

## **ACHIEVING SUSTAINABLE RELATIONSHIPS BETWEEN AUSTRALIAN LANDHOLDERS AND LANDSCAPES**

**David Mitchell**

Charles Sturt University, Albury, Australia.

### **Introduction**

Most forms of economically productive land-use in rural Australia are not truly ecologically sustainable without significant human intervention. Many are centred on plants and animals, or rely on procedures, that are not well adapted to the large natural temporal and spatial variation in the availability of water that characterises this continent. Most have introduced species or practices that have destabilised native ecosystems and initiated environmentally degrading processes that still have to run their course (State of the Environment Advisory Council 1996, Australian State of the Environment Committee 2001). Furthermore, these processes have been augmented by the presence of other alien species of plants and animals, which have invaded native ecosystems for reasons unrelated to agriculture (Groves and Burdon 1986). The land that appeared to early European settlers to be young (though strange), tough, and open to exploitation has, in reality, turned out to be old, impoverished, and very sensitive to change, particularly in respect of balanced relationships between vegetation, soil and water.

This raises a number of important issues. Is ecological sustainability a feasible objective for managed landscapes in Australia? How is it to be recognised and assessed? Are agricultural practices that have their origins in the Northern Hemisphere compatible with the processes that are necessary to sustain Australian ecosystems? Do we have the knowledge to describe an ecologically and economically feasible vision for the future nature of the Australian landscapes, which are currently undergoing profound change? Can we develop a strategy to achieve such a vision? If so, will it be possible to win widespread community support, including financial support, for the remedial efforts required to return a measure of ecological stability to Australian landscapes? These are complex conceptual matters that require urgent objective debate, despite the uncertainties that are implicit in these questions and the paucity of information that is required to resolve some of them.

It is also critically important to recognise that the main agents for managing Australian landscapes are landholders, whether they are private individuals, commercial companies, or government agencies, and that traditional owners should be consulted about their management. All these people and agencies have responsibilities as stewards of natural resources, as well as being dependant on the nature and productivity of those resources for their livelihood and the economic welfare of their communities and of the nation as a whole. Moreover, there is increasing realisation that these strongly utilitarian relationships need to be moderated by ethical considerations, which can be influenced by spiritual bonds between sectors of the population and the natural world. The potential for the former role, to prejudice the benefits of the latter relationships, also needs to be more widely understood and sympathetically handled by landholders (and by the general community), than has been the case hitherto. These complex socio-economic issues are further complicated by intense political debate that subjugates

understanding to opinion - and there is no shortage of the latter, both to promote change and to resist it!

*The purpose of this paper is to venture into these poorly charted waters to begin to distinguish what is known from what is presumed, and to initiate identification of the assumptions on which current practices are based. Hopefully, this will provoke research of matters that need to be corrected, or refined, as well as pointing out the need for wider acceptance of information that has the greatest potential to place the management of Australian landscapes on a more sustainable basis. It is also important to begin to identify the constraints that currently prevent the introduction of changes that would lead to better management from both ecological and social perspectives.*

*The overall purpose of this paper is, therefore, to lay the basis for the development of a widely acceptable, holistic approach to the management of Australian landscapes. This basis must be scientifically and socially sound, and must be supported by elements of a strategy that could be applied progressively to stabilise rural landscapes and populations throughout this vast continent in the interests of the future of the nation and its people.*

### **“Ecological sustainability” myths**

The concept of “ecological sustainability” is open to a range of interpretations. Originally linked to development and abbreviated to “ESD”, it was used to indicate that unfettered development of natural resources would eventually be limited by the ecological capacity of those resources to continue to support the development in question. However, it was not long before “ESD” was also used as an abbreviation for economically sustainable development. This also indicated a potential constraint on development, but of a very different type, in which the potentially limiting resource is more open to human control and assessment. It is perhaps not surprising that the phrase has become a pseudo-cognate component of natural resource discussion, capable of several applications, depending on the context in which it is used and the objectives of the user.

