Land-Use Policy in Australia: Assessing Trade-Offs Among Agricultural Profitability, Environmental Protection, and Social Equity

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Introduction:

Australia does not operate under a single national land-use policy. Instead, land use is governed through state-led planning, Commonwealth environmental law, and nationally agreed frameworks and strategies that influence—but do not control—how land is used.

The Agriculture and Land Sector Plan (ALSP), released in September 2025, is the most recent national sectoral emissions-reduction plan aimed at achieving net-zero greenhouse gas emissions by 2050 (Department of Agriculture, 2025). ALSP is an important strategic document, but it has several limitations when viewed through a land-use decision-making lens:

1. Lack of operational decision rules
The ALSP clearly recognises competing land-use objectives (food production, emissions reduction, biodiversity, regional outcomes), but it does not provide a formal method for assessing or resolving trade-offs. This means decisions remain implicit, dependent on separate policies or agencies rather than a consistent framework.
2. Strategic, not regulatory
The ALSP is a high-level strategy rather than a binding policy instrument. It sets directions and principles but does not directly control land-use decisions, which are largely managed by state and regional planning systems. This limits its ability to influence actual land allocation outcomes.
3. No integration of cumulative impacts
While the plan acknowledges multiple land uses, it does not fully address how cumulative or interacting impacts (e.g., carbon projects + agriculture + biodiversity) should be assessed together. This can lead to fragmented decisions across sectors rather than system-level optimisation.
4. Limited linkage to decision tools
The ALSP signals the need to balance objectives but does not specify any analytical frameworks (e.g., multi-criteria decision analysis, natural capital accounting in practice) to operationalise decisions. As a result, there is a gap between policy intent (balance outcomes) and decision practice (often single-objective or siloed).

5. Weak connection between scales
The plan does not clearly define how national objectives translate into farm-level or regional decisions, or how trade-offs at one level affect outcomes at another. This creates disconnects between individual landholder incentives and broader system goals (climate, biodiversity, equity).
Putting together, the ALSP articulates competing land-use objectives but lacks formal mechanisms, decision rules, and cross-scale integration needed to systematically assess and resolve trade-offs in practice. This paper aims to fill this gap by demonstrating how a multicriteria decision analysis (MCDA) method can be applied to Australian land use policy to guide decision-making.

Australia's Land-Use Dilemma

For this work, we have adopted Robert et al. (2005) definition of sustainability, which defines sustainability as a concept comprising three pillars: people, planet, and profit. These pillars are also known as environmental, economic and social sustainability.

i. Environmental sustainability asserts that natural resources are used in economies or societies at a rate not exceeding their regenerative and absorptive capacity, which implies minimising the emission of pollutants to the air, water and soil.

ii. Economic sustainability implies balancing costs and revenues so that a system can sustain, and includes issues of profitability, volatility and employability.

iii. Social sustainability ensures that production systems, such as farming approaches, are socially acceptable, aligning with the community's cultural norms, values, and expectations.

Figure 1 captures the interconnections and presents an integrated lens of the proposed conceptual framework, with sustainability as the key goal, and a focus on farmland use.

