversity, without government spending. Non-government enterprises that protect biodiversity include the McIlhenny family's Avery Island and the National Audubon Society's Rainey Preserve in Louisiana, the Fort Apache Reservation in Arizona, the Joint Venture Partners' preserve along the Kikori River in Papua New Guinea, and those run by Conservation Corporation Africa. They prevent trespass and generate funds from limited commodity development or from the wildlife itself. Such private options should be explored.

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## Proteins and the naked truth about e-commerce

Sir — Vani Kalyanaraman (*Nature* **402**, 118; 1999) objects to the photo in the advertisement on the back cover of the 7 October issue of *Nature*.

Perceptions differ. Far from being “unpleasant”, the picture in my opinion is sensuous and certainly not pornographic, not even erotic. Together with the text, “The beauty of protein folding”, it made me sufficiently curious to read the entire advertisement.

The contortions through which the human body can go depend on the bending properties of muscles, tissue, sinews, ligaments and whatnot, and these must in turn depend upon the properties of proteins.

On page xvii in that same issue there is an advertisement headed “Human tissues” with a picture of a naked body that shows more explicitly what humans are like in the nude than the photograph in question, but Kalyanaraman does not comment on it. I think *Nature* has exercised its editorial

prerogative wisely in both cases and should guard against undue censorship.

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*Sir* — Vani Kalyanaraman objects to nudity in advertisements for scientific products, but I believe that nakedness might be more appropriate here than Kalyanaraman realizes (*Nature* **402**, 118; 1999). Given that we are being increasingly encouraged to buy almost everything via the web, perhaps use of nudity reminds us of the strong association between images of nakedness and e-commerce?

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### EPA error risked halving India's rice harvest

*Sir* — Methane has attracted particular attention as a greenhouse gas, as once it is formed, mitigation strategies are not easy to devise. The US Environmental Protection Agency (EPA) estimated in 1990 that global methane emission is about 550 Tg (550 million tonnes) per annum, with about 110 Tg of this released from paddy cultivation. This estimate turned out to be wrong, but it could have had devastating consequences for the economy of India.

Nearly 90% of the world's rice production comes from Asia, and rice is the staple food for 2 billion people. India produces about 80 million tonnes from about 42 million hectares. The EPA estimated methane emission from India as 37.8 Tg per annum in 1990<sup>1</sup>. The implications of this estimate were so serious that India's National Physical Laboratory led an international collaboration of 15 laboratories to measure methane emissions directly<sup>2</sup>.

Methane released during paddy cultivation was collected and analysed, with careful controls. Methane fluxes were typically between  $-10$  and  $+80$  mg per hour per m<sup>2</sup>. Samples were taken from 34 sites in India of varying agricultural conditions, and measurements were done at different cultivation stages, from seedlings to harvesting, and integrated over a full year to cover single and multiple crops. Methane emission depends on the paddy-water ecosystem, and this was also measured in various ways over time.

All this direct agricultural information was used to calculate the methane emission budget<sup>2</sup>, which was  $4.07 \pm 1.25$  Tg per year, only one-tenth of the 1990 EPA estimate. A repetition of the measurements in 1996 gave essentially the same result.

The main reason for the difference between the EPA estimates and the actual

measurements is that long incubation periods lead to anaerobic conditions, favouring high methane genesis. The EPA extrapolated the 1990 data without realizing that the high methane flux conditions had resulted in an annual methane emission from India that was an order of magnitude larger than the experimentally measured values.

This error has now been corrected and the estimate of global methane emission from paddy fields has been scaled down to 60 million tonnes. Methane emission from rice cultivation in India and other similar Asian countries is no longer considered a major factor in global warming.

If this error had gone uncorrected, international protocols would have required Indian methane emissions to be brought down to global average levels, reducing paddy cultivation by at least 47% in the short term. The economic cost of this would have been about 135,000 million rupees (US\$3.1 billion) per annum, nearly double the annual budget of all India's science and technology ministries combined<sup>3</sup>.

So the investments that enabled the National Physical Laboratory to perform and coordinate precise measurements saved the country from an economic crisis. This story illustrates that, even in developing countries, it is wise for governments to invest in research and development.

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### Wherever HIV originated, polio vaccine is safe now

*Sir* — John Moore's review of E. Hooper's *The River* (*Nature* **401**, 325–6; 1999), on the possible link between the origin of HIV and a contaminated polio vaccine used during a mass vaccination campaign in equatorial Africa in the 1950s, carefully discussed the weakness of the book's hypothesis. But it is important to add that the polio vaccine currently being used worldwide is safe.

This message was not very clear when newspapers in Uganda first picked up the HIV–polio theory from the US media some years ago. As a result, some people thought that their child would be given a contaminated vaccine. So they kept their children from being vaccinated, putting them at high risk of poliomyelitis. In 1999, there were 49 confirmed polio cases in Uganda, according to the World Health Organization.

With the recent renewal of interest in the HIV–polio theory, there is a need to stress

the safety of the present polio vaccine whenever it is discussed. Hopes for global eradication of polio depend largely on vaccination coverage in all parts of the world.

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### East German academics faced unfair hurdles

*Sir* — We have some doubts about statements attributed to Jens Reich in a recent Briefing (*Nature* **401**, 637; 1999), that some evaluation interviews conducted by the Wissenschaftsrat in Germany were held in English. Although some evaluation committees may have interviewed an East German lecturer in English or may have required someone to give a lecture in English, the claim that interviews were conducted in English must be due to a misunderstanding.

East Germany's academics were not capable of conversing in English at this level. Real proficiency in English would have aroused suspicion — either of a rightist (non-socialist) leaning or, even worse, of collaborating with the West. How could scholars or scientists have learnt a foreign language in a country such as East Germany, which disadvantaged classical and humanist studies and allowed the modern language teaching of Russian to dominate?

Of course, a knowledge of English in the former East Germany was not unheard of. A few academics who travelled abroad endeavoured to learn the language. At the end of the GDR period, language training centres were established to provide quality teaching in Russian, English, French, Spanish and Portuguese, following the example of UK language schools. These centres gave academic and other specialist staff chosen for foreign assignments an opportunity to learn their target language.

The Briefing may have overlooked an important angle. Immediately after the fall of the Berlin Wall, many heads of institutions and departments in their fifties were replaced by members of the 'pretender' generation — biting the hand that had once fed them. If reunification hadn't happened, these 'pretenders' would only now be starting to reach those positions — but they would have been properly prepared by their mentors.

So, while we needed people who would stand by their principles, it was once again the Fouché-like opportunists who — believing a political fault is worse than a crime — left the field as victors of the game.

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