Recent Initiatives for Biodiversity Conservation on Privately Tenured Rural Land: An Introductory Survey and Discussion

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Abstract

In Australia, and across the world, there is growing interest in protecting biodiversity on privately tenured rural land. New design frameworks and new funding models, including market-driven opportunities, are being actively pursued by Australian governments at all levels. Recent critiques have exposed a number of design flaws in some of these programs. This makes it timely to consider alternative models, both national and international, with a view to ascertaining what lessons, if any, Australia can learn from these examples. In pursuit of this objective, this article describes and comments on some alternative models for securing land for biodiversity conservation on privately tenured rural land in Australia and overseas. We survey three different schemes in Australia and briefly describe a variety of schemes in five overseas jurisdictions. These schemes were selected because they include some approaches that are different from those in the Australian case studies. Overall, we found that whilst Australia has made some strides towards expanding the range and type of programs available to secure biodiversity conservation on privately held rural land, there are more options and some promising approaches with which Australia is yet to engage. Overseas jurisdictions can provide valuable insights and additional ideas.

Keywords: biodiversity conservation, nature-based solutions, rural land, private tenures, funding schemes

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Introduction

Biodiversity conservation initiatives are on the move. In the past, declaring, protecting and managing a dedicated system of national parks and reserves was, for the most part, accepted as a routine budget item for responsible governments (Bradsen, 1994; Bates, 2019; DAWE, 2022). In recent years, however, new sources of finance and new management models have leapt to centre stage. There is growing interest in protecting biodiversity on privately tenured rural land and continuing talk about developing market-driven opportunities to help finance initiatives in this area (Carbon Market Institute, 2017; Bates, 2019; Godden & Peel, 2019; Australian Farm Institute, 2021).

At the same time as new funding opportunities are being explored, the rationale for biodiversity conservation is also expanding. The International Union for Conservation of Nature (IUCN), for example, advocates for 'Nature-based Solutions' which value the conservation of ecosystems and biodiversity not simply as ends in themselves, but

as a means of addressing a number of related and connected sustainability issues (IUCN, 2022). Nature-based Solutions "use the power of functioning ecosystems as infrastructure to provide natural services to benefit society and the environment" (IUCN, 2022). Nature-based Solutions recognise and promote the role healthy ecosystems play in addressing issues as varied as deteriorating agricultural productivity, biodiversity loss, the mental health crisis and the challenge of climate change (Seddon et al., 2020, 2021; IUCN, 2022). This re-positioning of nature conservation brings biodiversity and ecosystems management programs centre stage to debates about resilience, sustainability and climate change (Portner et al., 2021; IPBES, 2022; IUCN, 2022).

This article describes and discusses some recent initiatives aimed at securing biodiversity conservation on privately tenured rural land within Australia and overseas. First, we describe three schemes in Australia which represent a good sample – albeit not the entirety – of recent initiatives. Among other things, they demonstrate an ongoing shift in funding models. We evaluate some of the advantages and disadvantages of that shift. Second, we briefly describe some different schemes and programs in five overseas jurisdictions. Again, there is no attempt to be comprehensive. Our goal is to highlight some alternative approaches that may be of interest to Australian readers and to indicate additional resources that cover these schemes in more detail. We recognise that the Australian situation – environmentally, legally and politically – is different from those of the selected countries, but this does not mean they have no lessons for us. Some potentially relevant lessons are identified in the Discussion.

Biodiversity Conservation in Australia – the Context

Biodiversity decline is a common outcome of humans' transformation of landscapes to support their food and fibre production, infrastructure, mining, lifestyles and urban settlements (IPBES, 2022). There is increasing evidence, however, that biodiversity loss is detrimental to ecosystem services – such as clean air and water, nutrient and water recycling, and climate stability – and it reduces our resilience to extreme weather events (IUCN, 2022; IPBES, 2022). The gravity of this dilemma was recognised by the international community when it adopted the Convention on Biological Diversity in 1993. Unfortunately, neither that measure nor those of individual nations since then have been able to prevent continuing biodiversity decline. In 2022, the Intergovernmental Panel on Climate Change warned that ongoing global warming, including increases in the number and intensity of extreme natural events, will exacerbate the continuing loss of biodiversity (Portner et al., 2022). The IPCC assessment suggests that the conservation, protection and restoration of ecosystems, including forests, will require adaptive measures developed and implemented with local communities and Indigenous people involved (Portner et al., 2022). It asserts that safeguarding biodiversity is fundamental to climate-resilient development (Portner et al., 2022).

The value of biodiversity for Australia, its continuing decline and its causes have been well documented (Cocks, 1992; Department of the Environment, Sport and Territories, 1993; Creswell & Murphy, 2016). Australia is unique because of its mega biodiversity and globally significant ecosystems (Creswell & Murphy, 2016). Australia has 12 World Heritage Sites based on natural values. We have several global biodiversity hotspots (very biologically rich regions with heavy native vegetation losses) including south-west Western Australia, the temperate forests of eastern Australia and Queensland's tropical rain forests (Creswell & Murphy, 2016).

The Australian Government has long recognised the need to reduce the adverse environmental impacts of land use change (Hawke, 1989; COAG, 1999). From 1982 onwards, state governments enacted legislation to stem the rate of vegetation clearing for agricultural purposes (Bates, 2019). This approach often generated a hostile response from landholders (Productivity Commission, 2004). Over time, the strength of the regulatory requirements has waxed and waned in the hands of governments of different political persuasions (England, 2016; Bates, 2019). Overall, legislation has had some success at stemming the tide of land clearing, but our rates of biodiversity loss remain concerning (Department of Agriculture, Water and the Environment, 2016; Department of Climate Change, Energy, the Environment and Water, 2021).

