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SYSTEMATIC REVIEW



WILEY

Exploring the potential of long-term agreements for achieving landscape-scale environmental recovery

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Abstract

This systematic review examines existing literature on environmental long-term agreements (LTAs), such as conservation covenants, to identify the enablers and barriers to adoption and thus their potential for use in new contexts such as across land boundaries. To achieve environmental and societal targets, there is a clear and urgent need for more ambitious, longer-term agri-environment funding mechanisms which operate at a large scale. This is, in part, due to the recognition by national governments that shifts in policy for long-term sustainability are needed since many existing agri-environment schemes have not had the desired outcomes. The recent inclusion of conservation covenants in the UK's Environment Act demonstrates one such attempt to address this issue. Through critically analyzing the use of LTAs across the world using a systematic rapid evidence assessment approach, this article assesses the potential of these agreements to deliver landscape-scale environmental benefits and public goods that are increasingly being sought by national governments as they strive for transformative policies to prevent and mitigate environmental and climate catastrophes. Exploring the enablers and barriers to adoption, alongside examples of successful LTAs, we provide an overview from which interested parties—policymakers, land managers, and private enterprises, among others—can begin to understand the opportunities and barriers which surround these agreements. Overall, this literature review identifies several factors likely to affect the uptake of LTAs, including concerns around land managers' and stakeholders' real/perceived capacity to engage, a need for flexibility, finance structures, and how monitoring and evaluation are managed.

This article is categorized under:

Climate and Environment > Circular Economy

Climate and Environment > Ecosystem Services

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KEYWORDS

agri-environment, conservation covenant, environmental recovery, landscape-scale, long-term agreement

1 | INTRODUCTION

The urgent need to address the growing environmental and climate crises worldwide requires governments to develop transformative policies as they seek to reverse, mitigate, and prevent further ecological degradation (Pascual et al., 2022). The negative environmental impacts of intensive agricultural production have been well-documented, but while agri-environment schemes (AES) have been part of many European governments' strategies for several decades, they consistently fail to alleviate these impacts at a geographical scale and duration required for the delivery of widespread and lasting environmental benefits (Tyllianakis & Martin-Ortega, 2021). Both governments and private companies are beginning to explore other forms of agreement as they seek to secure long-term and wide-ranging land-use change (Monty et al., 2016; UN Climate Change Conference UK, 2021). For example, in the UK, a series of projects have been funded to carry out research into the suitability of long-term agreements (LTAs) to achieve these aims (see, e.g., Barkley, Short, & Chivers, 2022; Defra, 2020). Here, in line with these projects, we define LTAs as being agreements of at least 20 years duration, with the goal of continued sustainability beyond this point (Defra, 2023). Our conceptualization of LTAs in this article is broad, allowing for them to be agreements that involve both public and private actors, but given the paper's basis in agri-environment contexts, we focus on agreements that would include landowners and/or land managers. Moreover, we link such agreements with a discussion of their potential to be multi-party and boundary-spanning. The high level of interest globally, alongside rapidly changing policy arenas, warrants an examination of how such agreements may contribute to effective and sustainable transformation.

In England, the Environmental Land Management (ELM) schemes (Defra, 2021), developed as part of the UK Government's 25 Year Environment Plan (Defra, 2018), will support the rural economy during a transition to more climate-friendly nature-focused land management. Currently in its pilot phase and planned to launch fully in 2024, the most ambitious of these schemes, Landscape Recovery (LR), aims to generate ecosystem recovery through long-term, large-scale projects (Defra, 2022). This differs from previous AES offered in England, which have primarily been short-term schemes designed to support farmers' environmental efforts alongside agricultural production. In contrast, LR emphasizes significant land-use change away from agriculture, at a much greater scale and over a much longer timeframe (Defra, 2022). Given the landscape-scale nature of the scheme, cross-holding agreements that encompass multiple land managers and a range of stakeholders will need to cover issues of collaborative management, public and private finance, and governance in a way that AES have not previously included. In essence, LR agreements will be substantially different from existing AES, but are likely to contain such agreements within them. The design and utility of these agreements will be of interest internationally to those seeking to implement environmental measures across landownership boundaries and multiple stakeholders. In addition, since longer agreements are proven to deliver greater environmental benefits (Lennox & Armsworth, 2011), their adoption will be of considerable interest to governments, conservation organizations and private enterprises globally. Reflecting this, the core research question was, "what is the potential of LTAs to achieve land-use change and environmental outcomes at the landscape-scale?" We also carried out searches relating to blended finance, due to a recognition that LTAs operating under the ELM LR scheme in England are likely to follow this type of payment structure.

This systematic literature review was carried out as part of UK Government-funded research into long-term agreements for environmental restoration at the landscape-scale (see Barkley, Short, & Chivers, 2022). Examining literature on existing forms of LTA—primarily conservation covenants—this review critically analyses their current use internationally, assessing the potential of these agreements to deliver the lasting, landscape-scale land-use changes that are increasingly an essential part of environmental planning for both governments and private companies. By exploring the barriers and enablers to successful adoption of LTAs, we provide an overview from which interested parties can begin to evaluate the possibilities inherent in such agreements. Despite clear potential for LTAs, we identify several challenges that must be overcome to make such agreements viable. We conclude by outlining what makes an LTA successful, and explain why they could have significant positive impacts on land management practices by delivering environmental benefits and associated public goods. This article is of international importance as it can be used to inform future LTA development in a range of contexts.