Strictly, ecological sustainability is only possible, if the resources that are being consumed are replaceable and the ecosystems being affected are capable of returning to their original form, or to one capable of occupying the same ecological niche. The former is most unlikely in “developed” Australian landscapes, even if the ecosystems have the resilience to do so, while the latter is difficult to assess within the timescales required for management decisions. In any case, these ecological adjustments may take some time, rather like the basic process of evolution, but at different time-scales. Assessment of sustainability is therefore complex, difficult and dependent on technology that is still being developed, though it is generally recognised that, *inter alia*, this should include measures of biodiversity, biomass, resilience and capacity for self-optimisation. ***In simple terms, however, overexploitation of natural resources is not sustainable, continuing degradation of native ecosystems is not sustainable, and limitless growth is not sustainable in a finite world!***

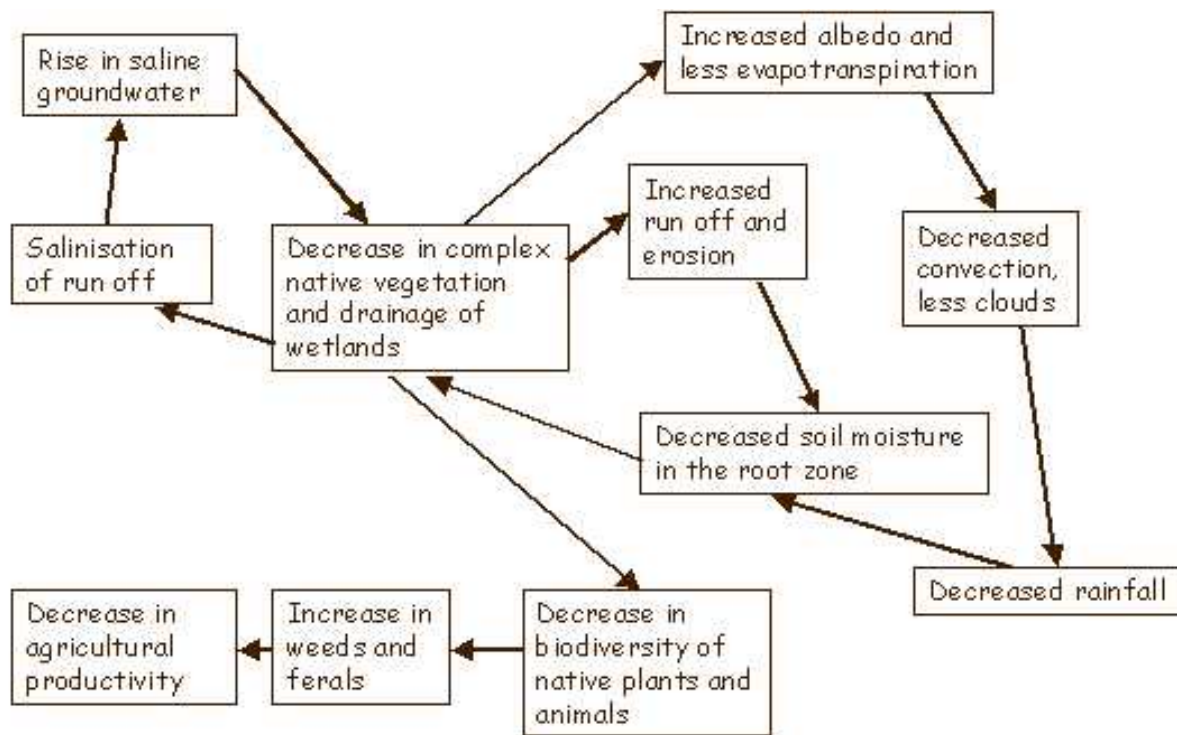
It is most unlikely that development of economically productive agriculture, as currently practised, can proceed in Australia without severe impacts on the ecological sustainability of native ecosystems. Structural changes will occur, often with unknown adverse consequences and there are abundant examples to illustrate this.

For example, fundamental ecological changes follow the clearing of complex communities of native vegetation, particularly of woodland and forest. Such vegetation, consisting of several strata, forms an insulating “buffer” zone above the ground. This zone establishes its own microclimate and mesoclimate, in which temperatures are lowered by evapotranspiration and short water cycles occur as temperatures change between night and day (Ripl, 1995). Such systems provide a rich range of ecological niches for many biota, both microscopic and macroscopic, and this complexity ensures a form of dynamic stability, in which resources are continually recycled to the benefit of the various life forms that inhabit them.