Land use change contributes to the spread of pest animals and weeds, which are a major contributor to biodiversity (and economic) loss (Steffen, 2009; Department of Agriculture, Water and the Environment, 2016; Shepard, 2021). The vulnerability of Australia's biodiversity to the impacts of invasive species benefiting from climate change is likely to exceed the direct impacts of climate change (Steffen, 2009; Corey, 2021; Shepard, 2021). The connection between biodiversity loss and economic loss has been well known to landholders and governments for many years (Sindel, 2000).

The majority of Australian land is owned and managed by private interests or government entities, such as Defence, some of which may not be under the direct control of government (Australian Trade and Investment Commission, 2022). Indigenous Peoples (Aboriginal and Torres Strait Islanders) are a significant landholding group. As of 2020, 17% of Australia was Indigenous owned and 57% of Australian land was either owned, managed, co-managed or subject to special Indigenous rights (Jacobson et al., 2020). Some particular programs, such as the Indigenous Rangers Program and savanna burning projects financed by the Climate Solutions Fund, have been carefully crafted to meet the interests of these stakeholders and appear to be meeting with success (National Indigenous Australians Agency, 2022). Nevertheless, 55% of the Australian land mass is used for agriculture, so measures that are designed to sit alongside and operate specifically in the context of agricultural activities are also vitally important (ABARES, 2022). Agricultural landholders will continue to have a major impact on the success or failure of biodiversity conservation measures (Taylor, 2012; Bourke, 2012; Whitten, 2016). This article is focused on schemes which address this community in particular.

Schemes for Securing Biodiversity Conservation in Australia – Three Examples

In this section, we survey three recent initiatives by different Australian governments – Queensland, New South Wales (NSW) and the Commonwealth. The first two initiatives, the Queensland Private Protected Areas Program and the New South Wales Biodiversity Offsets Program, illustrate, among other things, different approaches to funding biodiversity initiatives. The New South Wales scheme is significantly more complex, so we have chosen to describe and explain the funding arrangements for this scheme in some detail. The third scheme we describe is the Commonwealth's Emissions Reduction Fund. Although this scheme is not primarily a scheme to promote biodiversity conservation, we show how it is evolving to include that goal in conjunction with reducing carbon emissions. The Commonwealth scheme is our biggest experiment to date with tapping into markets for environmental management services. For this reason, we felt the scheme was worthy of some analysis in this article.

Queensland's Private Protected Area Program

In Queensland, the government runs a Private Protected Area Program to complement its system of public protected areas. This program encourages private landholders to partner with the state to protect conservation values on their land (State of Queensland, 2020). The operative mechanism is through the declaration of a nature refuge or, more recently, a special wildlife reserve. These two categories of privately held protected area extend across 4.47 million hectares – approximately 31% of Queensland's total protected area network (State of Queensland, 2020, p. 6). With 534 nature refuges in place, Queensland's Nature Refuge Program is now the largest private protected area program in Australia (Bowman, 2020; State of Queensland, 2020). Another indicator of their significance is that 6% of Queensland's regional ecosystems are found only on nature refuges (State of Queensland, 2020, p. 6).

In Queensland, establishing a nature refuge is generally a government-led initiative limited to sites which meet one or more selection criteria such as providing habitat for threatened species or ecosystems or establishing landscape linkages and corridors at a landscape level (State of Queensland, 2022).

The Department of Environment and Science (DES) has primary responsibility for identifying suitable sites and inviting relevant landholders to voluntarily participate in the program. Some aspects of the program seem relatively onerous. For instance, landholders must be willing to place the selected land under a permanent conservation covenant and negotiate a conservation agreement

establishing a nature refuge in line with the relevant provisions of the *Nature Conservation Act 1992*. The conservation agreement will identify management actions the landholder must undertake to protect significant conservation values on the land (State of Queensland, 2021a).

There are two funding programs available to support nature refuges, but neither guarantees financial support to landholders. Under the Nature Assist Program, the Department may fund and manage contractors to complete identified conservation projects involving, for example, fencing to manage stock access; or constructing artificial watering points away from natural watercourses (State of Queensland, 2021a). Additionally, subject to available finance, landholders may apply for funding from the Nature Refuge Landholder Grants scheme to complete relevant projects themselves. Routine management actions, however, will not be funded by either scheme (State of Queensland, 2021b).

Despite their seemingly onerous nature, there is a growing level of interest in nature refuges: 57 new nature refuges, involving 479,190 hectares of land, have been declared since February 2015 (State of Queensland, 2020). Funding levels, however, do not seem to have matched their recent growth. A 2019 independent expert report, commissioned by a group of not-for-profit organisations, echoed concerns raised by landholders (Outback Alliance, 2019, pp. 3, 9):

> Funding for private protected areas is stretched to breaking point, with landholders receiving less than 25 cents per hectare over the past five years …
>
> The current level of support available to nature refuge landholders is insufficient to support landholders' efforts to effectively manage existing nature refuges or to provide an appropriate incentive for new entrants to the program. (Outback Alliance, 2019, pp. 3, 9)

The report recommended investing $24 million per year in new and existing private protected areas and drew attention to the New South Wales Government's budget allocation – of $247 million over four years – to support private landholders to protect and conserve natural values on their land (Outback Alliance, 2019). Encouragingly, in June 2022 the Queensland Government announced a $262.5 million investment program (over four years) to grow the state's network of national parks and protected areas (Department of Environment and Science, 2022). It remains unclear how much (if any) of this money will be directed towards delivering a better deal for landholders managing existing private protected areas.

NSW Biodiversity Offsets Program

In New South Wales, biodiversity stewardship agreements have been linked to the state's Biodiversity Offsets Scheme since 2016 (State of New South Wales (Department of Planning and Environment), 2022a). This scheme applies when new development projects will cause significant adverse environmental impacts despite preventive and mitigating measures (State of New South Wales (Department of Planning and Environment), 2022a). It requires developers to fund or provide environmental offsets to compensate for the residual adverse impacts caused by their development (State of New South Wales (Department of Planning, Industry and Environment), 2022b). Environmental offsets are any measures that generate conservation outcomes that are not otherwise secured (Bates, 2019). The specific goal of biodiversity offsets is "to achieve no net loss and preferably a net gain of biodiversity on the ground with respect to species composition, habitat structure, ecosystem function and people's use and cultural values associated with biodiversity" (Business and Biodiversity Offsets Program, 2009, p. 4).

