

SOIL GOVERNANCE IN AUSTRALIA: CHALLENGES OF COOPERATIVE FEDERALISM*



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This paper analyses soil governance in Australia and the challenges facing sustainable natural resource management within the context of a cooperative system of federation and a globalised market economy. With only 6 per cent of the Australian landmass considered arable, one would assume that protecting Australia's valuable soil resource would be of national significance. However, Australia currently lacks nationally consistent policies and legal instruments to ensure that its soil is protected, maintained and enhanced for future generations. While recognising that soil governance is a broad discipline encompassing many areas of soil science and management, this discussion will only focus on the soil conservation aspects of sustainable ecosystems and sustainable food and fibre in Australia; it will not explore in depth issues of soil contamination and other pollution related areas. The paper discusses: the state of Australian soils and the managers of these resources; current soil governance in Australia (based on the Food and Agriculture Organisation of the United Nations definition); and a case study example of an Australian state approach to landuse conflict and the protection of agricultural lands. The paper highlights policies and institutional arrangements required for the protection of Australian soil and the very communities that are attempting to steward these resources for future generations.

State of Australian soil

In 2012-13, land accounted for 80 per cent of Australia's environmental assets and was estimated to be worth around \$3860 billion.¹ Soil (predominantly privately owned) underpins the value of the landuses assessed. Australia is globally recognised as an ancient, stable landmass of weathered soils; little of the land is arable.²

Soil takes considerable time to form and regenerate yet can degrade quickly.³ It has many vital roles in sustaining life including: acting as a carbon store; hosting biodiversity; producing biomass; storing and filtering water; storing and cycling nutrients; providing raw materials; and storing geological and paleontological heritage. This largely non-renewable resource has been severely impacted since European settlement in Australia, through the clearing of native vegetation and the use of unsustainable agricultural practices, leaving a legacy of landuse issues, including salinity, soil acidity, soil erosion and organic matter losses. There were concerted efforts between 1997 and 2008 to measure the state of the soils nationally through the National Land and Water Resource Audit (NLWRA) Phase 1 and 2. However, in 2009, the NLWRA states: 'Australia is still not well equipped to report on local progress or national soil condition and change'.⁴

Despite monitoring and reporting challenges, four processes (acidification, carbon storage, soils erosion and dryland salinity) were recently identified in the *State of the Environment Report ('SoE 2011')* as the key indicators of soil condition, with these processes having serious consequences, both economically and environmentally, for Australia.⁵

Evidence from *SoE 2011* indicates that, despite the lack of a monitoring system for soil acidification, it is widespread in the extensive farming lands of southern Australia, with rates of lime application insufficient to address the size of the problem. Soil acidity causes losses in potential production of approximately \$1 billion

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¹ Australian Bureau of Statistics (ABS), 'Australian Environmental-Economic Accounts 2014' (no 4655.0, ABS, 2014).

² Department of Foreign Affairs and Trade, 'Australia's Environment at a Glance (2014).

³ State of the Environment Committee, *State of the Environment Report 2011* (Independent report to the Australian Government Minister for Sustainability, Environment, Water, Population and Communities, DSEWPac, 2011) ('SoE 2011').

⁴ NLWRA, 'The National Land and Water Resources Audit 2002-2008. Achievements and Challenges' (PN22042, 2009) 27.

⁵ *SoE 2011*, above n 3.



each year.⁶ Acidification is common in intensive systems of landuse and is considered to be limiting biomass production in some regions in Australia - though there is uncertainty over acidification trends in the tropical savannahs. Soil carbon losses are a major outcome of degrading soil condition, with soil acidification a particularly major constraint on the capacity of soil to store carbon.

Until recently, the store of carbon across the Australian continent was largely unknown due to a lack of adequate monitoring systems. However, recent mapping by CSIRO⁷ has derived spatially explicit estimates (with uncertainties considered) of the distribution and stock of organic carbon in the soils of Australia in 2010. The results of this mapping indicates that the average amount of organic carbon in the Australian topsoil is 29.7 tonnes per hectare with the total stock of organic carbon in the top 0 to 30 cm layer of soil being 24.97 gigatons. Australia's organic carbon store in the soil represents approximately 3.5 per cent of total organic carbon in the upper 30 cm of soil worldwide, which is a significant contribution to the global carbon cycle. The largest soil organic carbon stores per hectare are found in the cool, temperate zones of Australia where the regions fringe coastlines and experience wetter conditions than found inland. The South Australian coastline is an exception - having the least organic carbon due to large areas of desert. The northern and western regions of Australia, coupled with other regions exposed to Mediterranean, subtropical and tropical climates have only low organic carbon stores.

Carbon stores are influenced by length of time since native vegetation clearance. Large areas of Australia are on a declining trend of soil carbon due to continuing land clearance. CSIRO predicts that, particularly, regions with intensifying landuse systems will have decreased carbon stores, as will regions with a projected drying climate. Savannah regions, however, have the capacity for increasing carbon stores if there are changes in landuse practices and fire regimes. CSIRO's research⁸ offers a baseline to work from for monitoring the carbon dynamics of Australian soils and to inform and monitor carbon sequestration strategies and landuse practices.

SoE 2011 identified the key factors affecting the rate of soil erosion to be loss of ground cover and poor agricultural landuse practices. Soil erosion by water at the current rate exceeds soil formation rates (ranging from factors of hundreds to thousands), resulting in the half-life of soil potentially ranging from less than a century to several hundred years in various agricultural upland regions. SoE 2011 also estimates that up to 10 million hectares of land could have less than 500 years until the more fertile topsoil is lost to erosion, with most of this threatened land occurring in Australia's humid subtropical zones.⁹

Salinisation poses a serious threat to native species, ecological communities and functioning ecosystems. Soil salinity occurs when the water table rises (eg, as a result of land clearing and replacement of trees and other deep-rooted native vegetation with shallow rooted vegetation) and results in natural soil salts rising to the surface poisoning plants and, in some cases, animals. The ABS¹⁰ estimates that 5.7 million hectares in Australia have a high potential to develop salinity with this potentially increasing to 17 million hectares by 2050 if there is no action to halt the practices contributing to salinity. Around 20 000 farms and two million hectares of agricultural land already show evidence of salinity. Not only does salinisation affect agricultural productivity, it also adversely affects biodiversity through loss of habitats. For example, there has been a significant decrease in the number of wetland bird species in the wheat belt in Western Australia due to salinity impacts.

