

The state of the Australian environment

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Abstract

The Australian environment has a range of serious problems resulting from population growth, lifestyle, technologies and demands on natural resources. There is growing recognition that many of our practices are not sustainable and we need urgently to satisfy our needs with less impact on the natural systems of the Earth. We are also developing a broader awareness of the impact of our actions globally, such as with acid rain, climate change and ozone depletion and these problems can only be resolved through international cooperation of an unprecedented kind. Our understanding of the Australian environment is limited by the lack of data which has either been not collected or is not in the public domain. Research must address these deficiencies to clarify whether our management of the environment is adequate. We need to improve our understanding of the complex biological systems and the impacts of human activities on them. A major impediment to achieving these is the systematic erosion of our basic science capacity. Several changes need to be made in our approach to these issues. The use of catchments as the basis for local government boundaries, the removal of divisions of responsibility between government departments and political decisions making in long-term horizons are essential components of the change. Also needed is a move from economic decision making to one within a sound ecological framework. Australia has a better opportunity than most countries to live sustainably and protect our unique biological heritage, but we will only be able to do that if we integrate the principles of ecological responsibility into all our social and economic planning.

Key words

Environment, sustainability, biodiversity, ecosystem, energy.

The 1996 report on the state of the Australian environment identified a range of serious problems which it attributed to the cumulative consequences of our population growth and distribution, lifestyles, technologies and demands on natural resources over the last two hundred years and more. It concluded that we have a better opportunity than most nations to use our resources sustainably, but we will need to do much more if we are not to lose this opportunity. Progress toward the goal of Sustainability requires the integration of ecological thinking into all social and economic planning. Although the Council of Australian Governments (COAG) adopted a National Strategy for Ecologically Sustainable Development more than five years ago, there is little evidence that it has changed the approach of governments. A recent OECD review of Australian performance noted that economic objectives still appear to take priority over environmental concerns. We urgently need to develop a more scientific approach which will allow economic decisions to be made within boundaries of ecological sustainability.

Sustainability

There is a growing recognition that many of our practices are not sustainable. Depletion of the ozone layer, degradation of our soils, local pollution of air and water, deforestation and global climate change are all symptoms of this fundamental problem. While it has not been an issue in the public eye in recent years, depletion of our mineral resource base is an equally important problem. We need, as a matter of urgency, to find ways of satisfying our needs with less impact on the natural systems of the Earth. As the report of the World Commission on Environment and Development identified? unless our pattern of economic development is ecologically rational we will be unable to maintain living standards, let alone improve them (13).

Finding a mode of human development that is sustainable, at least in principle, is a very complex task. It requires an understanding of physical, chemical, bio-logical, social, political and economic factors.

Indeed, it would be entirely understandable if we were all to conclude that the task is much too difficult. Until very recently, most of our political leaders have behaved as if they hoped the problem would just go away. In the 1990s, however, the phrase "sustainable development" entered political discussion. The Hawke Government undertook an ambitious exercise which eventually led to the adoption by COAG of a National Strategy for Eco-logically Sustainable Development (4). So the goal of ecologically sustainable development has been adopted, at least in broad principle, by all Australian governments. Since various individuals are using the term to mean things which clearly differ, it is important to be clear about what I think it means. Development means a process of change, usually with connotations of approval. It is sustainable only if it can be continued, or sustained, for the foreseeable future. Thus sustainable development is a pattern of development which can be continued. Probably the least contentious definition of that goal is the Brundtland approach (13) of seeing it as attempting to meet the needs of the present generation in ways that do not reduce options available to future generations. That would in turn pose three criteria. We should not be significantly eroding the resource base, damaging natural systems or threatening social stability, since to do any of those things would reduce options available to future generations. The difficulty is that there are no absolute rules which tell us what level of resource depletion, environmental damage or erosion of social structures might be acceptable.

Resources

The issue of depletion of resources is a complex one (3, 11). The size of the resource base is influenced, for example, by economics. A price increase, whether driven by scarcity or achieved by control of the market, is likely to make marginal resources economic and so expand the stock of available resources. New technologies can also extend the resource base; a new extraction technique may turn deposits which were previously inaccessible into useful resources. The most obvious example in recent decades was the expansion of the useful oil resources by development of techniques for exploiting oil beneath the sea. The political culture of the time also has an influence. The question of whether the minerals under the frozen ground of the Antarctic should be regarded as useable resources was the subject of active international debate until the early 1990s, when an international treaty effectively prohibited exploration or mining in Antarctica (6).

