US biologist says sustainability the only path to peace

AUSTRALIA'S future security will rely not on increased military expenditure, but on the sharing of scientific and technical infrastructure and information with neighbouring nations, according to leading US environmental scientist Dr Peter Raven.

Raven, director of the Missouri Botanical Garden and a member of the US President's Committee of Advisors on Science and Technology, was delivering the 1998 Australian National Insect Collection Public Lecture at Canberra in July. The address, sponsored by the Australian Academy of Science and CSIRO, underlined the fundamental importance of biodiversity to the future of life on Earth.

Raven said a major obstacle to sustainability was overpopulation, compounded by inequalities in resource use, wealth and education. The world's population had more than doubled from 2.5 billion in 1950 to six billion in 1998. At the same time, the proportion of people living in developed countries such as the US had fallen from 33% to 20%.

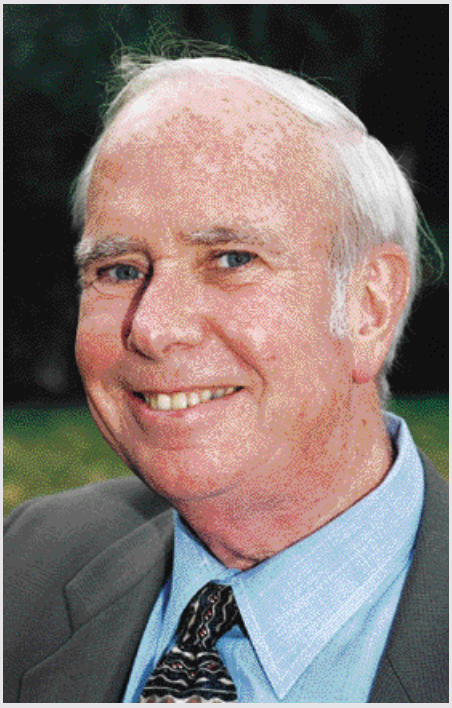
Despite this contraction, the 'ecological footprint' of the developed world continued extending beyond its borders. 'The 135 million people added to the population of the US since 1943 are having the same impact as if four billion people were added to the population of Indonesia,' he said. Developed nations controlled 85% of the economy, burned 80% of industrial energy, and used most of the world's iron, aluminium and steel.

People living in developing countries were paying an enormous price for the West's over-exploitation of resources, Raven said. 'We live in a world characterised by massive social injustice and widespread starvation. More than 1.5 billion people live in extreme poverty, on less than one dollar a day. More than 600 million people receive less than 80% of the World Health Organisation minimum calorific intake per day. Fourteen million babies, aged four or younger, die of diseases related to starvation every year.'

Some 80% of people lived in developing nations, mainly in tropical and sub-tropical regions. These countries held 80% of the world's biodiversity, but only 6% of its scientists and engineers: an insufficient knowledge base from which to provide technical advice on biodiversity management.

In contrast, Australia's scientific and technical infrastructure was strong and future security and stability depended on sharing this infrastructure with other countries in the region, Raven said. 'No level of military expenditure can provide a safe environment for Australia. On the other hand, regional sustainability, whereby you improve the capabilities of countries such as Indonesia, Malaysia, Cambodia, Laos and Vietnam, can win both regional security and stability and trading partners for the future.

Raven said the excesses of the industrial revolution, with its dependence on physical science and energy-based progress, must yield to a more sustainable, creative use of biological systems. But just as the technology for building the 'age of biology' was being developed, the Earth's biological diversity was in rapid decline. One-quarter of all plant, animal, fungi and micro-organism species may be extinct by 2025 and three-quarters may be lost or nearing extinction by the end of next century.



David McClenaghan, CSIRO Entomology

Dr Peter Raven says developing countries are paying an enormous price for the West's over-exploitation of resources.

This loss was compounded by enormous ignorance, Raven said. Only 1.6 million of the world's estimated five to seven million plant and animal species were named, and only 5 to 10% were actually known. Bacteria and fungi were the great decomposers of the biosphere, and essential for continued life on Earth, yet only 3000 kinds of bacteria had been fully described. The situation for fungi was even worse, with only 70 species described out of a possible world diversity of 1.5 million species.

Raven said the impact of humanity on Earth had been enormous. Humans used and directly diverted 45% of the planet's total net photosynthetic output on land. In the past 50 years, 25% of topsoil had been lost due to poor farming practices; 20% of agricultural land had been lost to salinisation, erosion, urban sprawl and desertification; atmospheric carbon dioxide levels had risen 15%; the ozone layer had decreased by nearly 8%; and one-third of forests had disappeared.

'We haven't been living off the interest, ecologically speaking, we have been living off the principal,' he said. 'That is something that cannot go on.'

Anna Van Dugteren

ED Edwards/CSIRO Entomology

The endangered synemon plana golden sun moth. One-quarter of all plant, animal, fungi and microorganism species may be extinct by 2025 and three-quarters may be lost or nearing extinction by the end of next century, according to US biologist Dr Peter Raven.