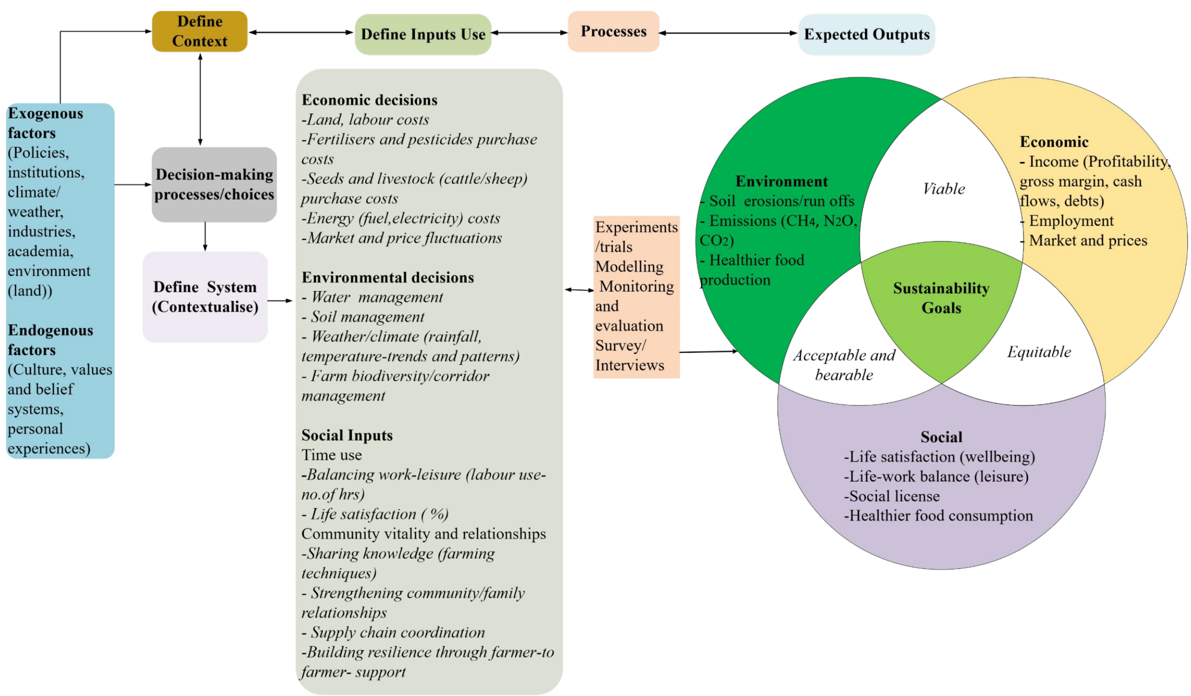

Figure 1: Conceptual framework modified from the authors' earlier published work Rai et al. (2025)

Australia's agricultural landscapes are under mounting pressure. Competing demands for food production, biodiversity protection, carbon sequestration, energy generation, housing and infrastructure increasingly converge on the same finite land base (Denton et al., 2025). Despite Australia's geographic size, truly productive farmland—characterised by reliable rainfall, fertile soils and proximity to infrastructure—is relatively limited and concentrated in specific regions (Climateworks Centre, 2019; Higgins, 2025).

Agricultural policy has historically focused on productivity growth and export competitiveness, while environmental policy has prioritised conservation through regulation and protected areas. Regional development policy has often aimed to maximise economic activity and employment in rural communities. While each objective is individually legitimate, their separation has obscured trade-offs and contributed to inconsistent land-use outcomes (Productivity Commission, 2023b).

Australian agriculture has produced more food and fibre from less land: farmland area has declined by ~3–5%, while real output has risen by ~34% in the last two decades, driven primarily by intensification and technological change (ABARES, 2026). However, this model carries risks. Soil degradation, declining biodiversity and increasing climate volatility threaten the ecological foundations on which long-term productivity depends (IPCC, 2022; State of the Environment Committee, 2021). At the same time, land-use transitions—such as conversion to urban development, renewable energy infrastructure, or carbon and nature markets—can unevenly redistribute costs and benefits, raising equity concerns for farming communities and regions (McDermott et al., 2023; Murphy & hUallacháin, 2025).

Our paper addresses these challenges by proposing a policy-relevant framework for assessing land-use trade-offs in Australia. It builds on insights from the economics of natural capital and emerging whole-farm assessment tools to propose practical actions policymakers can adopt.

Land Use as Natural Capital

Rethinking Land in Economic Policy

Early work in ecological economics recognised the role of natural capital in economic policy and emphasised that long-term development depends on maintaining stocks of land, ecosystems, and natural resources (Pearce, 1988); establishing that economic growth and environmental sustainability are interdependent rather than competing objectives. Missemer (2018) shows that natural capital has since evolved into a core analytical concept for understanding how environmental assets underpin productivity and well-being. From this perspective, land degradation is best understood as a depletion of productive capital, analogous to the depreciation of physical assets, with direct implications for future economic capacity.

In Australian agriculture, this framing is particularly salient. Soil health, water availability and ecosystem services such as pollination and pest regulation directly influence yields, input requirements and risk exposure. Yet these assets are rarely incorporated explicitly into policy appraisal or investment decision-making (OECD, 2019; State of the Environment Committee, 2021). At the same time, there have been important efforts to address this gap through natural capital accounting, including the Australian Bureau of Statistics' national environmental-economic accounts, which seek to integrate environmental assets into economic measurement and decision-making (ABS, 2026).