Energy is another factor affecting resources. When a high quality resource is depleted, there are usually lower grade resources which can be used if money and energy are available in sufficient quantity. In that sense, energy can be regarded as the key resource. With sufficient energy, quantities of almost any other resource can be produced. Poorer grades of ore can be exploited, land can be farmed more intensively and potable water can be produced from the ocean if we have abundant energy. For that reason, the availability and price of energy influence the issue of which mineral deposits can be regarded as resources. If we are moving into an era in which scarcity or environmental concerns are likely to limit the use of energy, the resource base will be constrained (9).

There is one obvious exception to the general assertion that there is no shortage of resources. For the best part of thirty years now, it has become steadily more difficult to find oil. The drilling per unit of proven resource has gone up and up. We are now getting oil from such unlikely places as the North Sea and Alaska. There is pessimism about the chance of ever again finding the sort of massive deposits which have fuelled the expansion in transport since 1950. The current rate of using petroleum fuels does not just threaten the global atmosphere, it also risks depleting the oil fields within the life-time of today's young people. We are not likely to run out of oil, in the sense of there literally being none left, but we may well decide [for example] that its value as a chemical feedstock rules out using it as fuel for cars (7). This inevitably raises the inter-generational issue of whether we are unreasonably foreclosing options for future generations by our profligate use of oil.

Even when we are not depleting resources in absolute terms, we usually exploit the richest and most easily accessible deposits, thus inevitably limiting the options available to our descendants. Thus, our use of copper is very unlikely to deprive future generations of the use of that mineral but it is certainly exhausting the best grades of ore, ensuring that it will be either more scarce or more expensive in future times. As the average ore grade being worked gets poorer, the quantity of rock which must be dug up and crushed for a kilogram of copper steadily increases, as does the fuel energy needed for extraction and

the amount of waste produced (2). Thus our activities may well be condemning future generations to a greater economic or environmental cost for their minerals, even where there is not a level of depletion that is itself unreasonable in absolute terms.

Environment

We also need to consider what have been called environmental issues. I prefer to describe these as ecological issues, as the word environment suggests surroundings. Natural ecosystems are more than just our surroundings; we are actually part of the natural systems of the planet. We are developing a broader awareness of the impacts of our actions on those systems. The whales of the southern ocean, the rainforest of the Amazon and the Great Panda of China are certainly not parts of our immediate environment; our concern for the loss of whales or Amazon rainforest represents an awareness of the ecological impacts of human actions.

There have always been some local impacts of productive enterprises. These local problems have been tolerated, either because the pollution was seen as an acceptable price for the economic activity or because those who derived the benefits were not the people who bore the brunt of the pollution. In recent years the scale of the human population and the nature of our technology have broadened the range of impacts, affecting whole regions in the case of acid rain and the entire globe in the cases of climate change and ozone depletion. These problems cannot be resolved even in principle by any one group or nation; if they are to be resolved, it will require global co-operation of an unprecedented kind (13).

Take the example of the enhanced greenhouse effect, mainly due to the release of carbon dioxide from the burning of fuels. Because carbon fuels like oil and coal have been cheap to obtain, we have evolved a life-style which depends on massive use of these compounds. The world burns thousands of millions of tonnes of these fuels each year; in other words, our lifestyle requires the burning each year of more than a tonne of carbon fuels. The process of withdrawal will be difficult, expensive and possibly even painful, at least in economic terms. The scale of the problem is truly formidable. World leaders recently agonised over the question of whether we should adopt a target suggested by the Framework Convention on Climate Change: the reduction in the rate of emitting greenhouse gases by the year 2012 to 5.2% below the 1990 level. The Australian government took the official position that such a commitment would do serious economic damage, and adopted an intransigent position of wanting to increase emissions! That stance will be seen in time to have done considerable harm to our international reputation.

While the Kyoto target is a useful step forward, the science says that the level of emissions which would allow global concentrations to be stabilised is about 40% of the current figure (8). Given that there is a perfectly reasonable expectation in Third World countries that they will improve their standard of living, if not to that currently enjoyed by the industrialised countries at least to something closer to human dignity than the conditions under which many people now live, the level of carbon dioxide production which will eventually be seen as reasonable for countries like Australia, the UK and the USA is probably about 20% of the present value. Thus, dealing with global warming will not simply require minor cosmetic changes but a fundamentally different approach to the use of energy. That is an inescapable conclusion (9).

It is a fundamental principle of sustainable development that the integrity of ecological systems should not be threatened. Ecological integrity is a short-hand term for the general health and resilience of natural systems. This includes the ability of eco-systems to assimilate wastes through basic natural cycles, such as the water cycle and the carbon cycle. It also includes the capacity of ecosystems to withstand other stresses, such as climate change or depletion of the ozone layer. The effects of a growing human population, with increasing production of a range of wastes, are putting severe pressure on the ability of natural systems to maintain their integrity. For future development to be sustainable, we need to reduce the pressure on natural systems by improving the efficiency of using energy and resources, as well as imposing rigorous upper limits on the emission of pollutants (12).