Results from recent research on the state of Australian soil, considered through the lens of the four main processes of carbon dynamics, erosion, acidification and salinity, indicate there is an urgent need to develop a soil conservation program for Australia, to be implemented as a national priority.¹¹ If such a program were to be developed and implemented, who needs to be involved? Or, perhaps, a better initial question is: how is the soil resource currently being governed? The following sections provide an overview of current soil resource managers and governance arrangements in Australia.

Australian soil resource managers

Statistics vary (51-59%) of the Australian landmass under agriculture, however, whatever the exact number, the fact is that agricultural use of the landmass is the dominant one. Agricultural landuse occurs on both

⁶ CSIRO, *Acid Soils a Ticking Time Bomb* (CSIRO, 2005).

⁷ CSIRO, *The Soil Carbon Research Program and Beyond* (CSIRO, 2014).

⁸ Ibid.

⁹ SoE 2011, above n 3.

¹⁰ Australian Bureau of Statistics (ABS), 'Measures of Australia's Progress, 2010' (no 1370.0, ABS, 2010).

¹¹ Andrew Campbell, 'Managing Australia's Soils: A Policy Discussion Paper' (9780980371413, NCST, 2008).



private and public lands. Recent reports¹² of the distribution of Australia's ~25 million population shows that 87 per cent reside in capital cities and inner regional areas surrounding those cities. The rest of the population (13%) live in the outer regional and remote areas of Australia. Regardless of tenure, this 13 per cent of the Australian population, which are predominantly farming communities, manage the majority of the landscape. Table 1 provides an overview of landuse estimations for 2011. Table 2 provides an overview of land tenure nationally (based on 1993 figures).

Table 1: Landuse¹³ in Australia 2011

Landuse	Area (%)
Grazing in native vegetation	46
Grazing in modified pasture	9
Nature conservation and other protected areas (includes Indigenous uses)	20
Minimal Use	16
Dryland cropping	3
Production forestry in native forests	1.5
Production forestry in plantations	0.3
Water	1.6
Irrigated and intensive agriculture	0.6
Urban and rural residential (intensive mainly urban)	0.2
Rural residential	0.1
Mining and waste	0.1

Table 2: Land Tenure¹⁴ in Australia as at 1993

Tenure	% Area
Public	23
Private	63
Aboriginal & Torres Strait Islander	14

There are approximately 134 000 farm businesses in Australia; most are family owned and operated.¹⁵ The majority of farms are relatively small: 36 per cent at 50 hectares or less; 36 per cent between 50 and 500 hectares, and around 100 massive farms over 500 000 hectares. In terms of annual total farm value, approximately 40 per cent of Australian farm businesses produce \$50K or less; 15 per cent produce \$50-\$99K; 15 per cent produce \$100K-\$199K; 18 per cent produce \$200K - \$499K; 7 per cent produce, \$500K - \$999K; and 5 per cent produce \$1000K.¹⁶ Farming activities are diverse, as shown in Table 3.

Table 3: Farming activities¹⁷ in Australia 2011

Farming activities in Australia	% of farmers
Mixed crop and livestock farmers	22.1
Beef cattle farmers	20.3
Dairy cattle farmers	8.3
Mixed livestock farmers	7.1
Sheep farmers	6.8
Grain, oilseed or pasture farmers	6.3
Fruit or nut growers	5.5
Vegetable growers	4.4
Grape growers	3.2
Other farmers (includes apiarists, sugar cane, poultry farmers, flower growers etc)	16.0

The agricultural sector at the farm-gate contributes 3 per cent towards Australia's total gross domestic product (GDP), exemplified by the gross value of Australian farm production in 2010-11 being \$48.7 billion with farm exports of \$32.5 billion in 2010-11. If value-adding processes and other values of economic activities supporting farm production through farm inputs are considered, the agricultural contribution to GDP is around 12 per cent (\$155 billion). Interestingly mining exports in the year to March 2011 were worth \$155 billion, or around 12 per cent of GDP (however value-adding processes have not been considered in this figure).

¹² ABS, 'Regional Population Growth, Australia, 2012-13' (no 3218.0, 2014).

¹³ *SoE 2011*, above n 3.

¹⁴ Geoscience Australia, *Land Tenure* (1993) <<http://www.ga.gov.au/scientific-topics/geographic-information/land-tenure>>.

¹⁵ National Farmers Federation, 'NFF Farm Facts: 2012' (2012); ABS, 'Australian Social Trends' (no 4102.0, December 2012)

¹⁶ ABS (2010), above n 10; ABS (2014), above n 12.

¹⁷ ABS, 'Australian Social Trends' (no 4102.0, ABS, December 2012).



Agriculture employed around 307 000 in 2011 whilst mining employed 217 000.¹⁸ Even though GDP and exports from Australian agriculture has contributed to the country's wealth since European settlement, a collective debt in the form of land and soil degradation is compounding (see Table 4). Based on the above figures for GDP and exports, it appears that degraded soil and land has cost Australia \$5.749 billion or almost 12 per cent of the GDP. Is there an equitable sharing of that collective compounding debt of degradation that is occurring, predominantly, in regional and remote Australia?

Table 4: Costs¹⁹ of soil and land degradation in Australia 2010-11

Degradation	Costs (\$ million)
Subsoil depletion	5302
Land degradation	447
Total net depletion	5749

With agriculture dominating use of Australia's landmass, the advent of relatively new environmental laws over the last 15 years (such as native vegetation laws, threatened species laws, water sharing plans and environmental water requirements) has resulted in farming communities also becoming the main stewards of Australia's natural resource base. These stewardship requirements occur in a sparsely populated country where the majority of the population reside near and around capital cities, and in a market environment where Australian farmers are 'among the least subsidised in the world, the least supported in the world'; producer support of Australian farmers is 3 per cent, the second lowest in the OECD.²⁰ Australia is considered one of the world's most efficient agricultural producers but, realistically, it is doubtful that the unsupported farming businesses in Australia can simultaneously meet expectations to grow GDP and undertake public good natural resource management.

