PERCEPTIONS OF THE FENNER CONFERENCE ON: INTEGRATING AGRICULTURAL AND ENVIRONMENTAL IMPERATIVES FOR A PROFITABLE AND SUSTAINABLE FUTURE

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Abstract

The considerations are based around the dichotomy between well defined objectives for production and ill-defined objectives for natural resources. Natural resource objectives are directed towards conceptual objective such as biodiversity because of the lack of a tangible objective other than having more trees. Integration of conservation and production involved partitioning the landscape between agriculture and native vegetation. This reflects the industry focus with agriculture and a monopoly on natural resource activities by public organisations. The conclusion discusses the likelihood of achieving the conference objectives given the existing organisational constraints.

Context

The conference focused on the achievement of desired production and environmental outcomes in agricultural landscapes but the considerations were strongly polarised. Scientists addressing 'the environment' focused on habitat and biodiversity where habitat was equated with planting more trees. Scientists addressing agriculture identified an incompatibility between trees and agriculture, particularly for cropping, and focused on how improvements in technology had improved agricultural productivity at the impressive rate of 4%pa. A response from the NRM camp to a presentation addressing environmental gains in agriculture was, what about the logs?

The conference was amicable as all presenters benefit from the existing arrangements for addressing agriculture and native biota. The generally agreed solution was to improve the profitability of agriculture to reduce the requirement for land so that cleared land could be planted to trees. Despite talks on integration there was no consideration of how conservation could be integrated into agriculture. For biota the integration was restricted to considerations of how to variously locate trees and agriculture in the landscape. The suggested integration was partitioning equivalent to apartheid. For some the natural resource management (NRM) issues were solely about native species.

Another dichotomy related to the approach to promoting conservation. The agricultural position was that farmers are innately concerned with the environment as it provides the foundation for their existence. Their requirement was for means to address the issues where

profitability was paramount in achieving implementation. The public funds provided to farmers by way of NRM programs are trivial compared to the resources they commit. The contrasting position held by at least some public administrators is epitomised by the question raised from the floor 'how can we get farmers to do what we say?' Despite many of the problems having been caused and/or promoted by past administrative actions, some public administrators still believe they are right and have a moral obligation to force their views onto others.

Production Objectives

The production objectives were well addressed in a number of presentations. They identified a cost – price squeeze that effectively saw no change in profitably despite the large increases in productivity. The wide variance in the performance of farmers allows the numbers to be variously presented but there is no disagreement that farmers have to continuously improve just to maintain their position.

A performance target was given for wheat of xxx tons per hectare per 100mm of water[1]. While wheat productivity has shown a general increase towards this target there have been several periods of rapid gain. The first major gain arose through fertiliser and the latest from the introduction of minimum tillage.

The current performance level for wheat is around 50% of the suggested maximum level but there was no consideration of the reasons for the gap. The reasons for gains were addressed but the obstacles and/or barriers to achieving further gains were not.

While agricultural presentations were dominated by publicly funded scientists there were presentations from a farmer and an agricultural consultant delivering services to farmers. The existence of an agricultural services industry and the party affected by the considerations were acknowledged but neither was well represented

Natural Resource Objectives

There were no specific objectives or targets other than having more native trees. There is therefore no tangible means for evaluating performance other than by way of the amount of land planted to trees. In consequence, performance was expressed generally by way of biodiversity and habitat.

Everywhere on the surface of the earth is habitat as habitat is where an organism occurs, and the term was seldom used correctly. Habitat is defined in terms of the occurrence of particular species but the occurrence of species is being evaluated in terms of the habitats in which they occur. Considerations assigning significance to habitat are almost invariably circular. Even relating a loss of species to a loss of habitat can be axiomatic in being an inevitable consequence of the definitions.

Biodiversity was presented as a tangible entity that could be used as a performance measure for NRM outcomes when is a concept. When presented as a tangible entity it is an ill-defined measure of species density. Biodiversity varies with virtually all factors that can be varied such as scale, location and time yet it was presented as a useful metric. Moreover, it was implicitly assumed that high biodiversity is good when some woodlands in effectively pristine condition have very low biodiversity. It was noted that some heaths have very high biodiversity but there was no consideration of how this arises and what it means other than

[1] It was not identified whether this target was derived from theoretical considerations or empirical observations.

having a large number of species. There is no rational basis for suggesting that biodiversity levels make woodlands bad and heaths good but that logic is being used to assess NRM performance.