Biodiversity refers to the variety of species, populations, habitats and eco-systems existing on this planet. There are sound practical reasons for seeking to maintain biodiversity through such means as the reservation of representative ecosystems and habitats, or the protection of endangered species. Such

protection provides a stock-pile of genetic diversity for potential use in medicine and agriculture; this is especially important in the face of expected changes in climate. It also enables scientific study of species and properties we do not yet understand, as well as improving the chances of natural eco-systems being stable under changing conditions. Thus, biodiversity enhances human welfare and is therefore desirable in those practical terms. There is also a moral argument for protecting biodiversity; this rests on our recognising that other life-forms have some right to exist, whether they have obvious direct value to humans or not (12).

Finally, it is a sound general principle to try to avoid unnecessary risks, but under conditions of uncertainty the risks may not be quantifiable or even known. This strongly suggests a need to adopt a cautious approach, especially when there is a risk of irreversible change. In the environmental sense, irreversible changes are such events as the loss of a species or a wilderness area. It is equally true that damage to the national economic structure or to the well-being of the community can be difficult or impossible to reverse. This precautionary approach differs fundamentally from the traditional principle of applying environmental constraints to energy use only when serious irreversible effects could be proved. Since the need for caution arises particularly from conditions of uncertainty, there is a general need for basic research on ecological systems to improve the level of our understanding of these systems (12).

Population

We should not ignore the impact of population growth on the problem. About two-thirds of the current rate of increase in the emissions of greenhouse gases can be attributed to increasing populations, with associated demands for increasing food production and preparation, for housing, for transport and the like. For a country with an established lifestyle, both the resource demands of that lifestyle and its environmental or ecological impacts are directly proportional to the number of people enjoying that lifestyle. Unless we are able to stabilise the human population, we cannot hope to achieve a sustainable way of life (10).

The state of the Australian environment

The Australian government began early in 1994 an exercise which culminated in the publication of an independent national report on the state of the environment (12). It covered our terrestrial systems, inland waterways, estuaries and the sea, the atmosphere, human settlements and our cultural heritage. The integrity of the report was based on the expertise of seven reference groups, peer review of draft chapters and the overall supervision of an independent advisory council.

While the final report constitutes a major advance in our understanding of the Australian environment, it certainly does not give a complete picture. Much of the data that would be needed for a truly complete assessment has either not been collected or is not in the public domain. There are instances of environmental problems for which the exact cause is uncertain, such as the high nutrient levels in some inland rivers. Some complex problems defy certainty, especially when there are long time lags between action and its consequences. We now know that about one third of all irrigated land in Victoria is affected by salinity, but the provision of irrigation water was widely supported in earlier decades, and is still being promoted in some parts of Australia. The writing of the report posed two thorny problems. To be useful, it needed to be clear and accessible without glossing over the complexities and uncertainties of our environment. That required the striking of a delicate balance. Finally, an honest and frank report must inevitably question some traditional practices and therefore threaten vested interests, so there will always be political pressure to dilute conclusions. Having chaired the advisory council which produced the report, I believe that we struck an appropriate balance and resisted pressure to hold back on uncomfortable findings, but others are obviously better placed to make an objective assessment of our performance!

The overall message of the report is that we have a beautiful and diverse environment, much of which is truly unique. We have good reason to be proud of many aspects of our past environmental management, and some of our approaches are now recognised overseas as models of good practice. There is a need for more research and data collection to clarify aspects of our environment for which it is currently not possible to say whether our management is adequate. We also have a range of serious environmental

problems which require urgent attention if we are to achieve the goal of sustainability. These problems are the result of population growth and distribution, lifestyles, technologies and demands on natural resources. So no single government or sector of the community is to blame for the problems. We are all responsible for the erosion of our natural environment.

Changes are needed for governments, corporations and individuals. Surveys show Australians are environmentally aware and recognise the need to do more (1). Most of the problems identified in the report do have solutions, and many successful initiatives have been described. Action has been most effective when the approach was comprehensive and systematic, integrating different aspects of the problem. By contrast, failures tend to have been the result of piecemeal efforts or treating symptoms rather than underlying causes. Finally, the report concluded that we have a better opportunity than most countries to live sustainably and protect our unique biological heritage, but we will only be able to do that if we integrate the principles of ecological responsibility into all our social and economic planning. I return to that point in the final section of this paper.