Two-thirds of native vegetation now occurs on lands mapped as agriculture.²¹ Native vegetation laws have been in place in each state and territory since the early 2000s,²² limiting agricultural activities and, at the same time, placing an enormous, collective responsibility for biodiversity, water quality and native vegetation management on the farming sector with little if any sharing of the burden by other sectors of society. Farmers already invest at least \$3 billion annually in NRM²³ and \$314 million annually in water-related management activities.²⁴ However, these investments remain largely invisible to governments and the broader community. For example, figures from the recent *Agricultural Resource Management Practices 2011-12*²⁵ found that around 32 per cent of all agricultural businesses reported setting aside a collective total of 8.4 million hectares of land for conservation or protection purposes. Farmers also revegetated nearly 70 million hectares of land with the main purposes being for: livestock production (54%), environmental purposes (44%) and plantation for harvest (1%). Some sort of vegetation management practices were undertaken on 68.9 million hectares of agricultural land, with around 64 per cent of this area having a reduction in grazing pressure to protect or regenerate vegetation. Weed management was undertaken on around 14.7 million hectares and fencing off or excluding stock was undertaken on around 3.8 million hectares, with 3.7 million hectares of agricultural land having soil improvement activities. In spite of these efforts by the farming sector, new demands and issues are arising as a result of environmental laws, with new landuse conflicts (in particular between mining and

¹⁸ National Farmers Federation, above n 15; David Richardson and Richard Denniss, 'Mining the Truth' (Institute paper no 7, The Australia Institute, September 2011).

¹⁹ ABS, 'Year Book Australia, 2012' (no 1301.0, ABS, 2012).

²⁰ ABC, *Malcolm Turnbull Correct: Australian Farmers Among World's Least Subsidised* <<http://www.abc.net.au/news/2014-02-14/malcolm-turnbull-correct-on-farmers-subsidies/5252596>>.

²¹ M Barson, J Mewett and J Paplinska, 'Trends in On Farm Biodiversity Management in Australia's Agricultural Industries' (Caring for our Country Sustainable Practices Fact Sheet 5, Department of Agriculture, Fisheries and Forestry, 2012).

²² For details on the institutional response in Australia to loss of native vegetation, see Department of the Environment, *Indicator: BD-17 Institutional Response to Loss of Native Vegetation* (2006) <<http://www.environment.gov.au/node/22175>>.

²³ ABS, 'Natural Resource Management on Australian Farms 2004-05' (no 4624.0, ABS, 2006); ABS, 'Natural Resource, Management on Australian Farms, 2006-07' (no 4620.0, ABS, 2008) <<http://www.abs.gov.au/ausstats/abs@.nsf/mf/4620.0>>.

²⁴ ABS, 'Australia's Environment: Issues and Trends, 2007' (no 4613.0, ABS, 2007) <<http://www.abs.gov.au/ausstats/abs@.nsf/mf/4613.0/>>.

²⁵ ABS, 'Agricultural Resource Management Practices, Australia, 2011-12' (no 4630.0, ABS, 2013).



agriculture), and the current natural resource governance regime is struggling to respond to matters of environmental justice.²⁶

The following section will provide a background of soil governance in Australia to provide context to the issues currently affecting Australian soils and farming communities.

Soil governance in Australia

The colonisation of Australia from 1788 by Europeans brought many land management practices that were incompatible with Australia's weathered soils and native vegetation. Since the early 1800s, concerns have been raised about the degradation of catchments, land clearing²⁷ and loss of habitat;²⁸ however, European landuse practices continued to dominate. The first soils management regulation was promulgated in the early colony days - in 1803 - concerning the impact of tree clearing:

From the improvident method taken by the First Settlers on the Sides of the Hawkesbury and Creeks, in Cutting Down Timber and Cultivating the Banks, many Acres of Ground have been removed, Lands inundated, Houses, Stacks of Wheat, and Stock, washed away by former floods which might have been prevented in some measure if the Trees and other Native Plants had been suffered to remain; and instead of cutting any down to have planted others to bind the Soil of the Banks closer; and rendered them less liable to be carried away by every inconsiderable Flood; nor is this the only evil: The Public convenience having suffered by the numerous large Trees lying in the Stream, and fallen across, rendering water carriage on the Creek, almost impracticable, and in some Part of the Hawkesbury very dangerous. As several Settlers have been, and are now fixing the Lower Part of the Hawkesbury, along the Nepean, South Creek, and Georges River, in Situations where the above Evils may be presented. It is hereby directed that no Settler or other Person, to whom Ground is Granted or Leased on the Sides of any River or Creek where Timber is now growing, Do on any account Cut Down, or Destroy by barking or otherwise, any Tree or Shrub growing within Two Rods of the Edge of the Bank, except for an Opening, One Rod wide, to have Access to the Water. Mr. Evans, Acting Surveyor, of lands, is directed to communicate this Ordinance to those lately settled and to give the Governor a List of those who have not yet cut any Timber down in the above Situations, that it may be made a Condition in their Grant: And should they not be sufficiently sensible of the general and individual Benefit arising from this necessary Regulation, the Magistrates are hereby required to Levy a Fine of Fifty Shillings for each Tree cut down; the Penalty to go to the Informer prosecuting to Conviction before two Magistrates. Within the two Rods of Timber left on the Banks, another Rod is to be left for a Public Road along the Sides of the River or Creek; which three Roads are not in future to be measured in the respective Allotments. It is earnestly recommended to those who already hold Farms by Grant, situated on the Side of any River or Creek liable to Floods, and which have been cleared of Timber, to Replant the Banks with such binding Plants and Trees as they can procure. By Command of His Excellency, W.N. Chapman, Sec. Government House, Sydney, Oct 4 1803.²⁹

The Acclimatization Societies in Australia had little understanding of the different ecosystems and climates they were attempting to develop in the 1800s, as Bennett eludes:

From a soil producing only a few fruits barely edible, the aborigines merely subsisting on the precarious supply of food, obtained by hunting or fishing, we now obtain by Acclimatisation a large

²⁶ See: R White, 'Resource Extraction Leaves Something Behind: Environmental Justice and Mining' (2013) 2(1) *International Journal for Crime and Justice* 50; F Millner, 'Access to Environmental Justice' (2011) 16(1) *Deakin Law Review* 189; Environmental Defenders Office (Victoria) Ltd, 'Environmental Justice in Australia' (Discussion Paper, 2011).