Removal of the deep-rooted plants that constitute an essential component of this vegetation also has profound impacts on conditions on and below the surface of the ground. Long water cycles involving surface run-off, natural flows in rivers and drainage to the sea are altered. Similarly, ground water dynamics and associated hydrogeochemical processes are affected resulting in changes exemplified by the increased movement of salt in the landscape (Murray-Darling Basin Commission, 1999).

Similar impacts follow the drainage of wetlands and alterations to the landscape that inhibit natural flows into the multitude of ephemeral wetlands that are manifested in the remarkably flat topography of most of inland Australia. These systems can be particularly rich biological “hotspots” in otherwise relatively barren regions (Mitchell, 1992). Furthermore, the highly variable spatial distribution of rainfall across the continent (Klotwicky 1986, Zillman 1989, Flood and Peacock 1997) makes it likely that at least some of these systems will be manifest somewhere on the continent, even in periods of widespread low rainfall. At these times, these wetlands have the potential to be important refuges for biota, such as waterfowl.

The loss of such dynamic systems can be permanent, or at best only replaceable over several human generations. This is tragedy enough for those that strongly regret such losses, but even for those that do not, the consequent changes to climatic conditions will have significant disadvantages. Changes to the balance between warm surfaces on the Earth, where there is high albedo, and areas, which are cooled by the latent heat of evaporation during evapotranspiration of richly vegetated landscapes, have the potential to decrease overall rainfall (Ripl 1995, Falkenmark *et al.*1999). Severe disadvantages will also be caused by the increased rate of movement and redistribution of mineral salts in the landscape that is consequent on these changes. These are natural processes, which are clearly illustrated in the endorheic Lake Eyre Basin, where they have operated for thousands of years. Unfortunately, the same processes are now accelerating in the Murray-Darling Basin as a result of the large-scale removal of complex native vegetation (Murray-Darling Basin Commission 1999), other agriculturally motivated developments and reduced flows to the sea. A simple outline of the interactions described in this and preceding paragraphs is depicted in Figure I.



**Figure 1:** Vegetation landscape relationships (after Falkenmark, *et al.* 1999).

Finally, although similar changes to vegetation cover and the area of wetlands occurred in the development of the predominantly agricultural landscapes of Europe, it is important for Australians to realise that the end result will be markedly different in Australia. Where rainfall is relatively low, such as in inland Australia (and Southern Africa and sub-Saharan Africa), damage to complex vegetation and the drainage of wet areas can lead to accelerated desertification. The environmental degradation following desertification is exacerbated in Australia by its flat topography, which slows water flows and increases ponding, leading to water loss by evaporation and increased deposition of salts. The green fields and pastures of the agricultural landscapes of much of Western Europe are replaced in Australia by landscapes exhibiting general aridity and declining biodiversity. ***Australians need to be more Australian in the management of their landscapes!***

Sadly, there is still widespread resistance in Australia to the development of Australian native species for agricultural production of food and other social resources. Indeed, it is difficult to visualise a sustainable ecological future for Australia, while this resistance exists and strong preference continues to be given to the consumption and use of products from non-native species. This situation is further exacerbated when Australian landscapes are undervalued and there is little attempt to derive an ecologically sustainable economic productivity from them. In these circumstances it is not surprising that most rural landholders would find it difficult to examine such possibilities and will continue to produce low-value large-volume products derived from non-Australian plants and animals. Moreover, even if appropriate knowledge to develop more ecologically sensitive productive processes did exist, the inertia of a pervading and complex

bureaucracy, which emphasises internal loyalty to States before loyalty to the nation, would ensure it received little serious consideration at this time.

For many Australians, there is no clear distinction therefore between what is assumed and what is known with respect to landscape management. It is convenient to treat the two as synonymous. Thus the European approach to agriculture, which was unthinkingly assumed to be correct, is still not seriously doubted, in spite of the widespread profound, though insidious, ecological harm it is causing to the countryside.

