

Forum: A wide brown land and sustainability

6.00-7.30pm Thursday 31 January 2008

Part of State Library of NSW environment exhibition “Impact: a changing land.”

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In starting I would like to acknowledge that we are meeting in the country of Indigenous Australians whose legacy has provided us with a bounty, much of which we have squandered to provide for a profitable past and present, and an uncertain and potentially bleak future. I am grateful to these Australians for their stewardship of the country and understand their strong desire to strengthen their connections to country from which they have been largely dispossessed.

I would like to set the scene for my presentation by citing sections from an article in *The Canberra Times* on the 20th September 2007. In a wide ranging and provocative article, the following comments made about social and environmental issues are germane to this forum on “A wide brown land and sustainability.”

In relation to social issues the speaker stated that “the market forces approach to development is increasing the momentum to make the north of our continent emptier than it had ever been. We are approaching a true *terra nullius* in a way that was never the case before Europeans arrived. This trend is creating a strategic vulnerability that is not immediately obvious to a population of aspirational consumers whose sense of owning the future for their children is dulled by a commitment to owning things. It seems that the legislature has almost entirely abrogated its responsibility for complex social policy issues in relation to Indigenous Australians and left the field to the dangerous amalgam of the executive and the media. There is some urgency in developing a partnership with the Aboriginal people that sees them reconnecting with the land and nurturing the natural environment in a way that empowers them and the nation.”

In relation to the environment the speaker stated that “a problem was the destruction of the unique ecology of the continent by imported vermin such as cats, dogs, rabbits, camels, weeds and cane toads. Any expression of nurturing coming from the remote southern centres of population was weak and transitory.” “It takes some doing to destroy the entire ecology of a continent in two and a half centuries, but somehow we are well on the way to achieving this staggering feat. The Burrup Peninsula in the Pilbara had hundreds of thousands of figures carved in the granite 20,000 years ago. This is staggering and might be the most significant archaeological site of its kind on Earth. Why then do most Australians think of it as simply a few crude scratchings in the rock, when it is perhaps the most important heritage we have on this continent? It seems to me that something is wrong with our values when we discount these deep strategic relationships that are fundamental to our sustained presence on this continent. We have yet to come to terms with the fact that we are of this part of the world, rather than an outpost of the northern hemisphere – a forward base for asset stripping in the interior of the continent on an expeditionary basis.”

These were not the candid comments of some lefty, greenie at a feel-good gathering of fellow travellers. It was part of an address given by Lieutenant-General John

Sanderson to the national conference of the Institute of Public Administration Australia. John Sanderson was the commander of the UN forces in Cambodia and a former governor of Western Australia. In effect he was saying that there is little social equity and environmental equity in this country and that few in the populous south of the country understood this. He is correct. I have very strong concerns about the social inequity in this country, particularly in relation to Indigenous Australians but that is for another forum. However the point must be made that we cannot disconnect people from the environment. This is something Indigenous Australians understood all too well with their philosophical approach “we are the land and the land is us”. European Australia has to a large extent divorced itself from the land and used massive environmental subsidies to generate its wealth; these subsidies must be paid sometime in the future.

From an environmental point of view, by any measure one cares to use we are going backwards. With the exception of the airsheds over our major cities, things are getting worse. Anyone my age knows the air is cleaner but most do not know the extent of the environmental issues facing us. Most will know of the problems of climate change but what about the state of our biodiversity? Every one thinks they know what biodiversity is; however it is obvious most do not.

Biological diversity or biodiversity is the variety of all life forms and their patterns in space – the different plants, animals and micro-organisms, the genes they contain, and the ecosystems of which they form part. Biodiversity consists not only of the genes and the life forms themselves, but also includes the interactions between these life forms and the environment. Thus there are three interactive levels of biodiversity; diversity at the genetic, the species, and the ecosystem levels. The term therefore covers a large array of ecological complexity and it is in general poorly understood.

To most people, biodiversity is taken to mean species diversity. In fact, it is sometimes even more narrowly defined to cover just the conservation of rare or endangered species, usually the conspicuous flowering plants or vertebrates. This erroneous interpretation leads to biodiversity being seen in an extremely restricted way. For example, many people assume that biodiversity is found only on conservation reserves, on uncleared agricultural land, or on remnant patches of bush in urban areas, that may or may not be fenced-off. In fact Gary Larson, that wonderful cartoonist, has expressed this common view of biodiversity in a cartoon showing the African veldt with a number of glass jars scattered over it. Each of the jars contains different animals; rhinos, lions, gnus and zebras. A jeep containing a guide and a tourist with binoculars is weaving its way across the veldt between the jars. The cartoon’s caption is “Biodiversity Preserves.” Our common view of biodiversity is within landscapes that are compartmentalised on the basis of ecological apartheid with no exchange between the different compartments.