In New South Wales, the *Biodiversity Conservation Act 2016* provides the current framework for linking developers, who have been approved to clear or develop land subject to offset conditions, with landholders, who are in a position to provide for and maintain environmental values in accordance with a Biodiversity Stewardship Agreement (Bates, 2019; State of New South Wales (Biodiversity Conservation Trust), 2022a). Similar to a nature refuge conservation agreement in Queensland, a Biodiversity Stewardship Agreement (BSA) is a voluntary agreement between the Biodiversity Conservation Trust and a landholder to permanently protect and manage an area of land (State of New South Wales (Biodiversity Conservation Trust), 2022a). However, unlike their Queensland counterparts, a biodiversity stewardship agreement

generates biodiversity credits which may be sold to a developer, the Biodiversity Conservation Trust or other interested parties (State of New South Wales (Biodiversity Conservation Trust), 2022a).

The Biodiversity Offsets Scheme embraces some complex terminology but operates generally in this way. Approvals for clearing or developing land are routinely granted by statutory planning authorities subject to conditions. If the approved clearing or development will cause significant environmental impacts which cannot be avoided or adequately mitigated, the developer will be required to provide an offset to compensate for those impacts (Bates, 2019; State of New South Wales (Department of Planning and Environment), 2022b). This obligation takes the form of a credit obligation which must be retired before the activity can commence (State of New South Wales (Department of Planning and Environment), 2022b). One way developers can retire their credit obligation is by purchasing biodiversity credits from landholders who have a Biodiversity Stewardship Agreement in place on their land (State of New South Wales (Department of Planning and Environment), 2022b; Bates, 2019). A Biodiversity Stewardship Agreement (BSA) is a contract made between a landholder and the Biodiversity Conservation Trust (the Trust) which is the statutory body appointed to administer the Biodiversity Offsets Scheme (State of New South Wales (Biodiversity Conservation Trust), 2022b). To obtain a BSA, landholders must offer land – a Biodiversity Stewardship Site – which meets the eligibility criteria (State of New South Wales (Department of Planning and Environment), 2022c). Landholders will need to retain an accredited assessor to apply the Biodiversity Assessment Method to the site (State of New South Wales (Department of Planning and Environment), 2022c). The assessor will produce a Biodiversity Stewardship Site Assessment Report identifying the type and number of biodiversity credits that will be generated by placing a BSA on the site (Bates, 2019; State of New South Wales (Department of Planning and Environment), 2022c). It will also identify and cost annual maintenance activities over a 20-year period. These costs constitute the Total Fund Deposit (State of New South Wales (Department of Planning and Environment), 2022c).

Once the BSA is formalised, the agreement and credits will be registered, including on the title to land (State of New South Wales (Department of Planning and Environment), 2022c). Landholders can then sell their biodiversity credits either to the Trust (for on-selling to developers); directly to a developer who will use those credits to retire its credit obligations; or to any other interested purchaser – e.g. government bodies or philanthropic organisations (State of New South Wales (Department of Planning and Environment), 2022c). The developer and landholder are free to negotiate a price, but it must at least cover the cost of the Total Fund Deposit (State of New South Wales (Department of Planning and Environment), 2022c). When the biodiversity credits are sold, a landholder must transfer the Total Fund Deposit to the Trust's Stewardship Payments Fund. The Trust will then make an annual payment to the landholder to maintain the Biodiversity Stewardship Site in accordance with the management plan (State of New South Wales (Department of Planning and Environment), 2022c).

Although the Biodiversity Offsets Scheme is organised around a marketplace that directly links buyers (developers with credit obligations) and sellers (landholders in possession of biodiversity credits), the Biodiversity Conservation Trust, a publicly funded statutory body, also has a crucial role to play. For instance, it enters into BSAs with landholders; it manages the Biodiversity Stewardship Payments Fund from which landholders receive their annual management payments; and it ensures landholders are complying with their management commitments (State of New South Wales (Biodiversity Conservation Trust), 2022a). The Trust is charged with ensuring a steady supply of biodiversity credits is available to developers (State of New South Wales (Biodiversity Conservation Trust), 2022a). It is subject to the control and direction of the Minister for Energy and Environment, except in relation to payments from the Biodiversity Conservation Trust Public Fund (State of New South Wales (Biodiversity Conservation Trust), 2022b).

The original NSW Biodiversity Offsets Scheme was revised in 2016 and this seems to have led to a reinvigorated program. Up to July 2014, only 29 bio-banking agreements (previous scheme terminology) had been approved and 5000 hectares of native vegetation set aside (Bates, 2016). As of 2022, over 195,000 hectares of land are protected

by private land conservation agreements, including BSAs, and 368 landholders have signed or are in the process of signing conservation agreements (State of New South Wales (Biodiversity Conservation Trust), 2022c).

Aside from the Biodiversity Offsets Scheme, the Trust delivers additional conservation programs on private land in accordance with the NSW Biodiversity Conservation Investment Strategy 2018 (State of New South Wales (Biodiversity Conservation Trust), 2022d). A budget of $350 million (over a five-year period) has been allocated to the Trust's private land conservation programs (State of New South Wales (Biodiversity Conservation Trust), 2022d).

The NSW Biodiversity Offsets Scheme is a proactive and relatively well-funded initiative that supports not only the establishment of permanent reserves on privately held land but also the ongoing provision of finance, support and monitoring in relation to their maintenance and upkeep – in contrast to the Queensland Protected Areas Program. The scheme also benefits from the support of a dedicated statutory agency driving the program. Nevertheless, a recent review of the scheme's effectiveness identified a number of unresolved flaws in the scheme (NSW Auditor-General, 2022). In particular:

- there is no clear strategy to ensure its work is consistent with the *Biodiversity Conservation Act 2016*;
- there is a shortage of available biodiversity credits, and those that are available are poorly matched to growing demand; and
- key concerns around the scheme's integrity, transparency and sustainability remain unresolved (NSW Auditor-General, 2022).