Specific environmental problems

The report identified some specific areas of difficulty, some of which are clearly relevant to this conference. Loss of biological diversity is probably our most serious problem. It is mainly caused by the destruction of habitat, a problem still associated with large-scale land clearing. Loss of soils is also a serious issue. With about 5% of the world's land area, we account for nearly 20% of the annual soil loss and are clearly losing soil much faster than it can be replenished, given our geological history. As discussed previously, agricultural land is also being lost as a result of the advance of salinity, due either to irrigation or land clearing.

Many inland streams have been deprived of the water they need to maintain ecological systems. The state of the Murray-Darling is very serious as a result of the level of approved extraction, now capped at about 80% of the average annual flow. The recent New South Wales fish survey sampled at eighty sites over a two-year period but only found 39 of the 55 known species, indicating that many are now extremely scarce. Some seafood has been harvested at rates that are not sustainable; in some cases there are now management plans to try to restore fish populations, but it is too early to say whether these are working. The most pervasive problems are short-term thinking, a tendency to overlook the complexity of natural systems and institutional structures which might have been designed to prevent the sort of integrated approach we need.

Impediments to a more scientific approach

There are three main impediments to achieving a more comprehensive science-based understanding, with a further three obstacles to the application of that understanding. The first impediment to achieving an understanding of the environmental implications of change is the lack of basic data. We now know most of the higher species, such as mammals, birds, fish and vascular plants, though new discoveries are still occurring. Our knowledge of simpler species is far from complete. More effort needs to go into the painstaking work of taxonomy if we are to have an adequate appreciation of existing biological diversity.

Secondly, our understanding of the complex interactions between species in real ecosystems is still comparatively primitive. The web of life is extraordinarily complicated; we need to improve our understanding of complex biological systems and the impacts on those systems of human activities. These analyses are bedevilled by long time-lags, lack of baseline data and the absence of comparable "control" systems.

Thirdly, there will always be pressure not to improve our understanding of the natural world. Any serious analysis of the environmental impacts of human activity must question some current practices and therefore antagonise vested interests. A science-based understanding of natural systems can only be produced where there is a scientific base which is not beholden to commercial interests. In the last ten years there has been a systematic erosion of our basic science capacity, likely to be seen by future generations as a neglect of our national needs bordering on the criminal.

There are three pre-requisites for the application of our improving understanding of the environmental implications of change. First, there must be appropriate structures for the making of decisions. New Zealand's move to use catchments as the basis of local government boundaries is a major step forward which we could well adopt in Australia, as our approach of using water-courses as the boundaries between different jurisdictions almost guarantees that we will not have sensible management of catchments. That change would not resolve a problem common to most political systems: the division of responsibility between different government departments or agencies. While there are agencies which see their role primarily as the promotion of economic development or structural change, with environmental protection the task of a separate body, there will always be sub-optimal decisions.

Secondly, there needs to be the political will to take responsibility for the long-term consequences of our actions. Much decision-making is based on a time-horizon no longer than the life of elected governments. When the consequences of today's decisions stretch decades or even centuries into the future, there is a clear need to think in terms of longer time-scales.

Finally, and most fundamentally, there needs to be a recognition that our future prosperity depends on the health of natural eco-systems. It is no longer acceptable to concentrate on the economy and assume that any environmental problems can be solved if our society is sufficiently wealthy. We need to recognise that the economy is a sub-set of our society, which is in turn part of the ecological systems of the Earth. This fundamental change in our approach is essential if we are to make responsible decisions about use of natural systems - they must be located within a sound ecological framework. So we need to move beyond the current obsession with trivial short-term economic indicators.

The Australian Bureau of Statistics is now moving to develop satellite accounts that will document the changes to our natural resource base from economic activity. That process could be seen as adding a natural resource balance sheet to the profit-and-loss account which is couched in monetary terms. The resource accounting process is likely to show that many activities give the illusion of economic viability by the systematic erosion of our asset base, rather like a farmer keeping the property viable by selling a paddock every year: the short-term profitability is an illusion produced at the cost of long-term viability.

Conclusion

We are part of a complex set of ecological systems of which we still have a comparatively primitive understanding. There is evidence that many past activities have contributed to the current crop of serious environmental problems. Their genesis is complex; for example, the erosion of our rangelands can not be attributed solely to grazing practice, being at least partly due to consumption patterns of the growing urban population. The scale of the human population and the power of our technologies mean that we are now significant change agents, actively shaping our own future and that of other species. That requires a more responsible approach, based on a recognition of the complexity of natural systems and the need to be cautious when we are uncertain. Above all else, we need to put more effort into research and data collection to improve the chances of making informed decisions about our complex, beautiful and unique natural landscape.

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