²⁷ See P Holzworth, *Forest Conservation Started in the 19th Century* Queensland Forests Service, <http://www.chapelhill.homeip.net/FamilyHistory/Photos/Tamrookum_AllSaints/Queensland%20Forest%20History%20Stories.htm> where concerns in 1870 of clearing of native vegetation eventually led to the formation of a Forestry Branch within the Department of Lands and Inspector of Forests appointed. Of interest were the concerns about native forest clearing by the Queensland Acclimatization Society during the late 1800s that contributed to the development of forest conservation in the 1900s.

²⁸ Even though the Royal National Park in NSW was initially reserved for rest and recreation for people rather than for nature conservation, it was significant as being gazetted the second national park in the world after Yellowstone US and created a foundation for expansion of the park on the basis of nature conservation and for other reserves across NSW through the advocacy of Myles and Milo Dunphy and others in the early 1900s.

²⁹ The Sydney Gazette and New South Wales Advertiser, *General Orders* (No 32 vol L, 9 October 1803) <<http://trove.nla.gov.au/ndp/del/article/625810>>.



supply of food, luxuries, and important articles of commerce, affording subsistence for a large population of thousands of human beings.³⁰

As drought, hardship, soil erosion and degradation increased, the mismatch between European pastoralism and the capacity of Australian land became more evident. Greater attempts at new forms of governance were made between the late 1800s and early 1900s, including Royal Commissions,³¹ new legislation,³² advisory bodies³³ and new institutions.³⁴ However, little changed until soil conservation became a national concern as a result of the dust bowl crises in Australia and the US during the 1930s.³⁵ The NSW Erosion Committee (established in 1935) found that erosion was widespread on farming and grazing lands throughout the state, with liability for very serious losses on account of erosive damage. In response to the dust bowl crisis, the Commonwealth Agricultural Council (agricultural ministers from the states and the Commonwealth) requested, in 1936, 'that each State should form a committee, in conjunction with the Council for Scientific and Industrial Research (now CSIRO), to assess the problem and make recommendations'.³⁶

As a result of the reports from the various state soil committees, new legislation was enacted³⁷ between 1938 and 1945 in New South Wales (NSW), Victoria, South Australia and Western Australia, with legislation in Queensland, Australian Capital Territory and Northern Territory following between 1951 and 1970 (Tasmania continues to have no specific legislation for soil conservation). Despite the Second World War interrupting efforts during the 1940s, the Australian legislative approach focused on extension, education and awareness of farmers. This approach is in contrast to the US approach of enforcing behavioural change if required.³⁸ As the 1950s focused on development and expansion after the war, soil conservation took a back seat until the 1970s when a joint state and Commonwealth collaborative study (1975-77) found more than 50 per cent of the land in Australia used for grazing or crops needed treatment for land degradation.³⁹ The published findings influenced the National Soil Conservation Program (NSCP) of 1983. Another drought in the early 1980s and a change of government at the Commonwealth level found a new approach to land degradation and soil conservation with the formalisation of the Landcare movement in Australia.⁴⁰ Various funding programs followed: the NSCP (1983-1992); the National Landcare Program (NLP, 1992-2008); the Natural Heritage Trust (NHT1 and NHT2, 1997-2008), National Action Plan for Salinity and Water Quality (NAPSWQ 2001-2008); and Caring For our Country program (CFOC 2008 to date).⁴¹ These funding programs have continued the approach adopted in the 1930s of focusing on extension, capacity and raising awareness. More recently, as a result of a change of government at the Commonwealth level, a number of new discussion papers⁴² and agreements⁴³ have arisen, all of which have relevance to soils conservation.

³⁰ Quote attributed to Dr George Bennett (1802-93) Secretary and Curator of Australian Museum 1835-1 from Occasional Papers held in the Australian Museum archives. For more information about Bennett see <<http://australianmuseum.net.au/image/dr-george-bennett-secretary-and-curator>>.

³¹ See, for eg, the NSW Royal Commission on Conservation of Water 1885 (held in NSW Government State Records), and the NSW Royal Commission into the Condition of the Crown Tenants of 1901 (see 'Report and Summary of Evidence', in *Votes and Proceedings of the NSW Legislative Assembly during the Session 1901* available at Macquarie University) and the Victorian Royal Commission into Water Supply 1884 (held by Public Record Office Victoria).

³² See for eg: *The Irrigation Act 1886* (Vic); *The Sand Drift Act 1889* (WA); *The Western Lands Act 1901* (NSW); *The Sand Drift Act 1923* (SA).

³³ Advisory Council of Science and Industry (1916).

³⁴ River Murray Commission (1917).

³⁵ J Bradsen, 'Law and Policy at Odds Over Aussie Resources' (1997) 12 *Forum for Applied Research and Public Policy* 115.

³⁶ See Primary Industries and Regions SA, *A History of Agriculture in South Australia* (2003) Government of South Australia <<http://www.pir.sa.gov.au/aghstory>>.

³⁷ See: *Soil Conservation Act 1938* (NSW); *Soil Conservation Act 1939* (SA); *Soils Conservation Act 1940* (Vic); *Soil and Land Conservation Act 1945* (WA); *Soil and Conservation Act 1951* (Qld), *Soil Conservation Act 1960* (ACT); *Soil and Land Utilisation Act 1970* (NT). The Standing Committee for Soil Conservation was formed in 1946 by the Commonwealth Government as the coordinating body on soil conservation and reported to the Australian Agricultural Council.

³⁸ Bradsen, above n 35.

³⁹ NSW Department of Environment and Heritage, *Gully Erosion* <<http://www.environment.nsw.gov.au/soildegradation/gullyerosion.htm>>.

⁴⁰ See C Love, *Evolution of Landcare in Australia: In the Context of Australian Government Natural Resource Management Policy and Programs* (Australian Landcare Council, 2013).