Overall, the report concludes: "[T]here is a risk that biodiversity gains made through the Scheme will not be sufficient to offset losses resulting from the impacts of development, and that DPE [Department of Planning and Environment] will not be able to assess the Scheme's overall effectiveness" (NSW Auditor-General, 2022, p. 2).

Many of the weaknesses of the NSW scheme identified in the Auditor-General's report are mirrored in the academic literature on environmental offset schemes generally (Gibbons & Lindenmayer, 2007; Maron et al., 2012; Maron & Gordon, 2013; Norris, 2014; Falding, 2014; Bates, 2016; Dwyer, 2016). The timing, quality, comparability and reliable delivery of offsets are common issues that bedevil offset schemes (Falding, 2014; Norris 2014; Dwyer, 2016). There seem to be few examples of good environmental outcomes emanating from these schemes to date (Maron, 2012; Maron & Gordon, 2013). There is also the fear that developers (and decision makers) will resort to offsets too readily instead of insisting on costly mitigation measures or rejecting outright development that will cause unacceptably high environmental impacts (Gibbons & Lindenmayer, 2007). These concerns are mirrored at the international level: the 2021 IPBES-IPCC report found that only about one third of 12,983 cases in 37 countries demonstrably deliver 'no net loss' outcomes (Portner et al., 2012).

The Emissions Reduction Fund and Carbon + Biodiversity Pilot

The Emissions Reduction Fund is the main scheme for funding voluntary measures to reduce the nation's greenhouse gas emissions. In this scheme, proponents of eligible projects registered with the Clean Energy Regulator bid for funding from the government in quarterly auctions. Eligible projects must satisfy one of the approved methodologies for reducing emissions, including requirements about newness and regulatory additionality (Clean Energy Regulator, Commonwealth of Australia, 2020a). Contracts are awarded to proponents offering the lowest price for their emissions reductions (the 'reverse auction'). For each successful proponent, the government purchases Australian carbon credit units (ACCUs) and transfers them to the project proponent once the project is completed. The proponent may then choose to sell their ACCUs back to the government or in the secondary market (Clean Energy Regulator, Commonwealth of Australia, 2022b).

Although biodiversity protection is not the main focus of the Emissions Reduction Fund, some of the adopted methodologies seem to lend themselves to complementary biodiversity outcomes. For instance, eligible projects include: "environmental or mallee plantings; avoided clearing of native regrowth (subject to newness and additionality requirements); avoided deforestation; native forest from

managed regrowth; reforestation and afforestation. Agricultural projects are also eligible – including soil carbon and higher quality pasture for cattle – and so too are savannah fire management schemes" (Clean Energy Regulator, Commonwealth of Australia, 2022a). As of 2019, the Clean Energy Regulator had registered more than 780 projects and purchased over 192 million tonnes of abatement (Clean Energy Regulator, Commonwealth of Australia, 2020b).

Despite the apparent complementarity of sequestration and biodiversity objectives, concerns have been expressed that not all projects funded by the CSF/ERF have promoted biodiversity (Blakers & Considine, 2016; Reside et al., 2017; Corey et al., 2020; Standish & Prober, 2020). The priority afforded to carbon sequestration precludes a more holistic treatment (Reside et al., 2017). In a bigger debate, critiques have also been made regarding the overall integrity and actual emissions reductions attributable to the scheme (Commonwealth of Australia (Climate Change Authority), 2020; Crowe, 2020; MacIntosh, 2022; Hemming et al., 2022).

The Agriculture Biodiversity Stewardship package, a more recent initiative commenced by the previous government, includes funding for a Carbon + Biodiversity Pilot to strengthen the biodiversity credentials of the Emissions Reduction Fund. In this pilot project, farmers who undertake new vegetation plantings for carbon abatement will be eligible for additional payments if they plant a mix of species and manage the vegetation to realise biodiversity benefits in conjunction with carbon abatement (Department of Agriculture, Water and the Environment, 2022a). Other features to be developed and included within the Agriculture Biodiversity Stewardship Scheme are an Australian Farm Biodiversity Certification Scheme and a Biodiversity Trading Platform (Australian Farm Institute, 2020). Whilst the new program aims to reward farmers for delivering biodiversity outcomes, the linkage with, and dependence on, funding from the Climate Solutions Fund may continue to constrain the realisation of biodiversity goals. For instance, the Pilot project is focused on new environmental plantings with a mix of two or more species rather than on protecting and enhancing mature, ecologically complex vegetation already in existence (Department of Agriculture, Water and the Environment, 2022b). A similar scheme in Queensland, the Land Restoration Fund, has been criticised by industry groups as poor value for money (Moore, 2020).

Some Overseas Comparisons

Here, we describe some conservation initiatives in North America, the United Kingdom, the European Union, China and Costa Rica. The schemes under review include but are often not limited to securing land for biodiversity conservation. A comprehensive and detailed survey of measures in each of these jurisdictions is beyond the scope of this article. Rather, the authors have chosen here to select and briefly describe measures which suggest alternative or varied approaches to those in Australia. Our purpose is to encourage readers to think broadly about additional measures that could usefully supplement the range of mechanisms currently in operation in Australia.