2 | METHODOLOGY: A RAPID EVIDENCE ASSESSMENT

This systematic literature review derives from a Rapid Evidence Assessment (REA) (Collins et al., 2015), which sought to answer the following primary research question: How to construct long-term agreements to safeguard investments in land use change and associated environmental outcomes? Figure 1 provides an overview of the process used to identify and refine evidence (see Barkley, Short, & Chivers, 2022 for full details). Peer-reviewed papers and gray literature were identified using Web of Science (WoS) and Google Scholar. While Google Scholar is an “imperfect tool” (Piasecki et al., 2018, p. 809), it proved useful for gathering gray literature; additional gray literature was identified by the research team.

The literature searches were carried out between February 21, 2022 and February 25, 2022 under the University of Gloucestershire and University of Exeter’s journal subscriptions. Table 1 provides an overview of the search strings used, including the ordering. Multiple searches were used to ensure that as many relevant papers were examined as possible, and to reflect the range of terms used surrounding LTAs in different jurisdictions. However, only full-text articles available in English were included in the final analysis. While no specific time range was assigned, it should be recognized that earlier literature is less likely to be available electronically and thus some bias may be introduced (Raum et al., 2023, p. 589). Each search was sorted by “relevance” with the first 150 papers listed being examined. This limitation was due to the time constraints of the project, and while it is recognized that the necessary reduction in the scale and scope of the analysis might result in relevant papers being excluded, this practice is in accordance with systematic rapid evidence assessment protocol (see Collins et al., 2015, p. 4).

Once the above literature was imported to Endnote, duplicates were removed and papers underwent a further examination of relevance and robustness, using red-amber-green (RAG) ratings. These were scored according to the relevancy of the evidence to the research questions, and the robustness of methodology (for empirical studies) and transparency of conclusions. Those papers with the highest combined scores were taken forward for detailed analysis. These

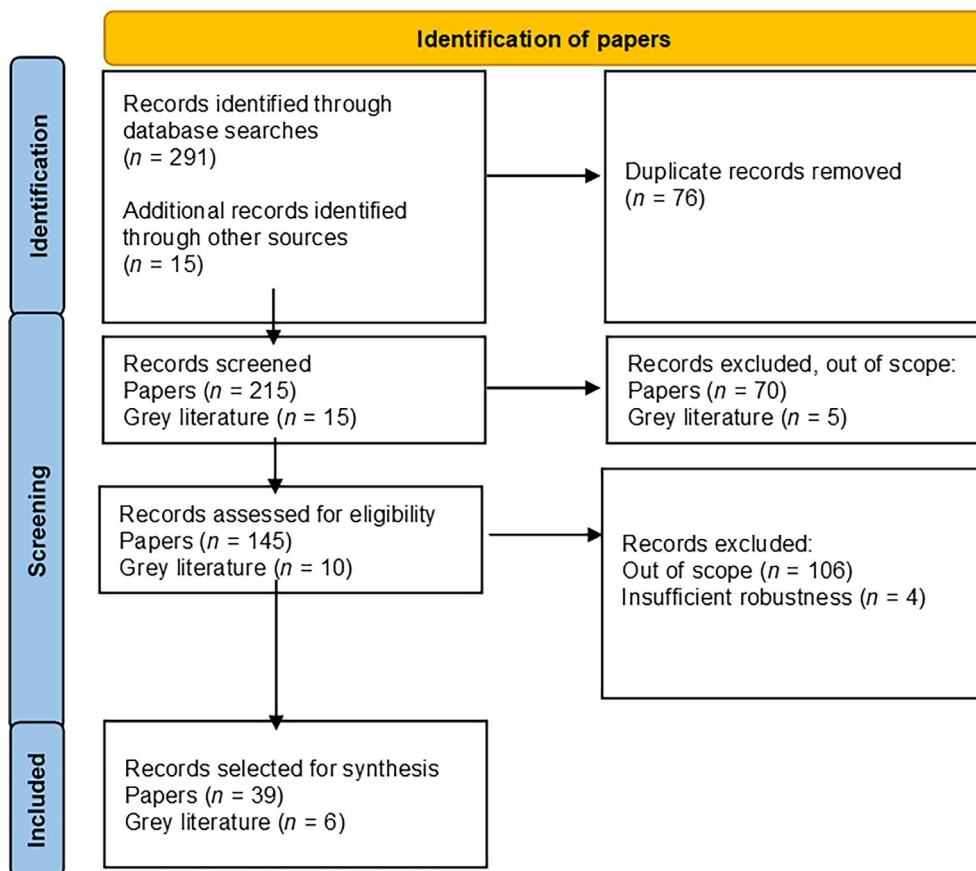


FIGURE 1 PRISMA diagram: LTAs for environment and agriculture.

