Carbon farming in rangelands: Policy lessons from Australia

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Abstract

Australia was one of the world's earliest adopters of carbon farming incentives via its 2011 Carbon Farming Initiative, with rangelands at the forefront of project development. Since that time, policy incentives for rangeland carbon sequestration have been introduced from Canada to China and the European Union has embraced the language of carbon farming. So, what has Australia learnt in the past 15 years that could provide insights for other countries embarking on their rangeland carbon journey? This paper traces the history of Australian carbon policy and presents perspectives from diverse stakeholders based on interview data collected through five research projects undertaken between 2009 and 2025. This analysis maps the changing issues and attitudes amongst rangeland landholders, government agency staff, researchers and the carbon industry.

One notable trend apparent in the interview data is the way that concerns raised by landholders in earlier interviews, such as long commitment periods, taxation rules and inflexible trading rules were addressed through subsequent policy adaptation, only to be replaced by new concerns such as absenteeism, sequestration shortfalls or credit integrity. Whilst these concerns have evolved over time, the interviews also provide a record of carbon farming's progression from a potential income stream to a reality for many landholders, with reported benefits for economic resilience, sustainable land management and socio-cultural wellbeing. Amidst all this change, one factor that has been a constant throughout is the perception that carbon farming is a complex activity facing considerable uncertainty relating to biophysical outcomes, market conditions and policy shifts. These lessons may help other countries to anticipate issues that could emerge as their own carbon industries mature and design carbon farming policy proactively rather than reactively.

Introduction

Carbon farming is increasingly recognised as a significant strategy for climate change mitigation. Numerous jurisdictions, including the European Union, China, India and Canada have established frameworks for landholders to generate income by storing carbon in their soils and vegetation (Baumber et al., 2024). Australia established itself as an early pioneer of carbon farming policy with its 2011 Carbon Farming Initiative (CFI) and 2015 Emissions Reduction Fund (ERF). The ERF involved direct government purchases of carbon credits while also creating the policy infrastructure to support a private market in carbon offsets. Australia's early adoption of, and experimentation with, carbon farming may provide lessons for more recent developments in other jurisdictions, including the use of results-based payment schemes for carbon sequestration under the European Union's Green

Deal initiative (Bumbiere et al., 2022), the Alberta offset scheme in Canada (Government of Alberta, 2023) and the emergence of public-private partnerships focused on trading farm-based carbon credits in India (Jat et al., 2022).

In this paper, the term "carbon farming" is used to refer to practices aimed at maintaining or increasing carbon sinks in vegetation and soils, such as afforestation or reforestation to increase above-ground biomass and the alteration of grazing or cropping regimes to increase soil organic carbon. It should be noted that other research and policy literature employs a broader definition that covers all farm-level management of carbon pools, flows and greenhouse gas fluxes, including on-farm emissions from transport, livestock and fertilisers (EC, 2021).

Carbon farming in Australia received its first major policy boost via the creation of the Carbon Farming Initiative (CFI) in 2011. This created a set of prescribed methods that could be used to generate carbon credits through sequestration in vegetation and soils. The original plan to link the CFI to a comprehensive cap-and-trade scheme did not survive a change in government in 2013, but it did lay the foundation for the Emissions Reduction Fund (ERF), a AUD4.5 billion initiative that was established in 2015. The ERF utilised a reverse auction system to provide financial incentives for projects that reduce emissions or sequester carbon, with government funds directed to the lowest-cost abatement methods. This was a boon for vegetation projects in the rangelands (Figure 1), with the two key methods of Human-Induced Regeneration (HIR) and Avoided Deforestation (AD) making up almost half of all Australian Carbon Credit Units (ACCUs) issued by 2020 (Baumber et al., 2020).