North America

The United States (US) *Agriculture Improvement (Farm) Act of 2018* (with updated provisions in 2021) authorises several programs to address the conservation of biodiversity (see Title 11, Programs on Stewardship and Reserve, and Soil Health). These include: an Environmental Quality Incentives Program; a Conservation Stewardship Program; the Regional Conservation Partnership Program; the Conservation Reserve Program (CRP); the Working Lands for Wildlife Program (which targets conservation and enhancement of wildlife and endangered species habitat); the Agricultural Conservation Easement Program (which targets specific issues such as wetlands management); and the Conservation Technical Assistance Program (which provides private landowners and organisations with technical expertise to guide sound natural resource management decisions) (USDA, 2018). Funding for these programs, administered by the US Department of Agriculture (USDA), is substantial – approximately AU$10 billion per annum (USDA Natural Resources and Conservation Service, 2021a).

The Conservation Reserve Program is, in essence, a government land rental scheme which takes private land out of production through a reverse auction mechanism, thus removing from the market the goods that land would have produced

and paying instead for land restoration (Mandle et al., 2019; USDA Farm Service Agency, 2021). Contracts are for an initial period of 10 to 15 years with options to continue the annual payments. The bids to change land management are assessed against a set of criteria covering benefits to wildlife habitat, water quality and reduced erosion, run-off and leaching, and air quality benefits from reduced wind erosion, all of which are likely to endure beyond the contract period. Another subprogram covers Grassland Enrolment. Land can be offered for Continuous Enrolment at any time without competitive bidding. The USDA estimates the CRP has prevented over 8 billion tonnes of soil from eroding and restored 275,000 km of streams with riparian buffer strips (USDA Farm Service Agency, 2021). The US Government is aiming to increase the extent of the Conservation Reserve Program (CRP) from 24 million acres to 27 million acres (9.7 million ha to 12 million ha) by 2023 (USDA, 2018).

In the Regional Conservation Partnership Program (RCPP), activities must be undertaken as partnerships between stakeholders – including not-for-profit organisations, land trusts, landowners, and other groups who provide matching funds including in-kind services such as monitoring, conservation planning and producer assistance. RCPP projects address natural resource management at a landscape level (USDA, 2022b). This includes identifying and managing Critical Conservation Areas such as the Prairie Grasslands Region which extends across 11 states. Management measures address a range of issues including: degraded plant condition; excess water/flooding; inadequate habitat; and insufficient water/drought (USDA, 2022b).

Two examples demonstrate the scope of the RCPP. The American Prairie Reserve, based in Montana, connects 1.2 million hectares of public lands with purchases since 2004 of 175,000 hectares of private lands. The aim is to create a seamless and fully functioning ecosystem including wildlife corridors (American Prairie Foundation, 2021). The project was initiated after an assessment in 1999 by The Nature Conservancy of the need for eco-regional planning for the Northern Great Plains Steppe. A not-for-profit organisation, the American Prairie Foundation, was established in 2001. As of 2019, the Foundation holds assets worth US$101.3 million. Scientific support has been critical to the success of the Foundation, and it continues to benefit from the input of an 11-member Scientific Advisory Council.

The Saskatchewan Prairie Conservation Action Plan was established in 1998 (Saskatchewan Prairie Conservation Action Plan, 2021). It focuses on Native Prairie Education and Awareness, Responsible Land Use and Ecosystem Management. Since 2011, it has hosted workshops on restoration, reclamation and development, bringing together more than 1500 participants over six events. The Action Plan operates as a partnership of 31 Partners: multisector government agencies (Federal, Provincial, Local and Indigenous); industry; NGOs; and private agencies. Each Partner organisation has a representative that participates in the Steering Committee which meets three times per year. An Executive Committee, made up of the chair and four to five Partner representatives, has oversight of business and operational matters. A full-time manager, part-time Education Coordinator, Stewardship Coordinator and technical support maintain the organisation's communication and programming, operating out of the Saskatchewan Stock Growers' Association Office (Saskatchewan Prairie Conservation Action Plan, 2021).

United Kingdom

While the United Kingdom (UK) was a member state of the European Union (EU), its landowners received payments under a government Basic Payment Scheme and from EU-funded subsidies. These subsidies typically made up over 50% of farmers' incomes and, until recently, were not targeted at delivering ecosystem services. In the aftermath of Brexit, a new scheme is commencing. The *Agriculture Act 2020* provides the legislative framework for these changes (Tsouvalis & Little, 2020).

The new scheme will shift payments away from a per-hectare basis in favour of payments for producing and maintaining public goods – in this case, environmental services. Over the next seven years, 82,500 farmers will be engaged in environmental land management contracts. The process involves an initial mapping exercise identifying areas best suited for agriculture and those best suited for producing ecosystem services.

Payments from the scheme will operate on three tiers (Harris, 2020). Tier 1 will "encourage farmers to adopt environmentally sustainable farming and

forestry practices" (Harris, 2020). In this tier, farmers will "be paid for taking action rather than delivering outcomes" (Harris, 2020). Tier 2 will "encourage farmers, foresters and land managers with specialist knowledge, to deliver locally targeted environmental outcomes" (Harris, 2020). Payments will be made for specific "services such as tree planting, flood mitigation, habitat creation, restoration or management" (Harris, 2020). Tier 3 payments will be made to "farmers and land managers who undertake transformational landscape-scale projects" such as restoring major soil degradation (Harris, 2020).

In addition to this emerging new scheme, the government also funds farmers who wish to take part in the UK Countryside Stewardship Scheme. This scheme was established in 1991 and now covers 530,000 hectares at a per-annum cost of UK£52 million (ca. AU$94 million). The scheme aims at sustaining the beauty and diversity of the rural landscape and providing wildlife habitat. Participants are contracted over a 10-year period to deliver agreed land uses such as arable land conversion, maintaining grassland and making provision for wildlife habitat.

Somewhat analogous to the Australian Commonwealth's Climate Solutions Fund, the UK has also developed a system for reverse auction projects funded by private water companies (Peacock, 2017). In this scheme, farmers undertake agreed action to protect or improve the quality of the public water supply (Peacock, 2017). Because the outcomes are visible infrastructure or land management changes, the projects are easy to manage, and the success of the pilot projects suggests that more will follow (Peacock, 2017).

