Crucial Concepts to Be Considered When Developing Rangeland Policy

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Crucial Concepts for Developing Rangeland Policy

1. *The foci need to be both strategic and tactical*: strategic for a rangelands-wide policy; and tactical where graziers and other land and resource managers are incrementally contributing to the wider strategy at a larger map scale, e.g. property, paddock, etc. (Hynes, 2015).
2. *With the exception of 'real' grassland systems, e.g. the Mitchell Grasslands, all other rangeland agro-ecosystems are expressions of keeping most of the land cover in a state of early succession*. This demands ongoing intervention by grazing animals and land managers, otherwise these systems would move through successional stages towards the original: tree-dominated or shrub-dominated landscapes. Fire may be employed in management; however, wildfires could further deflect successional patterns. Or if over-exploited, the systems will move into deeper levels of degradation. (*Note*: The State-Transition Model for sub-humid and semi-arid grasslands (Ash et al., 1993; MacLeod et al., 1993) partly addresses these ongoing management challenges. The Trigger-Transfer-Reserve-Pulse and Feedback Model (Ludwig et al., 1997) is also useful for sparsely covered semi-arid and arid rangeland systems, and partly addresses these challenges.)
3. *Agro-ecosystems that require ongoing intervention to maintain grass or pasture cover are always vulnerable to weed infestation* as the available solar energy, soil nutrients and water resources are never utilised to their full potential. These additional unutilised or under-utilised resources are available for woody weed invasion (Hynes & Scanlan, 1993).
4. *With climate change impacts accelerating, the policy strategy needs to anticipate, as far as possible, effective responses to enable long-term fluctuating agro-ecosystems to achieve stepwise but non-permanent equilibriums* as the effects of climate change put these ecosystems under continuous survival pressure.
5. *In the rangelands of the near future,* ***some*** *enterprises will need to be retired and property managers paid to manage the remaining bio-physical values, especially water resources*, not necessarily as national parks – there are probably enough already as these are usually under-resourced and endure very limited management of the spectrum of ecosystem values. However, it is acknowledged that national parks are usually established with specific objectives that are not generally achieved on private lands.
6. *In some rangelands of the near future,* ***some*** *enterprises will need to become mobilised to take advantage of intermittent rainfall events to move stock in and out of semi-arid and some sub-humid ecosystems that are suitable for such land use*. Kidman & Co – Outback

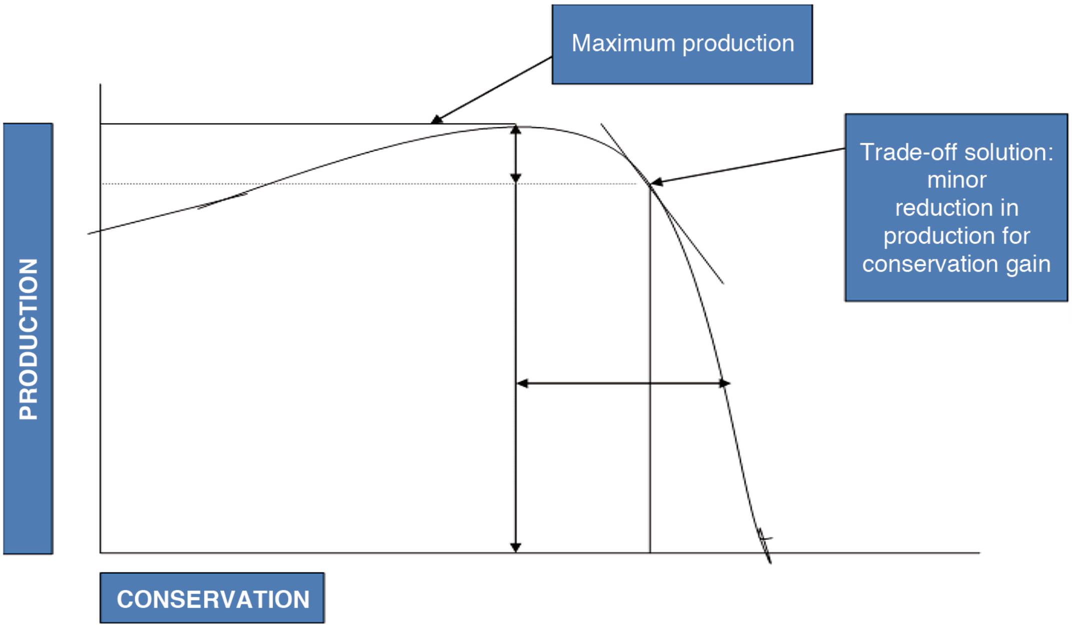
Beef has been doing this for more than a century and continues this practice over the largest landholdings in Australia totalling 7.92 million hectares (Wagstaff & Carberry, 2019).