### **The myth of rural wealth**

Rural landholders tend to be asset wealthy and cash poor. According to the 2001 census, 16% of the Australian population live outside major urban centres (Australian Bureau of Statistics, [www.abs.gov.au](http://www.abs.gov.au)), yet the vast majority of available wealth is centred in urban populations. Moreover, economic production in rural areas is put at risk by three main potential constraints: uncertainty of climate (especially rainfall), variable availability of investment capital and volatility of markets for agricultural products. This insecurity is exacerbated by the need to carry out ameliorative management of land and water that had been mismanaged in the past, estimated by the Australian Bureau of Statistics, in 1966, to be costing 40 million dollars a day country-wide. Unstable economic circumstances are a primary cause for promoting environmental degradation in rural areas, while the funds required to repair the damage and to minimise it in future are in the cities. *This destructive nexus between the inequitable distribution of wealth, where most is in urban populations, and the inequitable distribution of responsibility for environmental stewardship, which is overwhelmingly required in rural areas, is a primary cause for the accelerating degradation of the Australian environment. It also lies at the basis of economic and social decline in rural Australia with potentially disturbing political consequences for the whole country.*

### **Facilitating change through promoting economic welfare of rural Australia**

The unstable situation outlined above has clear adverse economic social and environmental impacts. It could be readily corrected if rural landholders were rewarded financially for environmental stewardship of their land. While this would result in public good as well as private gain, the latter is a powerful motivating factor to the achievement of the former and therefore should not inhibit the use of public funds to obtain extensive public benefit. Payments for environmental stewardship would also be independent of the vagaries of climate and of volatile markets for agricultural products and would offset problems caused by unavailability of investment capital.

The funds to pay for environmental stewardship in rural areas, including expensive long-term rehabilitation of degraded landscapes, could be raised by an environmental levy obtained through a percentage addition to income tax structured in the same way as the Medicare levy. *These funds should be administered, independently of government bureaucracy by a National Environmental Trust established by the Federal Government with streamlined cost-effective bureaucratic support.* The bulk of the funds would be allocated, with respect to need, in processes open to public scrutiny. A possible way forward would be to distribute such funds on

the basis of areas demarcated in relation to the current disposition of Landcare groups, who would provide a sensible and accountable means of giving effect to the local use of such funds (Campbell 1994). This should be preceded by the development of appropriate strategies to enable local communities to formulate short-term and long-term action plans that embody objective setting, implementation and monitoring processes, criteria for success and accountability procedures (eg Brown *et al.* 2001). It is critically important that the action plans be formulated on a local basis to secure local “ownership” and take advantage of the motivation supplied by enjoying the benefits of success and suffering the consequences of failure. Only a relatively small proportion would be disbursed as grants provided in response to invited applications, as is currently required for most funds supplied to local groups for environmental purposes. Continued support would depend on effective discharge of agreed goals.