Underpinning many of these developments is the influential Dasgupta Review of 2021 (Dasgupta, 2021). This landmark report placed biodiversity at the core of economics and argued the economic case for an urgent response to biodiversity loss and decline. The British Government reacted positively to this analysis and, in response, embraced a general commitment to leave the environment in a better state than we find it and to ensure that collective demands on it are sustainable (Badenoch, 2021). It also announced a species abundance target and an increase in protected land and sea programs (Badenoch, 2021). It has adopted an ambitious Ten Point Plan for a green industrial revolution mobilising "£12 billion of government investment…. to create and support up to 250,000 highly skilled green jobs" across the UK (HM Government, 2020; Badenoch, 2021, p. 2).

European Union

Since 1962, rural communities in the EU have been subsidised through the Common Agricultural Policy (CAP), a scheme worth approximately 38% of the EU budget (about €54 billion per year since 2006). In the past, CAP subsidies often contributed to environmental damage with little broader social benefit beyond farming, but the scheme has evolved over time. Initially offering price support to increase production (Pillar 1), it now provides direct payments for keeping land out of production for at least five years (Pillar 2 payments) and support for securing environmental sustainability goals. Subsidies are being re-directed into support payments for farmers who implement environment and climate-friendly practices, as outlined in the UN Sustainable Development Goals 2030, the Green New Deal and Green COVID-19 recovery (Scown et al., 2019).

Less well known than the CAP is the EU's LIFE Program. This program started in 1992 and is the key funding instrument for nature conservation and biodiversity health in the EU. It leverages national and other co-funding. LIFE funds support another major EU initiative, Natura 2000. Since 1992, Natura 2000 has created a continent-wide ecological network of protected areas across 28 countries, protecting 1500 animal and plant species and 200 habitat types. Natura covers 28,000 sites across 1.35 million km^2, 18% of the EU's total land area. The LIFE program has funded strategic land purchases of more than 200,000 hectares and extended the area covered under land management agreements on private land (EU, 2020). The proposed budget for LIFE in 2021 is €5.4 billion per annum. The LIFE program claims to have demonstrated the social and economic benefits that nature provides and changed attitudes towards nature conservation within the EU citizenry (EC, 2022).

In addition to the LIFE program, in 2019 the EU instituted the European Green Deal (EC, 2022). This aims to preserve and restore Europe's natural capital in accordance with the EU Biodiversity Strategy for 2030. It receives funding from member

countries in the order of €20 billion per year. The goal is to extend legally protected areas in Europe to at least 30% of land area (134 million hectares) including trans-European ecological corridors.[a]

China

Over the past decade, China has embarked on a massive 'National Program to enhance environmental services and thereby create an Ecological Civilization' through a four-step program which entails:

(a) conducting a national ecosystem survey and assessment; mapping ecosystems and identifying crucial areas requiring ecosystem service provision;
(b) evaluating how to most effectively secure the required ecosystem services; and
(c) translating all this into practical and effective policies, including:
  – zoning by ecological functions;
  – developing compensation method(s) for ecological services provision, including novel systems of payments for ecological services (PES) on a large scale;
  – implementing ecological restoration methods;
  – establishing a sustainable supply of ecosystem services as a national goal; and
  – developing Gross Ecosystem Product (GEP) accounting.

The adopted approach first identified the ecological problem and relevant land restoration science and then assessed and developed ways to provide the required ecosystem services (Ouyang et al., 2016; Ouyang et al., 2019). The aim is to make the provision of ecosystem services a major component of environmental management with policies and financial mechanisms to back this up (Boer et al., 2020).

During the initial data collection phase, information was assembled on food production, carbon sequestration, soil retention, sandstorm prevention, water retention, flood mitigation, and habitat for biodiversity. Sixty-three Key Ecological Function Zones (KEFZs) were identified, covering 4.74 million km^2. These zones provide 60–80% of the major ecosystem services. The exercise also provided the basis for Ecological Asset Accounting and natural capital assessment for Eco-compensation.

Ecological compensation policies were enacted to help communities transition towards new livelihoods and to promote land conservation. Transfer payments amounted to US$43 billion by 2019, with $US9 billion distributed across 700 counties in 2017. The amount received by individual farmers is determined at the local level. The funds support national nature reserves and national park planning, ecological restoration projects and recruitment, training and salaries of rangers to protect KEFZs, as well as pollution reduction and mitigation measures.

The Sloping Land Conversion Program was established to control soil erosion and dust storms by taking vulnerable land out of grain production and converting it to horticulture and forestry, tree and grassland production. The scheme is one of the largest PES programs in the world, with the participation of 124 million farmers and, by 2013, reforestation of 31.8 million hectares of vulnerable land. The outcomes are mixed, suggesting that some ecological states of natural capital may not be restorable. Nevertheless, the claimed benefits are: a decline in soil erosion and surface run-off by 30%; a 22% reduction in siltation in the Yangtze and Yellow River Basins; and a reduction in dust storms and in wind speeds at the soil surface (Ouyang et al., 2019).

Costa Rica

On the international stage, a 'debt for nature swap' involves developed country institutions forgiving commercial or bilateral debt held by developing countries on condition an equivalent amount of some or all of that value is made available within the developing country for use in environment rehabilitation projects as long-term bonds or a specific fiscal budgetary item. Debt for nature swaps first commenced in 1988 (UNDP, 2017) and have been used more extensively in Costa Rica than in any other country.

[a] By way of comparison, the Queensland Rangeland area covers approximately 150 million hectares.

Until the 1990s, Costa Rica was known both for its outstanding biodiversity and record high deforestation rate. From that time onwards, recognition of the intrinsic value of its natural capital has led to an ambitious and novel system of payments for environmental services (PES) based on debt for nature swaps. The focus is twofold: on improving and expanding the National Parks system; and on incentivising 200 private conservation reserves with payments for environmental services. There is a focus on forest protection, commercial reforestation, agroforestry, and regeneration in degraded areas. The basic payment for forest protection is US$64/ha/year over a 5-year period, with indigenous communities making up 10% of the beneficiaries. Net reforestation is now occurring, with 27% of the land area under protected status and a further 20% (over 1 million hectares) placed under PES programs which incentivise conservation.