For some the Lindenmayer experiment appropriately addressed the conservation issues because of its scope and nested sampling design. However, the nesting relates to patch size and continuity and does not take fertility into account. As the significance of patch size for animals depends strongly on fertility the results will not reliably identify opportunities and constraints in fauna conservation and could therefore be misleading. Considerations of an appropriate landscape design derive from human perceptions evidenced in urban landscapes rather than the realities for the organisms involved.

This situation is reflected in the complete absence of considerations of the functioning of natural vegetative systems. The comment was frequently made and generally accepted that we cannot return things to how they were in 1770 and should therefore be designing landscapes to meet our perceptions of what is good or desirable. It was implied that we did not need to know how things naturally functioned to achieve the desired environmental objectives. A mentality prevailed that we can achieve what we want without knowing how the system works and what is achievable. Indeed, one presenter suggested that we could only make incremental gains through our mistakes (Stirzaker). However, acknowledging mistakes does not come easily and he defended the Natural Land and Water Resources salinity hazard mapping despite the production of a 2050 hazard map for Queensland when the existing salinity hazard could not be mapped because of insufficient information.

The 'learn by mistakes' was identified as representing the scientific method but failed to consider the differences between inductive and deductive approaches. The assertions were based on an inductive approach when ecology uses a deductive approach because it is effectively the only way of deriving valid generalisations from systems that function through complex interactions. A deductive approach is also used in astronomical physics.

In addressing what is good it was identified that we see what we believe. A slightly more detailed view is that we see what we look at and we look at what we want to see. What we want to see can reflect beliefs but it can also reflect what we are paid to see. A person that gains benefit from addressing native species will focus on those species rather than agriculture. While the associated promotion of disciplinary interests was identified as limiting the delivery of desired outcomes the limitation is more likely due to an unwillingness or inability to understand the considerations of others.

The solution proposed by Passioura was standardisation of terminology when standards promote stagnation and suppress innovation. Moreover, they do not necessarily resolve the communication issues. Defence provides an example where archaic systems are sometimes acquired and commonly perpetuated on the pretext of achieving interoperability when with allies the limitations most commonly arise from the use of a common language. The same words can mean different things to different people. Moreover, definitions are often ignored, as with habitat.

The main consequence of the critical deficiencies in knowledge is reflected in the NRM programs funded under NHT and NAP being identified on several occasions as a large ongoing experiment. However, we usually only evaluate the outcomes when something considered undesirable occurs and hence have no perception of the effectiveness of the activities. In a scientific experiment outcomes are assessed against objectives hence, while presented under the guise of science, the NRM experiment lacks essential ingredients for it to

be considered 'scientific'. It is definitely 'suck it and see' as it is based on suggested but unsubstantiated good intent and lacks defined design criteria.

All NRM presentations were from personnel funded directly or indirectly by public funds. All research was by scientists in publicly funded organisations and applications either by farmers of organisations such as Greening Australia. There was no acknowledgement of a role for industry[2] in NRM other than farmers as a client for government services where the services increasingly address constraints imposed by government regulation. One consequence is identified in the introduction, the existence of a disconnect between agricultural and conservation considerations. Another is that public organisations expect to deliver services direct to farmers. The one organisation can conduct the research, develop and police the regulations, provide 'supporting' services and evaluate performance.

General Approach

The general approach was best evidenced in the paper charting improvements in the productivity of wheat (Pratley). The mull board plough initially used in Australian agriculture produced undesirable large clods of earth, as did the disc plough introduced later. 'Defensive tillage' was used to break down clods to produce a favourable seed bed. Minimum tillage has now been introduced to avoid the damaging effects of ploughing. While not identified in that presentation, the same situation has arisen with acid soils. Fertiliser application has helped produce acid soils so lime is applied to produce a favourable soil pH. This is commonly identified as an engineering approach whereby new management practices are introduced to counter the deleterious effects of prior practices. The reference for assessing gains is the existing degraded state that was produced through management.