⁴¹ House of Representatives Standing Committee on Climate Change Environment and the Arts, 'Managing Australia's Biodiversity in a Changing Climate: The Way Forward' (House Hansard, Parliament of Australia, 2013).

⁴² See, eg, Australian Government, 'Green Paper on Developing Northern Australia' (Developing Northern Australia White Paper Taskforce, Department of Prime Minister and Cabinet, 2014); and Australian Government, 'Agricultural Competitiveness Issues Paper' (Canberra, February 2014).

⁴³ See, eg, Australian Government, *One Stop Shop for Environmental Approvals* Department of the Environment <<http://www.environment.gov.au/epbc/one-stop-shop>>; Australian Government, *Intergovernmental Agreement on*



Australia's current soil's governance system consists of: a mix of grant programs; bilateral agreements; legislation; policies and strategies; advocacy; and science-data-research systems. The mix reflects the 'federated' approach to NRM in Australia, which is a legacy of the 1930s and is supported by a voluntary basis of custodianship of natural resources. However, this is undermined by the lack of sufficient legal safeguards and by the dominant market-driven agenda of the commodification of natural resources that continues as a major driver of unsustainable land management. Based on the FAO definition of 'policies and strategies and the processes of decision making by nation states and local governments on how the soil is utilised',⁴⁴ Figure 1 (overpage) presents an overview of the main elements (with a few examples) constituting the current approach to soil governance in Australia. It can only be surmised that the cooperative federalism arrangements of these elements are assumed by governments (in their design) to tackle soil conservation and restoration. However, there appears a cooperative federalism 'dysfunction' occurring with soil governance in Australia. The following section will demonstrate this challenge through a discussion of a case in the Liverpool Plains of NSW.

The Liverpool Plains, Australia

The Liverpool Plains is situated in the northwest of NSW and is commonly referred to as the nation's food bowl, producing 37 per cent of Australian cereal crops from a relatively small area of 1.2 million hectares. Apart from its abundant agricultural production, the area has significant water⁴⁵ and biodiversity assets.⁴⁶

Despite being known for these nationally significant agricultural, biodiversity and water assets, the Liverpool Plains is currently a battleground of multiple coal mining and coal seam gas extraction interests,⁴⁷ with rural communities⁴⁸ contributing considerable efforts in attempts to protect and give a voice to these valuable environmental, economic and cultural assets. The Australian Centre for Agriculture and Law at the University of New England has been researching the 'next generation of rural landscape governance in Australia' since 2011, with the Liverpool Plains as one of the research case studies. Initial institutional analysis with regional stakeholders identified transaction costs and social justice issues associated with the mining versus agriculture landuse conflict. Further qualitative research undertaken between 2012 and 2014 informs the following case study discussion.



Figure 2: Liverpool Plains, NSW

(Source: Liverpool Plains Shire Council 2014 <http://www.visitquirindi.com.au/>)

National Drought Reform Department of Agriculture < <http://www.agriculture.gov.au/ag-farm-food/drought/drought-policy/drought-program-reform/iga-national-drought-program-reform>>.

⁴⁴ Food and Agriculture Organisation of the United Nations, 'Soils Policy and Soil governance' (2014) <<http://www.fao.org/soils-portal/soil-policies-and-governance/en/>>.

⁴⁵ See Schlumberger Water Services (Australia) Pty Ltd, 'Namoi Catchment Water Study Independent Expert Final Study Report' (no 50371/P4-R2 final, Department of Trade and Investment, Regional Infrastructure and Services, July 2012). Despite many water studies, knowledge of the link between surface and groundwater is limited.

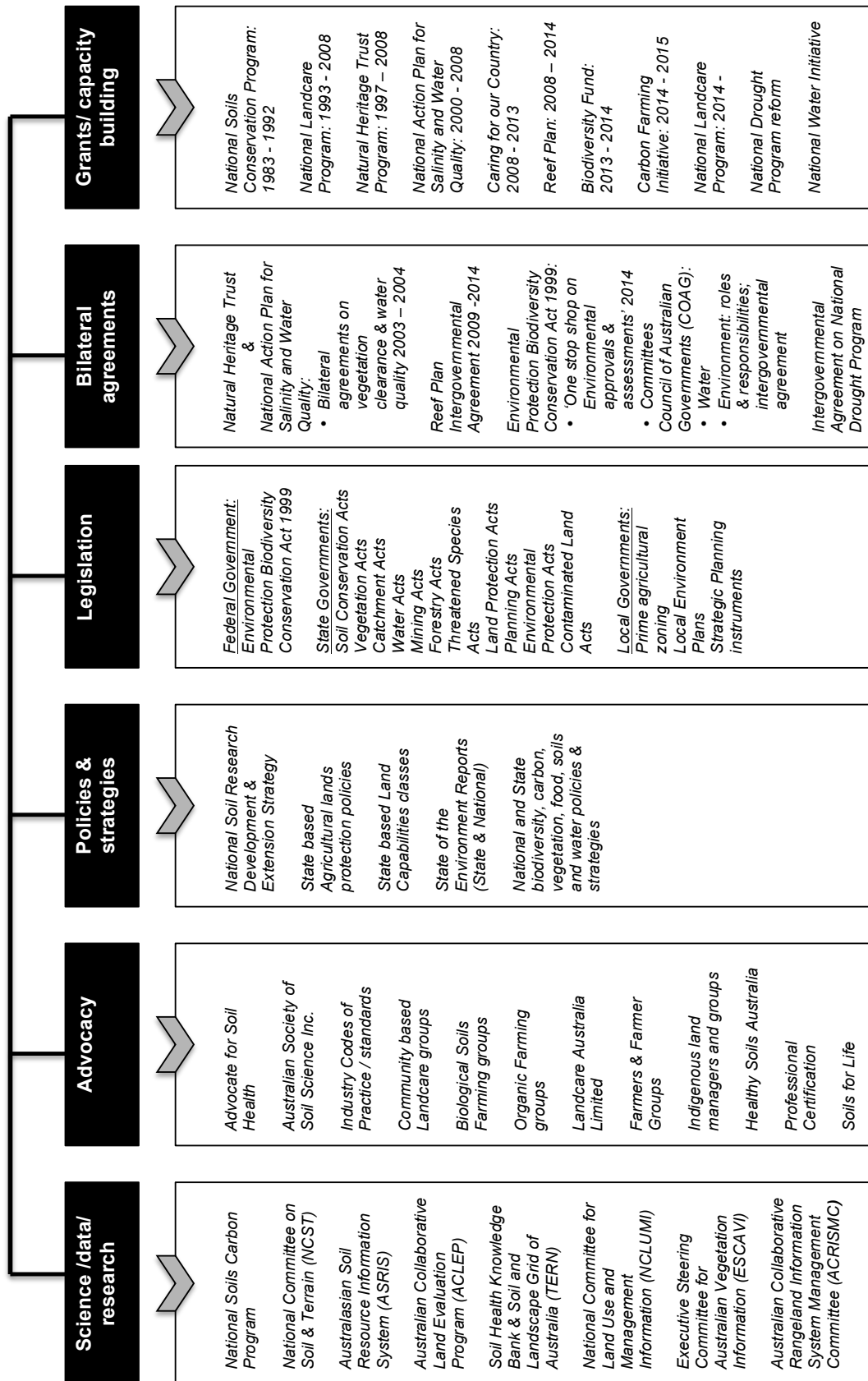
⁴⁶ See EcoLogical Australia, 'Biodiversity Strategy Liverpool Plains' (no 09COFNRM-0005, Liverpool Plains Shire Council, 19 March 2010).