Over the last 30 years, the scheme has reversed deforestation in Costa Rica. The nation now has more than 50% of its land under some sort of forest cover, up from less than 30% when the policies around land use changed in the late 1980s. The PES schemes have evolved over time, along with a significant cultural change. While the complementary programs have secured the environment, they are also noticeable for improving the livelihoods of rural and indigenous peoples (Quesda, 2019).

Costa Rica has led the way in governmental recognition of the need to halt deforestation. It has elicited financial support through debt for nature swaps involving both commercial and bilateral debt, complemented by interactions with private donors, international and national NGOs, international agencies such as the World Bank and Global Environment Fund, and bilateral funding. The key to its success seems to be the strong level of commitment by the government and the community in recognising the significance of deforestation and the importance of restoration activities, making Costa Rica's success internationally known. Whilst it is unlikely commercial banks would allow debt for nature swaps in the Australian context, a plausible option could be for the government to fund debt write-offs in return for nature conservation activities.

Discussion

The first part of this article surveyed three schemes supporting biodiversity outcomes in Australia. Although not by any means a comprehensive survey of schemes and initiatives across Australia, the schemes surveyed illustrate three emerging trends:

1. There Is Growing Interest in Conservation Initiatives on Privately Held Land

This trend has been evolving since the 1980s when, for example, controls on the clearing of native vegetation on private land were first mooted (Bates, 2019). Queensland's protected area program, which was originally one of the measures accompanying vegetation clearing controls in that state, is a good example of the scale and significance this trend has now reached. Privately held protected areas in that state account for approximately 31% of its total protected area network (State of Queensland, 2021a).

2. Biodiversity Conservation Is Becoming Increasingly Commodified

The New South Wales Biodiversity Offsets Scheme, the Climate Solutions Fund and the Carbon + Biodiversity Pilot exemplify this trend. This trend potentially opens doors to significant new sources of funding from private investors seeking to offset their development impacts and reduce their carbon emissions profiles. The allure for cash-strapped state and federal governments is self-evident (Carbon Farming Institute, 2017). Three observations, however, provide an important caveat on the apparent opportunities. First, there is ample evidence that offset schemes in general do little to stem the tide of development-led environmental degradation and may even encourage it (Gibbons & Lindenmayer, 2007). Second, developers and industry partners are often motivated by a mix of factors, meaning genuine biodiversity conservation will often play a secondary role to other factors such as the need to offset carbon emissions (Seddon, 2021). The existence of multiple motivations means biodiversity objectives may be compromised (Blakers & Considine, 2016; Reside et al., 2017; Corey et al., 2020; Standish & Prober, 2020). Third, despite increasing interest in these schemes from developers, the reality, for the time being, is that state and federal governments are the most significant investors in these programs. The generous budgetary support for the Biodiversity

Stewardship Trust from the NSW Government, as outlined in its Investment Roadmap, exemplifies this point (State of New South Wales (Biodiversity Conservation Trust), 2022d). Private markets on their own, it seems, are a long way from driving or even sustaining a credible response to our biodiversity investment needs (England, 2021). With significant public money being channelled into these hybrid public-private schemes, questions about value for money are and will remain pertinent (Blakers & Considine, 2016; Moore, 2020; Australia Institute, 2020). In recent months, the integrity, accountability and transparency of these schemes have been questioned (MacIntosh, 2022; NSW Auditor-General, 2022).

3. Biodiversity Conservation Is Becoming Increasingly 'Bundled' with Carbon Mitigation Measures

In Australia, the Carbon + Biodiversity Pilot illustrates this trend. This trend is also occurring overseas (Seddon, 2021). As noted above, the risk inherent in this bundling of seemingly compatible interests is that biodiversity outcomes will be compromised in favour of obtaining quick, substantial and easily verified carbon sequestration outcomes (Blakers & Considine, 2016; Standish & Prober, 2020; Seddon, 2021).

In the second part of this article, we surveyed a range of alternative approaches and programs for biodiversity conservation in jurisdictions outside Australia. There were some striking points of contrast between Australia and overseas.

Other Countries Are Investing Substantial Amounts of Government Funding in Conservation Projects

In the United Kingdom, for example, public sector expenditure on environment protection was £13.9 billion in 2021–2022, compared with £12.9 billion in the previous year. Compared with 1998–1999, environment protection spending increased by £7 billion in real terms (Clark, 2022). In North America, the USDA spends approximately AU$10 billion per annum funding environmental stewardship programs, reserves and soil health programs. In the European Union, the budget for the LIFE program alone amounts to approximately €5.4 billion per annum. A recognition that biodiversity and nature conservation are public goods that deserve much greater recognition and support than in the past seems widespread overseas. That recognition, and measures which flow from it, seem somewhat tokenistic in Australia by comparison (England, 2021).

Direct Payments to Landholders Are Mandated Part of Conservation Framework

These direct payments are not linked to, or contingent upon, market funding. Again, the United Kingdom provides a salient example. When the UK was a member of the European Union, landholders typically earned up to 50% of their income from EU-funded subsidies. That support mechanism is now being redirected into contracts for providing environmental services (Tsouvalis & Little, 2020; Harris, 2020). In North America, the Conservation Reserve Program engages individual landowners to take land out of production and to provide environmental services for that land instead.