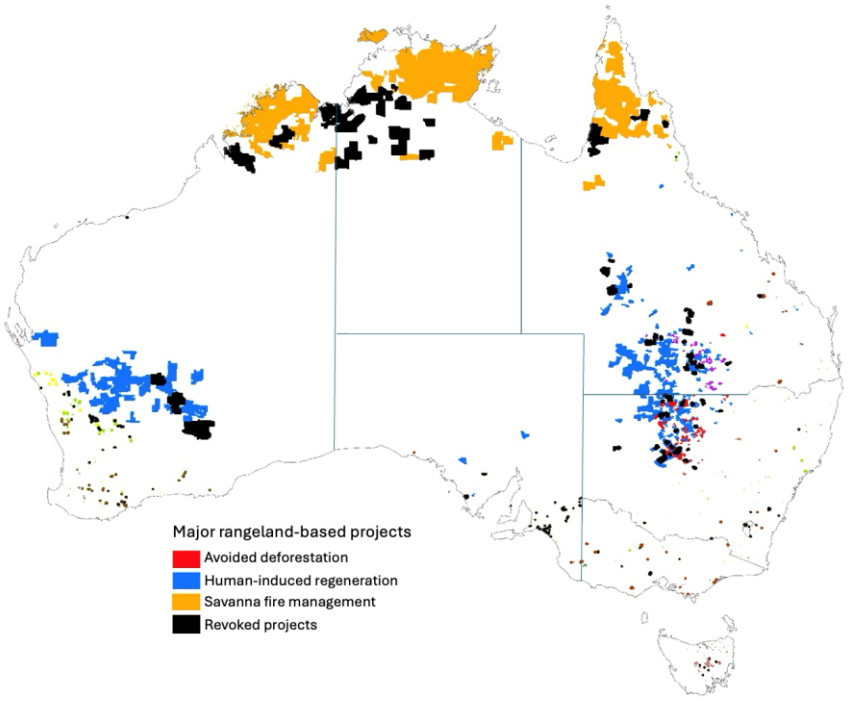

Figure 1: Australian ERF projects as of 2020 (adapted from Baumber et al., 2020). Note that savanna fire management involves emissions reduction rather than sequestration and is not covered in this paper.

The AD method involved a landholder agreeing not to clear trees they hold a legal right to clear, while the HIR method required a change in management to allow trees to regenerate (e.g. fencing out livestock). The rapid growth in these rangeland-based methods attracted some criticism, including "additionality" concerns around AD, given that some of the areas were unlikely to have ever been cleared, and concerns that HIR models were over-estimating the amount of carbon that was actually being sequestered through changes in land management (Macintosh et al.,

2024). The independent "Chubb Review" recommended some changes in 2022 aimed at improving transparency around project reporting and method development and separating responsibilities for scheme regulation from government procurement of credits (Chubb et al., 2022). The AD method was revoked and HIR was allowed to expire, meaning no new projects could be registered after 2023. Other recent trends include a shift in policy terminology from "ERF" to "ACCU Scheme", an increased interest in soil-based sequestration in higher-rainfall areas and an expansion of the "Safeguard Mechanism", which has increased demand for carbon offsets amongst large emitters and shifts the carbon market in Australia away from its earlier reliance on government purchases of carbon credits (Baumber et al., 2024).

Overview of previous research projects

The policy lessons discussed in this paper are drawn from the following five research projects involving carbon farming across Australia, with a particular focus on the rangelands of New South Wales (NSW):

1. A 2009-11 study involving farmer interviews on woody crops for multiple purposes, including bioenergy, eucalyptus oil and carbon credits in western NSW (Baumber et al., 2011)
2. A 2017-18 study involving a technical workshop and online survey of landholders, researchers and agency staff linked to carbon farming in western NSW (Cowie et al., 2019)
3. A 2018-20 study involving an online survey, semi-structured interviews and focus groups with carbon farming stakeholders in western NSW (Baumber et al., 2022)
4. 2022-24 study on collaborative approaches to soil-based carbon farming with national key informant interviews and a western NSW case study (Baumber et al., 2024)
5. Ongoing 2023-26 study of landholder information sources and intended actions on carbon farming, involving ten interviews in NSW so far (unpublished)

The studies listed range from the period just prior to the introduction of the CFI, when federal carbon farming policy was being developed and debated, through the period of rapid growth in rangeland projects following the introduction of ERF payments (2015-2020), to the period of policy reform in 2022-2025. The research questions focused on in these studies cover perceived risks and benefits of carbon farming, perceptions of carbon farming versus other land use activities, carbon farming's potential contribution to socio-ecological resilience, social licence (i.e. community acceptance), information sources and adoption support, and the potential for collaboration between landholders.

Policy lessons

Lesson 1: The need for policy adaptation

One of the characteristics of Australia's global leadership on carbon farming has been a willingness to change rules and policy settings to increase adoption. A notable result in Study #1 on woody crops (Baumber et al., 2011) was that interviewed landholders preferred bioenergy over carbon due the perceived inflexibility of carbon farming, with comments including "It's inhibitive, it devalues the land" and "You lose control of your land for 99 years". A requirement to maintain sequestration for 100 years was incorporated into the CFI in 2011, but the introduction of the ERF in 2015 also provided a 25-year option. Farmers could commit to the shorter permanence period in exchange for a 20% discount on the credits they received (designed to cover the risk that sequestration may be reversed after that time).

The focus studies record the shift over time as carbon farming changed from a potential to a real income stream, with socio-economic benefits for landholders and surrounding communities. As income was generated, taxation emerged as another area in which policy adaptation was required to achieve fairness and increase incentives for adoption. Tax treatment was a common complaint amongst landholders in Study #2, including "Got 3.5 years' worth of carbon payments and lost a lot to tax" and "Why isn't it primary production?" (Baumber et al., 2022).

Taxation rules were later changed to allow concessional tax treatment for ACCUs generated by primary producers from 1 July 2022. Another example of a policy change that was designed to increase flexibility and the incentive to participate was the 2022 decision to allow carbon farmers to exit fixed delivery contracts they held with the government under the ERF in order to capitalise on higher prices available on the ACCU spot market (IEEFA, 2022).