⁴⁷ See the extent of the mining and gas interests via exploration licences in the Liverpool Plains at <<http://ccag.org.au/wp-content/uploads/2009/06/petroleum%20and%20coal%20leases.jpg>>.

⁴⁸ See Maules Creek Community Council <<http://www.maulescreek.org/>>; SOS Liverpool Plains <<http://ccag.org.au/uncategorized/sos-liverpool-plains/>>.



Figure 1: Overview of Soils Governance in Australia



The suite of soil governance elements at play

The means for this land-use conflict to be negotiated is through a suite of soil governance elements as presented in Figure 1. As discussed earlier, the lack of a coordinated approach to data management leaves much of the natural resource base under-defined, mapped, categorised and understood. In the case of the Liverpool Plains agriculture versus mining landuse conflict, the science is largely driven through the legal planning processes that demand a market-driven approach through an Environmental Impact Statement (EIS), with short time frames and limited legal standing provisions (despite the formation of the statutory based Planning Assessment Commission (PAC) in 2008). Alternative science is often contracted by landholders in the region (at great expense) in an attempt to balance the scientific debate:

So, I suppose from an irrigators perspective we think we're fairly closely monitored with monitoring bores which are throughout the area and when we have a consultant that says, 'This is what I would've done if I'd been trying to work out a figure for that, not just got a conceptual model', and then, you know, like as an irrigator you go, 'Well, why didn't they do that?' and we - you know - we put that in our submission and the PAC looked at it and then eventually went, well, the model - the miner's model's a conceptual model and we'll just believe that.⁴⁹

The advocacy groups involved in this case study region are diverse. Collaborations are from unlikely sectors, including peak farming lobby groups, Aboriginal Land Councils, Industry groups, community based non-government organisations, faith-based groups and environmental organisations. The style and type of advocacy appear to be determined by the planning and mining law processes, which are largely adversarial with the law supporting the high-consuming users of the region's natural resources.⁵⁰ The various policies and strategies that are relevant in this case study region include:

- The *NSW Strategic Regional Landuse Policy* ('*SRLUP*'), implemented in September 2012 and consisting of a package of reforms, such as Strategic Landuse Plans for two regions, the Aquifer Interference Policy, The Gateway Process and new Codes of Practice for the Coal Seam Gas Industry;
- NSW Biophysical Strategic Agricultural Lands (BSAL), which is land identified as having high quality soil and water resources capable of sustaining high levels of productivity was finally mapped across NSW and integrated into legislation in January 2014; and
- The *NSW State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007* ('*Mining SEPP*').

The Gateway Process of the *SRLUP* adds another layer of assessment in the approval process rather than prohibiting a proponent from lodging a development application on lands mapped as strategic agricultural lands. Legislation utilised and triggered by the *SRLUP* include: the *Environment Protection Biodiversity Conservation Act 1999 (Cth)* ('*EPBC*'); *Mining Act 1992 (NSW)*; *Water Management (General) Regulation 2011 (NSW)*; *Petroleum (Onshore) Act 1991 (NSW)*; and the *Environmental Planning and Assessment Act 1979 (NSW)*. The bilateral agreements that have relevance include the 'EPBC One Stop Shop on Environmental Approvals and Assessments 2014', which transfers national powers on matters of national significance to the NSW Government and the Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development (IESC). The Australian Government established the Committee in 2012 under the *EPBC* in response to community concern about coal seam gas and coal mining. The NSW Government agreed to a further bilateral agreement - being the National Partnership Agreement on Coal Seam Gas and Large Coal Mining Development - with a specific 'Referral Protocol'⁵¹ in relation to engaging with the IESC.

Note that the NSW State Government, apart from being the legislator for natural resource protection, also benefits from the windfall of mining royalties for the state. Grants and capacity building relevant in the Liverpool Plains includes many decades of predominantly private landholder and public investment in biodiversity, agricultural and water assets, including many of the grants and programs listed in Figure 1.

The current dysfunctional system of Australian federalism can be exemplified in the proposed BHP Carooona Coal Project⁵² within the Liverpool Plains, which has the potential to be the largest coalmine in the world. The

⁴⁹ Quote from Liverpool Plains stakeholder. Interview conducted by the author in 2014.

⁵⁰ B Preston, *Internalising Ecocentrism in Environmental Law* (2011) Griffith University <http://www.lec.justice.nsw.gov.au/agdbasev7wr/_assets/lec/m4203011721754/preston_internalising%20ecocentrism%20in%20environmental%20law.pdf>.

⁵¹ Australian Government and NSW Government, *National Partnership Agreement on Coal Seam Gas and Large Coal Mining Development NSW Referral Protocol* (Planning NSW, 2013).