Of course, this view ignores ecosystem processes and functions such as oxygen production, soil formation, nutrient cycling, maintenance of hydrological cycles, and amelioration of climate. These processes and functions are all driven by interactions between elements of biodiversity. This narrow species-focussed view of biodiversity gives rise to the notion that protection of remnant native vegetation is therefore the primary action required to conserve biodiversity. This attitude does not take into

account the majority of biodiversity, and is leading to continuing loss of its essential elements.

Here again, Gary Larson has aptly expressed these views in his cartoon on environmental disasters of the fleas' world. He depicts two fleas on the underside of a horse that has been gelded, with one flea saying to the other, "not only have the forests been clear-cut, the mountains are gone as well!" This neatly sums up our views and the way we manage biodiversity; that is, with a very narrow focus and with very short time frames.

Conservation and maintenance of biodiversity are important for four reasons. These are life support, economics, aesthetics and culture, and ethics. Our survival depends on biodiversity as some of its elements provide the critical life support systems that make human life possible. These are the healthy, functioning ecosystems that maintain the atmosphere, including the air we breathe, regulate the climate, produce fresh water, form soils, cycle nutrients, and dispose of wastes. These are all processes we take for granted and we risk the tragedy of the commons because of our attitudes.

Biodiversity provides us with great economic returns. For example the provision of food and fibre, medicines, control of pest organisms, and building materials. However, only a limited subset of biodiversity provides us with economic returns. For example, there are about 9000 described species of grasses, but only five species (wheat, corn, rice, barley and sorghum) provide more than half of the calories consumed by humans. Biodiversity is also an essential element of tourism which is rapidly increasing in economic importance.

Many of us obtain cultural identity, spiritual enrichment and recreational activities from elements of biodiversity. For example, much of the Australian "sense of place" comes directly from biodiversity. This is not only of fundamental importance to Aboriginal and Torres Strait Islander peoples, but is also true of many other Australians. Our unique native vegetation with its associated native fauna is what gives Australia its distinctive character and colouring.

Conservation and maintenance of biodiversity are also important for ethical and inter-generational equity reasons in that no generation has the right to appropriate Earth's resources solely for their own benefit. This is one of the major platforms behind the need to develop enterprises that are ecologically sustainable. At present we are following a Marxian philosophy in relation to our use of natural resources. I mean of course Groucho Marx who said "Why should I do anything for future generations, what have they ever done for me?"

It is fair to say that we have little idea what biodiversity was present in Australia in 1778 and not much better idea of what is present now. Brave people have made a stab at estimating the number of species present, but bear in mind that is only one level of biodiversity and does not reflect ecosystem or genetic diversity. Figures such as "over a million" have been given, but if we look at these estimates we find indications of the extent of our ignorance. Possibly less than 10% of species have formally been described and we are only really confident that we have a good handle on mammals, birds, reptiles and amphibians and a reasonable handle on our flowering plants. We know only a small percentage of other organisms, including the thousands of micro-

organisms in our soils and waters. In fact we may be grossly underestimating species diversity.

Harry Recher and Jonathon Majer sampled the foliage of two species of eucalypt in southwestern Australia and two species in eastern Australia over a year. They found more than 1600 species of arthropods. The four species of eucalypt they sampled had an invertebrate fauna as rich as Australia's total terrestrial vertebrate fauna. Based on this and other work they estimated that the arthropod fauna of eucalypt canopies alone could exceed 250,000 species compared with present estimates of 300,000 species of terrestrial invertebrates for Australia. Obviously, when it comes to assessing ecosystem diversity and genetic diversity we are still in our infancy.

Australia is biotically very rich and is regarded as one of the mega-diverse nations. It has a very high level of endemism reflecting its long isolation. For example, of the 20,000 species of plants described in Australia, 85% originally occurred nowhere else on Earth. It also has very high numbers of naturalised introduced species of plants. For example, there are between 1500 and 2000 species of exotic plants now naturalised in Australia.