Pratley presented Glyphosate as being the current saviour for minimum tillage cropping and this currently represents the peak performance. However, there was no evaluation of the impact of the chemical on production. It will inevitably be found to have negative effects on production and the environment but at present the gains from its use are substantial compared to prior practices hence that possibility is not being addressed. This is one consequence of using a degraded state as a reference for performance. Performance is evaluated by an incremental rise from a debased condition rather than progress towards where we want to be. It is a piecemeal approach to providing solutions.

Further implications of this situation are evidenced in the comment that consideration of a healthy soil does not make sense but that fertility does. The parallel in human health is that those focusing on disease usually have poor cognisance of what constitutes good health. The focus has been on finding remedies for identified problems rather than designing systems that avoid the problems. Prevention is much more effective than providing a cure and a good engineer uses systems design incorporating margins to prevent problems arising.

This situation also occurs with NRM where the objective has been to plant more trees on the basis that trees are better than grasses and/or that the natural system contained trees. We implement an action that is expected to remedy deleterious effects of prior actions without having the knowledge to design a system that will achieve defined objectives.

The one positive with NRM was the identification that addressing all individual species considered important is impossible for plants (Burgman). The reasons given related to the practicalities of obtaining sufficient information on each species to allow rational management

[2] The Australian Government definition is that industry is subject to income tax. Industry organisations are therefore not industry.

decisions. However, there is an overriding constraint that the interactions between components in ecosystems greatly limit the reliability of predictions based on projections from component species. Having very high levels of information on individual species is unlikely to provide reliable predictions.

From theoretical and practical viewpoints the focus must be on systems rather than species, except perhaps for critical situations. This premise is ecologically sound and may eventually become acceptable to plant scientists that focus on species. However, any change will be slow as natural attrition was not identified as a cause for the loss of species and there is currently no sign of a systems approach being adopted by those addressing fauna[3].

Organisation

Despite the many examples of individual activities funded under NHT, NAP and other public sources of funds for research and application there was little examination of how NRM was being addressed organisationally other than to identify it as a very large scale experiment involving regional implementation. Campbell identified the multitude of public and community organisations feeding off the stream of public funds just in the Canberra region. In at least 4 States the catchment management boards introduce another level of government in a society that arguably already had too many levels of government.

Gleeson paid most attention to organisation and concluded that the system is broke. Apart from the lack of tangible and measurable objectives the transaction costs are inordinately high. Even without the burden of an extended network of organisations situations arise where the administrative costs for research funds appear to exceed 50% of the available funds. This means that Australian Government funds that match farmer levies go solely to support public administration. In effect, farmers get no contribution to their research from government but the arrangements allow a large degree of control of their funds by government.

Another issue raised by those involved in the current NRM delivery arrangements is the lack of continuity due to the funding arrangements. Projects have limited duration, and continuity can only be achieved by successful application for new grants.

One irony in this situation is that the system developed to deliver sustainable environmental outcomes is itself inherently unstainable due to the high administrative cost, uncertain funding and dependence on public funds. Another is that, having gradually withdrawn from providing agricultural services, governments have rapidly expanded their provision of environmental services. The lessons from the past have not been learnt. Obvious critical deficiencies, such as agencies providing services against regulations they develop and police, have been disregarded.

Innovation

Scientists assume they are innovative when they are frequently followers in simply providing explanations for developments by others. However, while grammatically sematic, a division has arisen between the terms innovative and innovation with innovation including an additional requirement that the developments be implemented to provide benefit. Innovation involves the realisation of benefit from a development rather than just the R&D.

[3] The use of habitat to address fauna conservation was meant to address this requirement but has been negated by the circularity associated with addressing relationships between species and habitat when habitat is defined by the occurrence of species.

The conservative view was presented that farmers should not be innovative due to the risks (Sackett). Don't introduce change until it is clear that the change will be beneficial. This presents a dilemma as it slows the rate of development and, if generally applied, no change need occur. Moreover, while the approach may be viable for profitable farmers it need not be for those caught in a downhill slide. The innovations in conservation farming have often come from those caught in a bind where doing more of the same would not change the outcome despite the application of best practice[4]. Viability depended on radical change to seek the potential rather than incremental changes to address identified deficiencies.