⁵² See, for more details: Coal Mines Australia Pty Ltd (BHP Billiton), 'Notice of a Mining Gateway Application' *The Northern Daily Leader*, 11 February 2014 (classifieds) <http://www.bhpbilliton.com/home/society/regulatory/Documents/_coal/nswec/carooona/140430_coal_nswec_carooona_CarooonaLocalNewspaperAdvertisements11Feb2014.pdf>.



following discussion will present how the interactions of science, advocacy, policies, strategies, legislation, bilateral agreements and government programs are perpetuating unsustainable outcomes by the lack of protection of high quality agricultural soils of the Liverpool Plains and the very rural communities who manage these soils. The environmental approvals process has recently begun for the Carooona Coal Project with a test of the much-criticised 'Gateway'⁵³ process of the NSW *SRLUP*. Such detailed consideration through the gateway process is only possible if land that is subject to a proposed development falls under the zoning of BSAL as determined by mapping undertaken by the NSW Government.⁵⁴ Areas proposed by the Carooona Coal project fall under the BSAL criteria and, hence, became subject to the Gateway Process.

In April 2014, the IESC was requested by the NSW Mining and Petroleum Gateway Panel to provide advice on the Carooona Coal Project. The IESC's advice to the decision maker on the Carooona Coal Project in May 2014⁵⁵ identified the lack of information provided by the applicant to the IESC to enable a 'robust' assessment of impacts on water resources. The lack of adequate information and evidence provided by the applicant resulted in consistent concerns raised about the uncertainty of the impacts on groundwater, groundwater dependent ecosystems, subsidence, surface water, ecological assets and water infrastructure, to name a few. The very brief document refers to 'uncertain' eight times and to the lack of 'evidence' four times. Especially concerning is the lack of data, monitoring programs and deficient modelling presented; evidence of the science hubris and insufficient legal safeguards⁵⁶ that dominate the current natural resource governance regimes in Australia.

Further, the July 2014 report to the decision-maker by the Mining and Petroleum Gateway Panel to accompany a 'Conditional Gateway Certificate for the Carooona Coal Project'⁵⁷ found that the application did not meet all of the relevant criteria:

The lack of site-specific data and analysis of the likely behaviour of the surface overlying the long wall panels provided by the Applicant is a hindrance to the Panel's assessment and level of certainty with respect to mining impacts related on BSAL within and adjoining the PAA (Project Boundary Area).

The panel also raised concerns about: impacts to highly productive aquifers and the cumulative impacts that have not been considered; the direct and significant impacts on agricultural productivity of BSAL within and adjacent to the project area; and the potentially significant indirect impacts on groundwater. Insufficient information was provided by the proponent to enable the Panel to be confident in the applicant's predictions.

Nevertheless, the Panel issued a Conditional Gateway Certificate. This is because they are only vested with the ability to either issue a certificate with conditions, or without. Despite claims by the NSW Government that the Carooona Coal project process still has a way to go through to a full development application, both the partnership agreement and Gateway only provide processes to inform the regulator who, ultimately, makes the decision. The diverse stakeholders of the Liverpool Plains, who are opposed to mining in these high valued agricultural and biodiverse landscapes, now find themselves vindicated by two independent reports. Yet both levels of Government remain entrenched in dysfunctional federalism, lacking leadership in adequately protecting vital agro-ecological zones in Australia (and the communities that underpin them) that are ultimately national and internationally important food systems.

French⁵⁸ warned of such dangers of a potential unitary federation in Australia due to a complex and dysfunctional federalism, which could lead to greater centralisation, less accountability and perverse implications for local communities. The Australian Government Minister for Agriculture claimed, in relation to the Carooona Coal Project Gateway outcome, 'I can't do anything about it, it's the role of the state

⁵³ If land has been mapped as biophysical strategic agricultural land (BSAL), then any proposal will be subjected to an additional level of scrutiny via a gateway process that includes an independent, upfront and scientific assessment of the land and water impacts of the proposal undertaken by an independent panel of scientific experts before a development application can be lodged. However, the expert panel only has powers to approve an application with conditions or without conditions.

⁵⁴ For details on the site verification for BSAL, see the interim protocol at http://www.planning.nsw.gov.au/Portals/0/StrategicPlanning/interim_bsal_protocol.pdf.

⁵⁵ Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development, *Advice to Decision Maker on Coal Mining Project IESC 2014-047 Carooona Coal Project - New Development* (IESC Canberra, 2014).

⁵⁶ Paul Martin and Jacqueline Williams, 'Science Hubris and Insufficient Safeguards' (2014) 31(4) *Environmental and Planning Law Journal*.

⁵⁷ NSW Government Mining and Petroleum Gateway Panel, 'Report by the Mining & Petroleum Gateway Panel to Accompany a Conditional Gateway Certificate for the Carooona Coal Project' (2014).

⁵⁸ Robert French, 'The Future of Federalism the Incredible Shrinking Federation Voyage to a Singular State' (2008) (17) *Federal Judicial Scholarship*.



government'⁵⁹ signifying the failure of the current cooperative federalism for the protection of Australian soil resources. Australia has examples where governments on the national and state/territory levels have worked in more functional cooperative federalism arrangements for natural resource protection, such as in the cases of: the Murray Darling basin;⁶⁰ forest conservation in the Regional Forest Agreements (RFA);⁶¹ the clearing of native vegetation on private property;⁶² and the regulation of fisheries zones.⁶³ While there have been some criticisms of these processes, they do provide evidence of where industries have been regulated with 'no go zones' in the interests of the nation to ensure public good natural resources are protected. For the protection of soil, the question needs to be asked: Why are not there 'no go zones' for mining? What is ironic in the Liverpool Plains is the clearing of forests for mining development that were banned from logging through the RFA process in the 1990s and set aside for conservation purposes.⁶⁴ Such contradictory government policies have undermined private landholder conservation efforts (the actual intention of many Government programs and strategies such as Caring for Our Country and the National Landcare Program to protect soils, biodiversity and water quality).