Recent Australian policy innovations reflect growing interest in natural capital concepts, such as the development of the Nature Repair Market, that signal an intention to reward landholders for maintaining or enhancing environmental assets (DCCEEW, n.d.). However, embedding natural capital considerations into agricultural and land-use policy would require systematic measurement of environmental conditions alongside economic outcomes. It would also require acknowledging that a continued decline in natural capital constitutes economic depreciation, even if farm income remains stable in the short term. Recognising land as natural capital thus strengthens the case for integrated, multi-dimensional assessment of land-use trade-offs.

Agriculture Beyond the Production–Conservation Binary

Australian land-use debates often frame agriculture and environmental protection as competing uses of land. This dichotomy encourages zoning and regulatory approaches that separate production landscapes from conservation areas. The NSW government's recent acquisition of the 437,000-hectare Thurloo Downs station for the national park estate exemplifies this dichotomy, as it permanently removed a massive pastoral property from agricultural production to establish a strict conservation zone. By segregating the landscape into mutually exclusive categories, the policy reinforces the "lock it up and leave it" model that farmers claim undermines rural communities while failing to manage pests and weeds effectively (Ormonde, 2026).

However, growing evidence suggests this framing is neither necessary nor effective. Research on multiple and sequential land uses demonstrates that agricultural production, biodiversity conservation, and other land uses can coexist when managed at appropriate scales and with flexible policy settings (Walcott, 2019). International experience with agroecological systems and diversified farming illustrates that biodiversity-friendly practices can sustain productivity while reducing environmental risks (Pretty et al., 2018). For example, the debate surrounding the Great Koala National Park in NSW demonstrates that biodiversity protection can occur alongside agricultural and forestry activities. Many landholders in the region already maintain productive grazing or forestry operations while conserving native vegetation and wildlife corridors (NSW Environment and Heritage, 2026). This shows that with flexible policy settings and appropriate landscape-scale management, agriculture, biodiversity conservation, and other land uses can coexist, challenging the assumption that they must be spatially separated.

Moving beyond binary thinking requires a shift from regulating land use by category to evaluating land by outcomes. For example, strict separation between productive and conserved land can increase pressure on remaining agricultural areas, intensifying environmental degradation. In the Murray–Darling Basin, water policy has historically separated "productive" irrigation use from "environmental" flows through fixed allocations and buybacks (Productivity Commission, 2023a). Conversely, conservation programs that fail to consider farm-level economics and farmers' values can undermine social licence and participation (Chapman et al., 2019). Moving beyond this binary requires outcome-focused policies that evaluate how land is managed rather than how it is classified. Alternative approaches that recognise the multifunctionality of land rather than assigning it to single-use categories should include outcome-based planning frameworks, where land is assessed according to performance across economic, environmental and social objectives, as well as integrated and sequential land-use systems that allow multiple uses to coexist or vary over time. Mechanisms such as stewardship schemes, flexible zoning, and market-based instruments can support this by incentivising outcomes rather than prescribing land uses. MCDA provides a framework for comparing these alternative approaches by explicitly evaluating their trade-offs across multiple criteria. Together, these approaches offer a practical pathway for transitioning from rigid zoning toward more adaptive and multifunctional land-use systems.

Three Interdependent Policy Objectives

Current land-use systems can generate perverse, farm-level inefficiencies when they force a separation between production and conservation rather than allowing integrated management. For example, an Australian mixed-grazing enterprise may be required to exclude stock from native vegetation under conservation rules, prompting the farmer to increase stocking rates and fertiliser inputs on the remaining paddocks to maintain output. This intensification can result in soil degradation, nutrient runoff and reduced on-farm biodiversity, effectively shifting environmental pressure rather than reducing it. At the same time, the conserved area may be under-utilised, as managed grazing or agroforestry could deliver both ecological and production benefits if permitted. Such outcomes illustrate how rigid, category-based land-use policies can reduce overall system efficiency and resilience, reinforcing the need for outcome-based approaches that support multifunctional land use (Pannell et al., 2012; Pretty et al., 2018; Walcott, 2019).