Lesson 2: The need to overcome complexity and uncertainty

Landholder concerns about the complexity of carbon farming rules and uncertainty around future policy changes are a key theme running through each of the five focus studies – and other studies as well (e.g. Cotton and Witt, 2024). Landholders expressed these concerns in remarkably similar ways over the 15-year timeframe covered by the focus studies, including:

- "Carbon trading is very political… too susceptible to political change" (Study #1).
- "Where do you go to for info?" and "I have found that there is a lot of uncertainty in the future direction of carbon farming" (Study #3)
- "I think the main barriers are understanding it" and "I think the biggest prohibitor is the lack of education and the confusion around carbon farming" (Study #4)

While improvements in information provision and landholder support may help to address uncertainty, confusion and complexity, there is also a fundamental tension between Lesson 1 on the need for policy adaptation and Lesson 2 on the need to overcome uncertainty. This tension was highlighted in Study #2 on socio-ecological resilience (Cowie et al., 2019) and Study #3 on social licence (Baumber et al., 2022). Confidence in governance is a key determinant of social licence and continual policy changes can erode trust. However, the potential loss of trust and social capital from continual policy changes needs to be weighed against the benefits of increased flexibility and adaptability, which can improve the resilience of farming enterprises and rangeland communities more broadly (Baumber et al., 2020).

Lesson 3: The need for confidence and integrity

This lesson was most clearly highlighted by the Chubb Review in 2022, including some of the concerns and claims that surrounded it (Macintosh et al., 2024) and the review's recommendations to close down the AD method, suspend the HIR method, and separate scheme regulation from government credit procurement into different agencies. This review was highly topical during Study #4 and was linked to several statements of cynicism about the carbon farming industry from landholders and other stakeholders, including: "farmers are inherently suspicious of any government scheme", "cover for the fossil fuel industry to continue business as usual" and numerous references to "sharks" in the industry.

Study #3 considered the social licence to operate with regard to carbon farming and found that a lack of confidence in governance was one of the biggest barriers to obtaining a broad-based social licence in affected communities. A narrow focus on maximising carbon was also found to be problematic in cases where it clashed with local values, such as the preferred balance between grass and trees and a feeling that people should stay on the land rather than become "absentee" landholders producing carbon only. Recommendations for building and maintaining social licence include using trusted information sources to disseminate information (e.g. landholders, local agencies), considering norms and values when designing carbon farming policy (e.g. perceptions of what good land management is), closing the gap between global-scale policy frameworks and locally-relevant actions, valuing co-benefits such as biodiversity and soil health, and decreasing dependence on a single program (i.e. the ERF).

Lesson 4: The need to overcome barriers of cost and bureaucracy

The costs involved in becoming a carbon farmer were a prominent barrier in each of the focus studies. These include costs associated with obtaining information and advice, baselining current carbon levels in vegetation or

soils, registering projects, entering into contracts, changing practices, measuring carbon sequestration and compliance and auditing of projects. These cost factors were a particular issue in Study #4, which looked at soil carbon and the potential for collaboration. While models exist to estimate above-ground carbon based on predicted tree growth, developing similar models for below-ground carbon has been challenging. Without reliable models, the costs involved with baselining carbon levels and measuring sequestration levels in subsequent years can be prohibitive, for example: "how much would it probably cost me… maybe 30, 50 grand to do the baselining…that's a fair bit of money then I'd have to recoup that in a sale." (Baumber et al., 2024).

As with Lessons 1 and 2, there is also a trade-off required between Lesson 3 on the need for integrity and Lesson 4 on the need to reduce costs. Bringing down the costs of measurement and compliance has been identified as a critical goal for expanding the adoption of carbon farming and realising its potential in Australia. However, the experiences with the Chubb Review and the ongoing questioning of the models used to calculate carbon sequestration from HIR highlight the need to tread carefully when replacing on-ground measurements with modelling and assumptions.

Conclusion

Australia's experiences with policy innovation, experimentation and learning over the past 15 years not only places it in a strong position to continue Australia's global leadership on carbon farming, but also to help inform the policy decisions made in other jurisdictions. However, challenges remain around the barriers of complexity and cost, the need to increase confidence in the integrity of carbon farming schemes and the need to balance continual adaption with landholders' desires for certainty and clarity. The Australian Government has demonstrated an ability to respond to concerns raised by landholders, such as around long commitment periods, taxation and inflexible trading rules. As these concerns are replaced by newer ones, such as around credit integrity or absenteeism, further adaptation will be needed, while also keeping key actors informed and avoiding a sense of constantly changing rules. By drawing on Australia's policy lessons, other countries may be able to anticipate issues that could emerge around their own carbon industries and design carbon farming policy proactively rather than reactively.

This paper also demonstrates how ongoing social research with landholders, government agencies, industry players and other members of rangeland communities is essential for sustaining a successful and responsible carbon farming industry. Semi-structured interviews, focus groups and surveys can all provide valuable data for this purpose, as can a mix of national-scale and locally-specific case studies.

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