Australia's record for managing its biodiversity is not great. The 1996 Australian State of the Environment Report stated that loss of biodiversity:

“is perhaps our most serious environmental problem. Whether we look at wetlands or saltmarshes, mangroves or bushland, inland creeks or estuaries, the same story emerges. In many cases, the destruction of habitat, the major cause of biodiversity loss, is continuing at an alarming rate.”

Those plant and animal groups we do have information on are all showing alarming trends. For example, the 1996 State of the Environment Report notes that:

“For the land animals and plants about which we know enough to assess their current state, the trends are disturbing. Some 5 per cent of higher plants, 23 per cent of mammals, 9 per cent of birds, 7 per cent of reptiles, 16 per cent of amphibians and 9 per cent of fresh-water fish are extinct, endangered or vulnerable. Australia has the world's worst record of mammal extinctions. In the past 200 years, we have lost 10 of 144 species of marsupials and 8 of 53 species of native rodents.”

These losses will continue. And the worry is not just that we are losing some precious heritage, or that we have fewer biodiversity “goods” to commercialise. It is the breakdown in ecosystem processes that supply the support systems on which we depend, and the changes in the way they function, that pose the most critical environmental issues Australians face.

The phrase “ecosystem goods and services” is appearing with increasing frequency in debates about alternative forms of land use. The “goods” are the products we harvest from ecosystems, and include an increasingly wide array, as landowners begin to find value in natural products in addition to the traditional livestock and agricultural crop products. The “services” are more difficult to define, but include such things as regulation of the hydrological cycle, maintenance of nutrient cycling, removal of carbon dioxide, production of oxygen, and disposal of wastes.

Pastoralism and forestry depend heavily on biodiversity goods. Pastoralism in the rangelands is based on production of forage by native plants. Forestry, both public and private, when based on harvesting native forests depends exclusively on biodiversity goods. Extensive agriculture also depends heavily on biodiversity goods, but in the main, they are goods originally from outside Australia. For example, cereal crops, domestic livestock, fruit, etc are mostly derived from elements of the biodiversity of areas other than Australia.

However, in the quest for ecological sustainability and the need for economic and ecological diversity, there is a small but increasing interest in extending the use of biodiversity goods beyond grazing native grasses and harvesting native forests. There are a number of ventures based on these goods. These include the obvious ones such as harvesting of kangaroos and other animal species from the wild. However, they also include honey production from native vegetation, harvesting of native flowers from bush patches for the cut flower market, farming native species (such as kangaroos, emus and crocodiles), and the 6 million tonnes of firewood cut annually from remnant woodland.

Soil fertility is the basis of all primary production. It is expensive to keep applying fertilizer, and the problems of soil acidification, salinization, compaction, loss of structure (and therefore water infiltration) and soil loss (erosion) are serious problems that greatly reduce profitability of primary production. A common reason for these various forms of soil degradation is loss of soil biodiversity – the loss of “free” ecosystem services that biodiversity provides.

Because it is minute, many people do not realise the wealth of biodiversity that exists in the soil. In fact, the majority of biodiversity in most productive landscapes occurs in the soil. For example, a crop of wheat in eastern Australia that produces 5000kg per hectare of grain may have had a total biomass before harvesting of about 15000kg per hectare compared with around 21000 kg of soil organisms per hectare.

The issue of biodiversity services needs to be borne in mind when making decisions on land use. For example, a patch of remnant vegetation may provide more than aesthetics, shade and shelter. It is removing carbon dioxide, producing oxygen, using water, and may have some role in controlling water tables, and the movement of wind and water over the surface of the land. At present, these services tend not to be included in the cost accounting for agricultural production.

As biodiversity is lost, ecosystems become less complex. This sets in train a cascading sequence of events that can result in changes that can have important and long-lasting consequences. Simplified ecosystems become less resilient, meaning that they are less able to absorb environmental shocks and disturbance and still continue to maintain their original levels of function. There is mounting evidence that many of the minor species that occur in ecosystems in very small numbers are ecological analogues of their relatively few abundant (and therefore obvious) counterparts; and in the event that the abundant species are reduced or eliminated the minor species expand to take over their functional roles. This phenomenon of substitutability among species is like an insurance policy for ecosystems, enabling them to keep performing at high levels under a wide range of environmental conditions. Reducing biodiversity

means that there are fewer components to buffer the blows inflicted by drought, fire, exotic species and climate change.

Does it matter if we lose species? How many can we afford to lose? The trouble is, we simply do not know how many species we can lose before ecosystem function is significantly affected; yet we do know that some species have direct functional significance. As one small example, honeyeaters are important for plant pollination and their loss may mean that many species of native plant will not reproduce.