An analogous approach to the Conservation Reserve Program in Australia would be for the government to contract with landholders to remove cattle, sheep or goats from their land and/or relinquish their leases, allowing the land to be re-designated as a protected area. In place of their production activities, the government would then pay landholders a regular wage to undertake land stewardship activities on the land. If there is a financial loan associated with the lease as the collateral asset, then negotiations with the bank(s) on ways to write this off or restructure – perhaps through a Rural Reconstruction and Development Bank (Katter, 2019) – would be needed at the individual farm level. Between 2007 and 2012, the Australian Government funded a similarly motivated Environmental Stewardship Program, with covenants and contingency funding for private land management commitments extending to 2024. The program operated as a reverse auction system, with private landowners bidding to improve habitat quality across the landscape with buffers for high-quality remnants of endangered species, ecological communities, Ramsar wetlands and World Heritage Sites. The program sought to create "enduring changes in attitudes and behaviours of land managers towards environmental protection and sustainable land management practices" (Burns et al., 2016, p. 36). Despite favourable independent

reviews of the program, it was terminated by the Abbott Government in 2012.

Some Partnerships with Not-for-profit Organisations Harness Additional Funding

The Regional Conservation Partnership Program in North America, which operates on a landscape scale across 11 states, is an example of this phenomenon. It partners with a range of stakeholders who provide matching resources including in-kind services. Like North America, Australia is home to a number of well-established not-for-profit organisations engaged in the acquisition and management of land for conservation purposes (Cowell & Williams, 2006). From 1993 to 2014, public money was available to these organisations to assist them in the acquisition of land for conservation purposes. A review of the National Reserve System Programme in 2006 found that partnering with the not-for-profit sector was a highly efficient method of extending Australia's network of protected areas (Gilligan, 2006). The Gilligan Review recommended increasing investment in the Programme and for at least two-thirds of the costs of new partnership acquisitions to be borne by the Australian Government (Gilligan, 2006). The Programme stagnated, however, from 2014 when funding for it was merged with the National Landcare Program (Department of Agriculture, Water and the Environment, 2016).

Comprehensive and Ambitious Approach to Nature Conservation

In this respect, China's national program to enhance environmental services and thereby create an 'ecological civilization' appears exemplary in its breadth and rigour. The four-step program included a preliminary ecosystem survey and assessment on a nationwide basis, followed by mapping and identification of priority areas and needs. This has allowed for a comprehensive scheme of investment including, but not limited to, payments for ecosystems services.

China is not alone in taking a strategic, landscape-based approach in its planning for biodiversity conservation. In the European Union, the Natura 2000 initiative covers 18% of the Union's total land mass, covers 28,000 sites and has funded more than 200,000 hectares of strategic land purchases (EU, 2020).

Australia is pursuing its own national Comprehensive, Adequate and Representative (CAR) Reserve System, which rests on a strategic, bioregional framework (Department of Agriculture, Water and the Environment, 2022c). It also has a national biodiversity conservation strategy (Commonwealth of Australia, 2019). Nevertheless, outside the example of its national reserves, actual funding models for biodiversity conservation tend to favour site-specific projects over and above achieving long-lasting regional or catchment-wide outcomes (Whitten, 2016). This approach to funding initiatives is unlikely to safeguard our biodiversity on a scale sufficient to cope with the anticipated impacts of climate change or other global changes (Whitten, 2016). Overseas experience showcases the importance of comprehensive planning for biodiversity and ecosystem services and the need for significant public funding to be aligned with that strategy. Comprehensive evaluation and mapping of the current status of the ecosystem services provided by our natural capital should be at the core of a comprehensive management approach not limited to planning for nature reserves.

Greater Recognition Is Given to Range of Ecosystem Services Provided by Biodiversity Conservation

This recognition is consistent with the IUCN's Nature-based Solutions advocacy (IUCN, 2021). In the United Kingdom, some of the environmental co-benefits being recognised and supported include flood mitigation and land restoration (Harris, 2020). In China, the list of identified environmental co-benefits includes contributions to food production, carbon sequestration, soil retention, sandstorm prevention, water retention and flood mitigation, as well as providing habitat for biodiversity (Ouyang et al., 2016; Ouyang et al., 2019). In the European Union, climate mitigation goals are identified as desirable co-benefits of some biodiversity conservation programs; but, unlike Australia's Climate Solutions Fund, they are not driven primarily by the desire to offset carbon emissions (Scown et al., 2019).

Explicit Recognition of Biodiversity Contribution to Economic Well-being

In the United Kingdom, the government has accepted the findings of the influential Dasgupta Review that

biodiversity underpins the whole economy, not just environmental well-being (Dasgupta, 2021). The government has now adopted an ambitious plan for a "[G]reen industrial revolution" underpinned by a £12 billion investment (Badenoch, 2021, p. 2). In an even more holistic approach, debt for nature swaps in Costa Rica have made an important contribution to improving the livelihoods and well-being of rural communities. The same understanding underpins the IUCN's position on Nature-based Solutions (IUCN, 2021). Despite calls from various actors for an environment-led recovery in the aftermath of COVID (The Greens, 2022; Farmers for Climate Action, 2001), the Australian Government seems yet to value the role biodiversity plays in contributing to a sustainable and resilient economic future (Australian Institute of Architects, 2021).

Conclusion

Australia has made some strides towards expanding the range and type of programs available to support biodiversity conservation on privately tenured rural land, but experience in other countries highlights that there are more options and some promising approaches with which Australia is yet to engage. Of particular instruction is the willingness of overseas governments to invest very significant sums of public money in biodiversity conservation without that investment being directly tied to commercially driven funding and/or carbon emissions-related objectives. The benefits of market-based and carbon-linked biodiversity conservation schemes have not yet been demonstrated, at least not in terms favourable to biodiversity conservation. Looking to international experience confirms our view that we should not be so hasty to 'put all our eggs in one basket'. We need increased domestic awareness of the importance of biodiversity and Nature-based Solutions generally, and increased public investment in direct, landscape-scale biodiversity conservation initiatives. We would also do well to explore an ongoing role for effective partnerships with a wide range of stakeholders, provided broader biodiversity conservation objectives will not be compromised. All of these matters, we believe, could usefully be encapsulated in a more expansive national strategy, delivering a level of coherence and ambition that is currently lacking in Australia.

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