### **The survival triad**

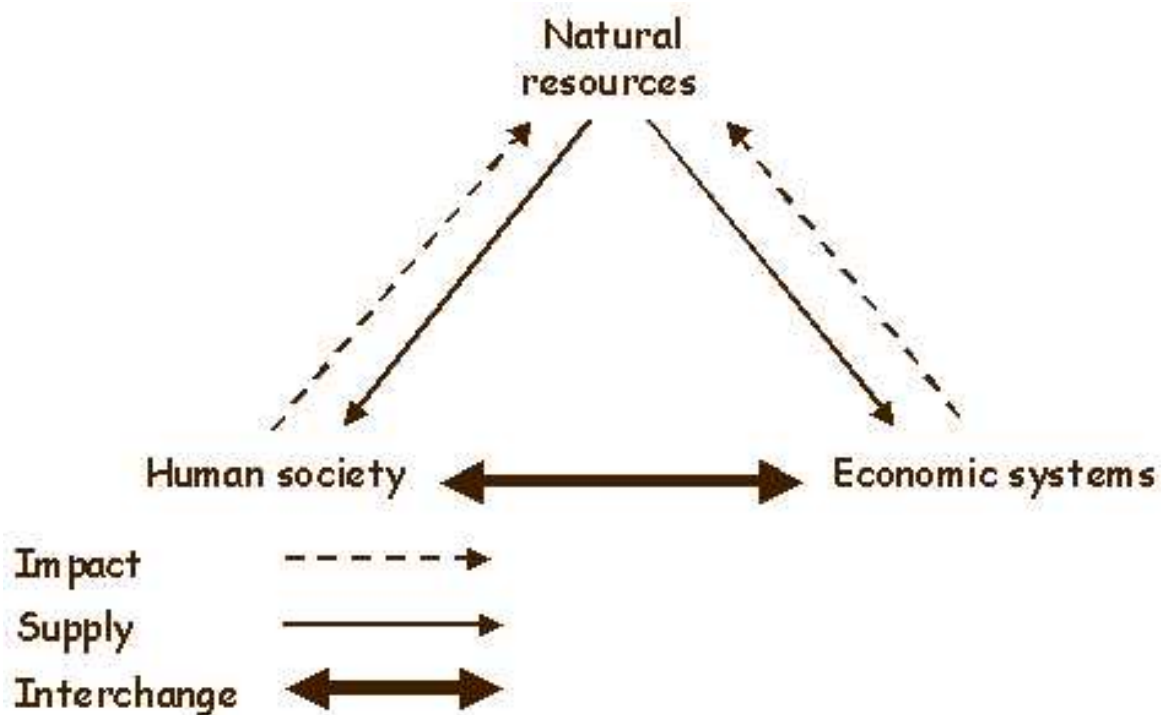
A major inhibitory factor to the effective, long-term management of Australian landscapes is poor communication between ecologists and the general public. Terms used regularly by ecologists are often misunderstood, sometimes because words in common usage, such as sustainability and resilience, are given specific technical meanings when used in particular contexts.

In spite of these complications it is very important to convey the basic nature of the interactions and interdependence between major components of the socioecological systems of which humanity is an integral part and on which humanity depends for its welfare and survival. The importance of establishing a continuing healthy balance between human society, the environmental systems which provide the resources needed for its survival and the economic systems used by humankind to manage these resources is commonly assessed as the “triple bottom line”. This evaluation of the contribution of each of these components to the welfare of the whole implies that the quality of this relationship can only be assessed periodically as part of an overall measurement of the whole system in the same way as an accountant examines a balance sheet. In contrast, however, sensitive management requires clear understanding and continuing assessment of interrelationships that contribute to the “bottom line”.

The basic relationships between human society, economic [*ecos* (home, house) + *nomos* (management)] systems and natural ecological [*ecos* (home, habitat) + *logos* (study, discourse, nature)] systems that provide the resources to sustain them are illustrated in Figure 2. *It is important to note that only the last of these can exist independently of the other two. If it is harmed or degraded, both human society and the economic systems on which it depends will be adversely affected.* Also, as the relationships depicted in this simple diagram are examined and explored, it becomes apparent that the primary external drivers for the management of the relationships as a whole are the economic systems. This implies that the achievement of sustainable balances between human society and natural ecological systems is best achieved through management of economic systems, instead of through management of ecological systems *per se*.

How, then, can this triple pointed diagram of relationships assist in the creating a sensitive understanding of these relationships for a human observer who is part of the overall system, but

who has little specialist knowledge of any of the three basic components? The term triad has been borrowed from the world of music to indicate how this may be achieved. This word meaning a group of three, is used musically to describe the harmonic chord between a given note and the third and fifth above it in the octave of eight notes that provides the basic structure of classical western music. If any of these notes are not perfectly pitched, or another combination of notes is played, a discord results and is apparent to an untrained person (who is not tone-deaf). In the same way, if any one of the components of the survival triad is not in balance with the others, the quality of each is threatened and survival is impaired. Most people are discomforted by a musical discord, and Australians are now being challenged to develop the same sensitivity to discords in the survival triad so they can coarse-tune or fine-tune their behaviour accordingly.



**Figure 2:** The survival triad

## Conclusions

- The conceptual basis of landscape management in Australia requires critical re-evaluation.
- Landholders must be financially rewarded for the stewardship of the environment under certain conditions.
- Appropriate methods of economic exploitation of Australian natural resources need to be investigated.

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