The extensive loss of native vegetation is now having major impacts on ecosystem functioning in many parts of Australia. The hydrologic balance of many of the extensively cleared regions has been radically changed. Water that was used by perennial native vegetation when it covered the region is now entering the groundwater, and water tables are rising, bringing salt stored in the subsoil to the surface. Estimates given to the Prime Minister's Science, Engineering and Innovation Council in 1998 are that over 15 million hectares of land could be so affected, and will be useless for cereal cropping within the next 50 years. In some parts of the landscape up to 50% could be affected by soil salinity. Changes in vegetation have also led to changes in surface flow of wind and water and these have become severe degrading forces. In addition, there is now evidence that these extensive changes to the landscape may be resulting in changes in the radiation balance, in turn leading to alterations to the macro- and micro-climate.

Many of these degrading forces are also affecting drainage systems. The problems are so severe in southwestern Australia that there are no surface potable waters in the wheatbelt, and a similar situation is developing in the Murray-Darling Basin.

Unfortunately we do not value biodiversity. This can be well illustrated by examining the economics of agriculture. How is real net farm income defined? Real net farm income consists of the real value of farm income minus the real value of farm costs. Farm income is taken to include receipts from agricultural production, rents, interest and other revenues, and farm costs include marketing expenses, purchases of inputs, rates, taxes, interest and other charges, as well as wages paid by the farm business. Note that in these calculations there is no mention of any costs associated with environmental degradation resulting from the farming enterprise. For example, the costs of remediation are not built into the costs of production. Similar calculations could be done to illustrate the way we under value water.

The scope of Australia's environmental problems is already affecting us economically. However, we are still not paying sufficient heed to the fact that it is the ecological realities which we need to address if we are to remain economically viable in the long-term. One thing that is certain is that Australians are receiving heavily subsidised food, fibre and water and those subsidies are borne by the environment.

Australia has a proud record in many respects, and still has a great future. But it is hard to avoid raising a “wake-up” call when biodiversity is considered. Given its direct potential economic value, and its enormous secondary “ecosystem service” value, Australians owe it to themselves to pay it more and better attention. All elements of society need to support the development of ecologically sustainable production of food, fibre and water. At present many people believe that food comes from supermarket shelves and water comes from taps; they have no idea of the difficulties or the environmental costs of production.

What are the challenges for the future? The first is to combat ignorance. There are many who do not understand the term biodiversity or, if they do, why we should be concerned about it. We need to convince them of the need to change not only attitudes but also behaviours and that is an enormous undertaking.

We need to continue to catalogue our biodiversity. So we should be bolstering our ability to contribute information on what it is and how it is distributed, not running down our ability to carry out taxonomy as we are at present. Without knowing what we have, it is impossible to work out how to maintain it.

We also need to take account of changes that seem inevitable and plan to minimise their impacts. For example, we know that some ecosystems, such as those in alpine areas and tropical rainforests are vulnerable as a result of climate change and so are species with distributions limited to areas under threat.

We also need to educate people that maintenance of biodiversity cannot be achieved simply by designating areas for that purpose. We have been very clever at reserving areas that were unsuitable for agriculture or some other productive purposes. That is, we have many conservation areas that represent our more impoverished soils, our drier areas, and our steeper slopes. However, vegetation associations in good soils suitable for agriculture are poorly represented and, in some cases, extinct. Some of our grassy woodland associations are vivid examples of this point.

We need to establish ways to conduct our production enterprises to minimise and ultimately prevent further loss of biodiversity. This means inculcating the idea of stewardship in all managers of natural resources and practicing conservation and maintenance of biodiversity in the more than 90% of Australia outside formal conservation areas.

We also need to develop economic systems that account for the environmental costs of production and a way of ensuring these costs are met and used to remediate those problems and not left to future generations to deal with.

And last, but by no means least, we as a society have to decide when enough is enough. At present it is totally unrealistic to talk of preventing any further losses of biodiversity. The changes we have set in train will result in further losses regardless of what we do in future. We have to decide what level of intervention is necessary to minimise further losses and how we go about that intervention: that I see is one of the most important challenges for the future.

I would like to close with a conundrum. Any competent financial planner will say that in order to maximise financial returns we should have a diversity of assets and not put all our eggs in one basket. Why is it that we are doing precisely the opposite with our most valuable assets; our natural resources?