This paper proposes evaluating land-use decisions against three interdependent pillars of sustainability: economic performance, environmental protection, and social equity. Each pillar represents a legitimate policy objective; none can be maximised in isolation if doing so undermines the others. Economic performance, environmental protection, and social equity must be considered together in agriculture and land use because they are fundamentally interdependent, and only their joint optimisation can sustain productive, resilient, and socially legitimate food and land systems over the long term. While the three-pillar sustainability framework is well established conceptually, its application in land-use policy has traditionally been fragmented, with economic, environmental and social objectives addressed through separate policy instruments and decision processes. This paper contributes by operationalising the framework as a practical decision tool, linking each pillar to measurable indicators and structured evaluation methods such as MCDA. This enables explicit and transparent assessment of trade-offs across objectives, rather than relying on implicit or single-objective decisions.

Economic Pillar: Food Security and Farm Profitability

Economic performance remains a legitimate and essential objective of land-use policy. Agriculture supports domestic food supply, export income, and employment, particularly in regional areas. However, conventional metrics such as gross value of agricultural production or short-term profit provide incomplete indicators of sustainability. Yield variability, exposure to climatic risk, and input dependency offer more informative measures of long-term food security and profitability (ABARES, n.d.). Policies that increase output at the cost of greater yield volatility, input dependency or environmental degradation may undermine system resilience.

Environmental Pillar: Biodiversity, Soil, Water and Emissions

Environmental protection encompasses biodiversity conservation, soil and water health, and emissions management. These dimensions are interconnected: soil degradation affects water quality, altered hydrology influences ecosystems, and vegetation loss contributes to emissions and reduces resilience (IPCC, 2022; State of the Environment Committee, 2021). Policy instruments often address these elements separately, creating fragmented incentives.

Social Equity Pillar: Regional Livelihoods and Fair Distribution

Social sustainability of land use and farming broadly focuses on maintaining viable rural livelihoods and community cohesion as land use intensifies or diversifies. Integrated land-use approaches can distribute benefits and burdens more evenly across production, conservation, and community goals. Equitable land-use planning strengthens long-term social resilience and legitimacy of farming systems under climate and market pressures (Thackway, 2018).

Multi-Criteria Decision-Making in Land-Use Policy

Single-metric decision rules obscure trade-offs and can erode policy legitimacy. Multi-criteria decision analysis (MCDA) offers a practical alternative by systematically evaluating options across economic, environmental and social dimensions, making trade-offs explicit rather than reducing them to a single metric. MCDA does not determine the ‘best’ outcome; rather, it provides a structured basis for comparing options, with final decisions resolved through policy judgement, stakeholder preferences and institutional priorities. It does not eliminate trade-offs but provides a structured way to balance competing objectives and compare how different options perform under alternative value judgements. In land-use policy, MCDA can be applied to assess competing land-use proposals across economic, environmental and social criteria and make trade-offs explicit, allowing policymakers to justify choices and engage stakeholders around clearly articulated value judgements. In practice, this requires specifying the actors and decision context. For example, MCDA could be applied by regional planning authorities or state agencies assessing land-use proposals, with weights on economic, environmental and social criteria determined through structured stakeholder engagement processes involving governments, landholders and community groups. Different weightings would reflect alternative policy priorities, while conflicts are not resolved by the framework itself but through transparent policy decisions informed by these trade-offs. This approach provides a structured process in which assumptions, priorities, and outcomes are visible. Evidence suggests that decision-making processes that explicitly acknowledge trade-offs are more likely to gain acceptance among landholders and communities (OECD, 2021). A case study on the use of MCDA illustrates that this can be done. For a detailed explanation of the steps, including studying the preferences, please refer to Havranek (2019).