An issue with introducing agricultural change beneficial to the environment is that some environmentally desirable changes need not be profitable. Such changes would not be implemented with the identified conservative approach to management. The solutions that were given focused on providing direct financial support to farmers where historically this approach has been shown to have many pitfalls in addressing social issues. Incentives are a normal part of the administrative process for promoting social change but the optimum solution of providing information to promote the agricultural enterprises as well as NRM activities has not been addressed. The basic requirements for achieving integration of production and conservation have been disregarded.

The saving grace is that farmers are concerned for the environment and, while financial viability is critical, the environment is generally taken into account to the maximum practical extent. The limitation relates to the provision of appropriate information and support to allow them to make decisions appropriate to their circumstances.

Conclusions

The conference was highly conservative in presenting and only supporting the status quo. The focus was on increasing efficiencies (marginal gains) by addressing identified deficiencies rather than achieving substantial advances. For example, the use of microbes got one question mark and several crosses. This is despite trash levels being identified as an impediment to eliminating the practice of stubble burning with wheat in eastern States (Pratley) when some sugar cane farmers routinely use microbes to rapidly incorporate the organic matter into the soil. This provides a substantial increase in profitability as well as removing the trash and improving the soil.

The above development arose from industry and is not recognised by public scientists. A development is deemed not to exist until they reinvented it. For many agricultural consultants and farmers a development is not accepted until it has been demonstrated locally.

There are an increasing number of situations where farmers have improved environmental outcomes while improving their viability but these were not addressed at the conference. This is despite public scientists receiving AU$1M to research one and likely a greater amount to research another. The second one involves Natural Sequence Farming but the research is addressing water harvesting aspects that have existed for thousands of years rather than the innovative considerations relating to nutrition. Some public scientists identify the nutrition considerations as being too speculative when the reticence arises because the issues are difficult to address and are outside the established capability.

While the Australian Tax Office has risk as an essential part of R&D the risk in most activities conducted by public scientists is now close to zero. This situation has been promoted by the

[4] The definition for insanity given by Driver was expecting to obtain a solution by doing more of what was previously unsuccessful.

evolution in science funding arrangements whereby public administrators use their funds to lever traditional research funds. While failure is intrinsic to scientific research administrators cannot afford to be seen to have failed. Research is now being directed to reinforce rather than reinvent the wheel as research is increasingly only being funded where it supports an established position.

Science has been suppressed to a level where it is now expected to focus on the delivery of practical tools. Science has become technology. For native vegetation the basic research needed to understand system function, and thereby allow the development of rational solutions to conservation and NRM issues, is not being done.

Overall the approach presented at the conference lacks objectives, knowledge and integration and fails to take advantage of the information that can be gleaned from the activities of farmers. Moreover, the process is only sustainable given ongoing and increasing levels of public funding which means it is inherently unsustainable.

The future

A conference summary given from the floor was that we have all done very well and it will be interesting to attend the next conference to see the developments that arise from the identified research. If the desired outcome is 'business as usual' then this is realistic. If the desired outcomes involve realising on the objectives of the conference then this appears to meet the definition of insanity presented by Driver.

The need for farmers to remain viable in a deteriorating situation is producing an underlying pressure for change, financially and environmentally. Despite the exceptional gains in production most farmers have not been winning. While the environmental pressures were identified as deriving from the affluent in cities there is an undercurrent across the entire community seeking to achieve the production and environmental imperatives.

Farmers are increasingly concerned for their health as well as the health of the systems they manage. Their concern is the same as those in the cities responsible for the political pressure to 'protect' the environment. Perhaps the future may see these mutual interests better combine to produce a more rational and effective response. The future could see environmentalists seek outcomes by fostering support rather than advocating increased government control. It could see public scientists give recognition to developments and innovations by others. It could also see governments supporting the development and delivery of environmental services by industry. This would avoid the conflict of interest that arises where governments provide services against regulations they develop and police while providing a more cost effective and sustainable system.

In the past such social objectives were addressed by providing supporting infrastructure. For agriculture this included information and knowledge as well as transport and communications. This public investment in developing information is now being directed into exercising control rather than providing support, and knowledge has been replaced by technology. The first step towards improving the future is to address the provision of infrastructure by way of information and knowledge needed to achieve the desired objectives. As implementation depends on the delivery of technical services the developments logically involve industry.