7. *In* ***all other*** *rangeland areas, pasture management strategies will need to rapidly adjust to enable optimum use to be made of shorter windows of production* in a more unpredictable and fluctuating environment (Lauder, 2019).
8. At a strategic level: *To enable landholders to prepare for these jolting changes, both state-wide and national strategies need to have visions based on understandings of whole-systems science which, in turn, have been translated into accessible, intelligent management approaches that have reasonable probabilities of success in ecological, social and economic terms.* Again, the problems are both reductionist (as in traditional science) and whole-system. And whereas scientists have long addressed the former level, they have only recently started to develop wide-window understandings of whole systems by recognising and utilising big data and powerful IT-based systems (McCallan et al., 2019). There is great urgency here to invigorate and resource whole-systems science, if we are to contribute effectively to solutions to these pressing challenges (Hynes & Scanlan, 1993; Hynes, 2002; Hynes, 2004; Hynes, 2010).
9. At a tactical level: *Management approaches that address minor production trade-offs for specific conservation gains.*

The concept schematically introduced in Figure 1 was developed with Dr Graeme Kirby (then Chief Economist, Department of Agriculture, Stock and Fisheries, Northern Territory) for graziers and national parks rangers in grazing lands of the Tropical Savannas of Northern Australia in 1996 (Hynes & Kirby, 1996; Hynes, 2010).

Producers and conservationists in theory should be able to agree on thresholds of resource use, which enable trade-offs for whole-systems sustainability.

Figure 1. A schematic representation of possible trade–offs between sustainable production and ecological conservation (Hynes, 2010).



The objective is to convey an approach for land managers which would allow them to contribute to the survival of certain rare and threatened species by adjusting their management in scientifically based ways. The approach would maintain an acceptable level of cattle production, while strengthening the survival niches of species such as the northern quoll and a range of other small marsupials, as well as certain bird species, e.g. the golden-shouldered parrot and the Gouldian finch. Therefore, in special cases, for a relatively small drop in production, an increase in certain conservation values could be achieved. These should be applied where practicable, although these trade-offs may appear to be simplistic and are often rare options.

Discussion

Acknowledging the foregoing, it is almost impossible to effectively implement Concept 9 as presented in Figure 1 in complex, real-world cases. And the trade-offs that result are usually expedient and often politicised (e.g. the black-throated finch and the 'Adani' fiasco, regarding mining developments in rangelands and the potential loss of crucial habitats of threatened species, as well as unpredictable impacts on the hydrology of the development site).

Most systems exploited by humankind tend to move into deeper and deeper levels of entropy; however, they can be managed to sustain certain values for specific purposes.

The Carbon Flow approach to pasture management described and practised by Lauder (2020) can positively contribute to productive pasture conditions; however, it works best when kangaroos are excluded. Somewhat ironically, the history of land resource use, with its 'make better' practices of providing continuous bore-water or dam-water supplies, has artificially increased the carrying capacity of extensive areas of pastoral land in Queensland. This has influenced both livestock and native species and has led at times to plague levels in kangaroo populations (to the chagrin of graziers) and the spread of feral animals that threaten biodiversity.

Whereas some conservation values can be maintained in agricultural production systems, this varies with the land-use strategies, the nature and resilience of the land resources and associated water resources, the types of farming and the intensity of resource exploitation.

Capitalist trading markets and the demands created by high urban population pressure (both national and international) and the demand for food products tend to force farmers to seek the maximum short-term profit from their land use, usually to the detriment of ecological services and non-priced values (Hynes & Panetta, 1993; Hynes, 1997). Generally, farmers will claim otherwise, but 'when the chips are down' there is a natural tendency to pursue economic survival tactics. This type of pressure historically has accelerated the demise of whole civilisations.

Conclusion

Technological innovations – both intensive (e.g. artificial photosynthesis, vertical factory farming, advanced property-scale water management technology) and extensive (e.g. the various rangeland strategies submitted above in conjunction with modern advances in rangeland management) – may assist in holding levels of presently deepening entropy in our terrestrial and aquatic ecosystems. However, what is needed is a revolution in the way humankind produces food and fibre to satisfy its nutritional needs, and perceived tastes in food, fashions and habitation.

The current equations addressing resource use expectations do not add up. The economics of farming production are largely disarticulated from ecological services. In a global sense we are back to:

$$\textit{Impact on the biosphere} = \textit{population} \times \textit{resource use} + \textit{pollution}$$

This is the crudest summary of the big, complex, 'wicked' challenge facing humanity.

In the past the human species has responded to a wide range of environmental challenges; we need to recognise that it is now in an ecological and societal crisis! The solutions will need to be revolutionary, highly intelligent, strategic, adaptive and be applied immediately! The likelihood of achieving this vision seems frighteningly over-optimistic! Still, we need to get on with the job or witness increasing rangeland degradation and associated species extinctions.

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Dust storm in south-west Queensland reflecting wide-spread soil loss on pastoral rangelands.
(Photo: Charles Nason)

Author Profile

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