Case study: Using multi-criteria decision analysis (MCDA) to support better land-use decisions

Land-use policy decisions increasingly require governments to balance competing objectives across agriculture, environment and regional communities. Recent research funded by the Soils CRC on the socio-economic benefits of regenerative agriculture demonstrates how multi-criteria decision analysis (MCDA) at an individual subregion level can improve the transparency, credibility and acceptability of these decisions by making trade-offs explicit rather than implicit (Sadok et al., 2008; Schreefel et al., 2022; Storer et al., 2025)

The study on regenerative beef grazing systems in South-Eastern Australia applied MCDA to evaluate alternative land-use pathways across a mixed agricultural region. The analysis assessed options against multiple criteria aligned with three policy and sustainability pillars: economic performance and food security, environmental condition, and social equity. Indicators included short and long-run farm profitability and risk, soil and vegetation condition changes over time, water impacts, and emissions intensity (Storer et al., 2025)

First, farmers' preferences for economic, social, and environmental objectives were elicited through surveys using MaxDiff (best-worst scaling) and Conjoint Analysis. These preferences informed the weighting of criteria within the MCDA framework and revealed that options performing strongly on one dimension often underperformed on others. For example, land-use changes that maximised economic returns frequently increased exposure to climate risks or higher environmental costs. Conversely, options that improved environmental outcomes delivered wider regional benefits, and often traded-off profitability and food production. Making these trade-offs visible allowed land managers to compare options on a like-for-like basis and identify pathways that delivered more balanced system-level outcomes.

Importantly, the process itself improved decision quality. The research found that involving land managers and local stakeholders in modelling systems and defining criteria and weightings built trust and strengthened legitimacy. It provided a structured way to quantify and consider trade-offs. For governments seeking more balanced and holistic landscape level outcomes, the methods applied in this case study would lead to better land-use decision making at the individual level, which when scaled would provide a more appropriate landscape outcome that considers individuals' competing demands for land use. A key limitation is that farm-level outcomes do not automatically scale to landscape or national objectives. Decisions that are optimal for individual landholders, such as maximising profitability or reducing on-farm risk and environmental impacts, can conflict with broader goals, including food production, biodiversity connectivity, water allocation, or regional equity. Addressing this requires recognising nested decision-making, where farm-level choices operate within policy, market and environmental constraints that shape system-level outcomes. MCDA can support this by enabling evaluation across scales, but alignment depends on governance mechanisms that link individual incentives to collective objectives. Making these scale interactions explicit clarifies how trade-offs vary across levels and improves coherence between decisions and outcomes.

The Global Farm Metric Framework as a Practical Tool

The Global Farm Metric Framework provides an applied methodology for assessing sustainability using whole-of-farm indicators that encompass economic, environmental, and social outcomes (Sustainable Food Trust, 2025). It aligns closely with the three-pillar framework proposed here. The Global Farm Metric (GFM) is used here as an illustrative example of a whole-of-farm assessment framework that aligns with the three pillars by integrating economic performance, environmental condition and social outcomes within a single measurement system. While GFM is not presented as a universally optimal or definitive tool, it demonstrates how multidimensional indicators can be operationalised at the farm level. Its inclusion highlights the practical feasibility of measuring sustainability across domains, which is often identified as a barrier to integrated land-use decision-making. The framework's structure broadly maps onto the three-pillar approach, although implementation would require adaptation to Australian policy and data contexts. The value of the example lies in illustrating how indicators can be standardised and linked to decision frameworks such as MCDA, rather than prescribing a specific tool.

In an Australian policy context, the framework could inform regional land-use strategies and agricultural support programs. MCDA could complement this approach by using these indicators to systematically compare land-use options, making trade-offs across outcomes explicit rather than reducing them to a single metric. While the framework structures comparison, decisions about preferred outcomes remain a matter of policy priorities and stakeholder values. Harmonising indicator requirements across programs would reduce reporting burdens on farmers while improving data consistency. Linking farm-level metrics to landscape-scale planning could also enhance alignment between individual decisions and collective outcomes (Rodrigues et al., 2010). Piloting such approaches in regional programs would provide an evidence base for scaling integrated assessment nationally.