Social justice

'We're going to get our 30 days, we're community members, you know, we're going to be landed with a document that's probably 4000 pages, that's social injustice, I think'.⁶⁵ The current dysfunctional federalism in Australia is passing the costs and burdens to the very communities who are the soils custodians, providing food and managing the landscape on behalf of all Australians. The transactions costs identified by communities in participating in these processes are enormous and destructive.⁶⁶ Governments were once responsible for providing the science and certainty. Now, in an apparent cost shifting exercise, they obtain the science from development application processes. Development application processes often use conceptual models. Can such models really be classified as science?⁶⁷ How can the current system be a fair, balanced, sustainable and transparent system? The Caroon Coal project exemplifies how science 'shopping' by developers, in the absence of adequate baseline data, can push through developments that would be questionable in other circumstances. Changes in legislation⁶⁸ have resulted in responses to community concerns being supported by the courts, thus entrenching the marginalising pattern. It could be only a matter of time before the international community starts questioning Australian governments in relation to violations of international obligations.⁶⁹ 'There's a key word missing in ... governance at the moment; it's integrity'.⁷⁰

A way forward

The Liverpool Plains case study exemplifies the urgent need to operationalise sustainability into policy and law practice.⁷¹ The Gateway Process in the Caroon Coal project demonstrates how policy and planning does not operationalise our international obligations to the precautionary principle and to sustainable development. The issues of social and environmental justice are apparent because the current shift of power sees the burden of proof not with the developer (exploiter of the resource) but the protector of the resource: 'If a coal seam

⁵⁹ Peter Hannam, 'BHP's Caroon Coal Mine Fails Gateway Test', *Sydney Morning Herald* (Sydney), 11 July 2014, <<http://www.smh.com.au/environment/water-issues/bhps-caroon-coal-mine-fails-gateway-tests-20140711-zt47v.html>>.

⁶⁰ See, eg, The National Water Initiative in 2004 (<http://www.nwc.gov.au/nwi>) and the *Water Act 2007* (Cth) and subsequent amendments in 2008 <<http://www.mdba.gov.au/about-mdba/governance/the-water-act>>.

⁶¹ See the Joint ANZECC and MCFFA National Forest Policy Statement Implementation Sub-committee, *Nationally Agreed Criteria for the Establishment of a Comprehensive Adequate and Representative Reserve System for Forests in Australia* (1997) (<http://www.forestry.gov.au/nfps.htm>).

⁶² See *Indicator: BD-17 Institutional Response to Loss of Native Vegetation* in R J S Beeton et al, 'Australia State of the Environment 2006' (Independent Report to the Australian Government Minister for the Environment and Heritage, Australian State of the Environment Committee, Department of the Environment, 2006).

⁶³ See Reef Plan and Greater Barrier Reef Marine Park <<http://www.reefplan.qld.gov.au/about.aspx>; <http://www.gbrmpa.gov.au/>>.

⁶⁴ Stakeholder interviews, above n 49.

⁶⁵ Ibid.

⁶⁶ Ibid.

⁶⁷ Martin and Williams, above n 56.

⁶⁸ See, eg, *Bulga NSW case*, where, after the judgement in favour of the community in the Land and Environment Court NSW, the Mining State Environment Planning Policy ('*Mining SEPP*') was amended to place economic interests higher than social or environmental; also, the NSW PAC hearings, which take away the rights of review.

⁶⁹ For example Australia's obligations to the *Rio Declaration 1992*; *Convention on Biological Diversity 1992*; *Ramsar Convention*; *World Heritage Agreements*.

⁷⁰ Stakeholder interviews, above n 49.

⁷¹ Preston, above n 50.



gas company or a mining company impacts on my aquifer, the burden of proof rests with me so that must change first and foremost'.⁷²

Reforms in forestry, water, native vegetation and fisheries in Australia since the 1990s only occurred because of ongoing community and industry concerns about environmental management, natural resource commons and resource security and a responsive government (particularly at the federal level), who, through a functional approach to cooperative federalism, used effective bilateral agreements, grants/programs, adequate science and natural resource law and policy reforms. To support, recognise and protect Australian rural and remote communities and the soil resources they steward, the definition of 'sustainable agriculture' in Australia in the 21st Century needs to be revisited: it needs to reflect sustainable food, fibre and the very ecosystems and human communities that underpin these services. The last attempts to define sustainable agriculture for Australia was in 1997⁷³ and 1998,⁷⁴ which failed to operationalise sustainable agriculture and recognise sustainable land managers and their communities. A suggestion recently in Parliament⁷⁵ to explore a Landcare certification system has merit because this could provide recognition⁷⁶ at the farm gate and along the value chain of ecosystem farming approaches that have benefits for all Australians.

Figure 1 attempts to illustrate the elements at play in soil governance in Australia and the many examples currently utilised to navigate and negotiate sustainable soils outcomes. However, the results are concerning, particularly in the new forms of landuse conflict, such as mining versus agriculture - as the case study highlighted. How might these elements be harmonised and coordinated so that the self-interest of states and territories do not override matters of public interest? A starting point would be to initiate a major national reform for the protection of soils in Australia modeled on the RFA process of the 1990s. A moratorium on mining activities is required in the public interest, again based on the same principles - such moratoriums were imposed on other industry sectors such as forestry and farming in the 1990s and 2000s - until a comprehensive, adequate and representative study is undertaken to determine the national soils resources required to be set aside from inappropriate landuses. For a consistent national approach, the Australian Government needs to take leadership through COAG and create incentives and collaborations to ensure consistency and harmonisation in the various elements of soil governance in Australia. Such an approach needs to be equitable, participative, resourced and transparent, with the intention of creating a permanent nationally consistent zoning system for the protection of soils in Australia, and fairer more equitable environmental law systems that address the many social justice and equity issues facing our rural communities where the burden of proof is wrongly imposed on the protectors of the country's natural resources.

⁷² Stakeholder interviews, above n 49.

⁷³ See *Natural Heritage Trust of Australia Act 1997* pt 3, s 16 of (Cth meaning of sustainable agriculture).

⁷⁴ See Standing Committee on Agriculture and Resource Management *Sustainable Agriculture: Assessing Australia's Recent Performance* (CSIRO Publishing, 1998).

⁷⁵ Bruce Scott, *Constituency Statements* (25 June 2014) Export House of Representatives Debate <<http://www.openaustralia.org.au/debates/?id=2014-06-25.152.1>>.

⁷⁶ See J Williams and P Martin, *Defending the Social Licence of Farming: Issues, Challenges and New Directions for Agriculture* (CSIRO, 2011).