Measuring What Matters

Effective policy requires measurable outcomes, but excessive complexity risks undermining usability. A small set of robust indicators can capture key trade-offs while remaining accessible – provided that they are clearly aligned with the decision-maker. At the farm level, indicators should focus on factors that are within a landholder's direct influence, such as yield variability (after seasonal adjustment), input efficiency, financial resilience, and on-farm environmental condition (e.g. soil carbon, vegetation condition). At the policy and regional planning level, a broader set of indicators is required, including water balance, emissions intensity, employment stability, participation in decision-making, and the distribution of costs and benefits across communities. This distinction recognises that individual landholders optimise decisions within their own constraints, while governments are responsible for aggregating outcomes and managing trade-offs across economic, environmental and social objectives. Clarifying these roles helps ensure that indicators support decision-making at the appropriate scale, reducing unrealistic expectations on individual actors while improving alignment between farm-level actions and system-level outcomes (FAO, 2014; OECD, 2019).

An important consideration in the Australian context is the principle of subsidiarity, given land-use decisions are distributed across a federated system. Farm-level decisions relate to production, management practices and on-ground environmental outcomes, while regional planning coordinates landscape-scale trade-offs such as biodiversity connectivity and water use. State governments play a central role in land-use regulation and planning frameworks, whereas the Commonwealth sets broader policy signals, including climate, biodiversity and market mechanisms. Clarifying these roles helps ensure that decisions are made at the most appropriate scale and that responsibilities for managing trade-offs are aligned with institutional capacity. Embedding subsidiarity within the framework will be another complex and key challenge, but it will strengthen its practical application by linking decision-making authority to outcome delivery across scales.

Policy Effectiveness and Acceptability

Policy resistance often reflects perceived unfairness rather than opposition to environmental or other goals. Research shows that trust, predictability and co-design are critical to

successful land-use transitions (Robinson et al., 2011). Higgins (2025) underscores the importance of community-led planning in managing competing land-use pressures. Policies that empower local actors and recognise place-based knowledge are more likely to deliver durable outcomes.
Multi-criteria decision analysis (MCDA) provides a practical mechanism to support these principles by explicitly evaluating and communicating trade-offs across economic, environmental and social objectives. By making competing outcomes visible, it supports more transparent and informed decision-making, although it does not remove the need for judgment in resolving these trade-offs.

Importantly, MCDA does not eliminate disagreement but structures it, allowing different stakeholders to see how alternative priorities influence outcomes. This supports co-design processes by providing a common framework for discussing options, rather than relying on implicit or contested value judgements. Integrated frameworks underpinned by MCDA can therefore improve policy acceptability by showing how competing interests are balanced and why particular decisions are made. A key challenge, though, is scaling up participatory MCDA from the farm or project level to regional and national decision contexts. While stakeholder engagement can be effective at smaller scales, broader applications must manage diverse preferences, representation, and aggregation of competing values. This requires institutional arrangements such as representative stakeholder processes, tiered decision frameworks, or the use of policy-guided weightings to maintain practicality and consistency. Without such mechanisms, participatory approaches risk becoming unwieldy or unrepresentative at scale. Addressing this challenge is essential to ensure MCDA can be applied credibly in real-world land-use policy beyond local contexts. Long-term policy signals—potentially built on short-term pilot programs—are more credible when supported by such transparent evaluation, as they reduce uncertainty and provide clearer incentives for landholders to invest in sustainable land management practices.

Conclusion

Australia’s land-use challenge is not a choice between agriculture, nature or communities, but the design of decision-making processes that recognise their interdependence. By conceptualising land as natural capital and assessing policies against economic, environmental and social objectives, policymakers can better manage unavoidable trade-offs.

This paper focuses on developing a conceptual framework, and several areas remain underexplored. In particular, the practical scaling of MCDA, the specification of weighting processes across stakeholders, and the alignment of decisions across governance levels require further empirical analysis. The integration of natural capital metrics into decision frameworks and the institutional mechanisms needed to operationalise trade-offs also warrant additional research. Future work should test the framework through applied case studies in Australian policy contexts. Explicitly recognising these limitations helps clarify the contribution and identify priorities for advancing operational land-use decision tools.

The framework advanced in this paper offers a practical, policy-relevant approach to land-use decision-making. It moves beyond high-level rhetoric and single-metric optimisation, providing tools to explain trade-offs clearly and design more credible, equitable and resilient land-use policies for Australia. By distinguishing between evaluating trade-offs and resolving them, the framework clarifies that better decisions arise not from eliminating trade-offs but from making them transparent.

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