TABLE 1 Search strings and number of records returned.

Search engine	Search string	Number of returns	Initial screening for relevance
WoS (February 21, 2022)	“Conservation covenant”	80	39
	(“agri-environment scheme” OR “long-term agreement”) AND (environmental OR agriculture)	291	14
	Farmer AND (environment OR conservation) AND (cooperation OR collaboration)	655	26
WoS (February 24, 2022)	Blended finance AND (environment OR conservation OR agriculture)	54	8
	“Private finance” AND investment AND (environment OR conservation OR agriculture)	443	33
	(“Agri-environment” OR “conservation covenant”) AND payment	216	67
	Blended finance AND (farmers OR landowners OR “land managers”)	8	2
	Blended finance AND investment AND (agriculture OR conservation OR environment)	13	6
	Blended finance AND (carbon OR soil OR biodiversity OR water)	32	8
Google Scholar (February 24, 2022)	“Conservation covenant”	869	31
	(“Agri-environment scheme” OR “long-term agreement”) AND (environmental OR agriculture)	3610	19
	Farmer AND (environment OR conservation) AND (cooperation OR collaboration)	435,000	28
Google Scholar (February 25, 2022)	“Blended finance” AND (environment OR conservation OR agriculture)	2540	27
	“Private finance” AND investment AND (environment OR conservation OR agriculture)	36,200	23
	(Agri-environment OR “conservation covenant”) AND payment	13,600	30
	“Blended finance” AND (farmers OR landowners OR “land managers”)	862	19
	“blended finance” AND investment AND (agriculture OR conservation OR environment)	2450	23
	Blended finance AND (carbon OR soil OR biodiversity OR water)	2210	21
<i>Total number of sources</i>			291

ratings were completed by LB, with decisions checked by CAC to ensure relevant papers were not excluded. In total, 39 papers and 6 pieces of gray literature were selected for in-depth critiquing and synthesis.

3 | OVERVIEW OF THE LITERATURE

When compared with the extensive literature on (shorter-term) AES, research relating to longer-term agreements and agriculture is notably lacking, with just 45 of the papers identified here deemed directly relevant. In addition, we identified a strong geographical bias in the literature on conservation covenants (Table 2). This may in part be due to the review's focus on English-language papers, but it also reflects these countries' established use of perpetual agreements for private land conservation (PLC) (Capano et al., 2019). The remaining literature discussed the use of covenants more generally, without reference to specific covenanting programs, and were often focused on the legal framework underpinning such agreements.

There is a growing body of research on factors that influence landholder participation in PLC programs (Bond et al., 2018, p. 410), however, most focus on short-term schemes, reflecting the limited adoption of LTAs to-date. In addition, the focus of PLC literature has shifted from a concentration on the details and effectiveness of conservation programs, to study the national and international policies that lie behind their implementation (Capano et al., 2019, p. 195). This reflects shifts in discourses on conservation and climate change, and the greater emphasis for governments

TABLE 2 The global distribution of research directly relating to conservation covenants.

Country	Number of papers
Australia	25
New Zealand	7
USA	3
Canada	1
South Africa	1

to meet both national and international environmental targets. While LTAs—including covenants—have been discussed in UK and European policy in recent years, they are yet to be widely implemented in practice. Moreover, within the limited English-language literature, different conceptualizations and terminology are used for LTAs; this makes comparative research on their utility challenging. There is, therefore, still much to be understood about the implications of their use in densely populated and agriculturally productive landscapes such as those found in northern Europe.

Conservation covenants are the most commonly addressed type of LTA, with most articles assessing factors motivating or inhibiting uptake. Key among these issues include: financial concerns; property rights; monitoring and evaluation; and administrative complexities. While their implementation can extend long-term conservation beyond the boundaries of traditional public nature reserves and onto private land (Comerford, 2013, p. 176), there is little information detailing covenants' utility for achieving coordinated and contiguous environmental recovery at scale (Archibald et al., 2021). Thus, the primary sources of reference for collaborative, cooperative, and cross-holding schemes are found in the wider literature on AES. While most AES operate at the field or farm-level only, it should be noted that some of these schemes aim to promote coordinated ecological action (Zaga-Mendez et al., 2020), thus achieving cross-holding benefits “by default” (Westerink et al., 2017). However, the short-term nature of AES contracts (typically 5–10 years) affects their ability to deliver lasting benefits at scale (Tyllianakis & Martin-Ortega, 2021). Moreover, although covenants and easements appear to have environmental benefits in areas under high pressure from development and other land uses (Pocewicz et al., 2011), the extent of their effectiveness is questioned both in terms of the impact on land management decisions and species protection. However, as Ferraro and Pattanayak (2006) note, the conservation community is not especially effective in evaluating key initiatives

4 | LITERATURE SURROUNDING CONSERVATION COVENANTS

4.1 | Defining conservation covenants for environmental recovery

The terminology used when referring to conservation covenants varies by jurisdiction: they are commonly known as “easements” in the United States and “burdens” in Scotland. Regardless, the literature reviewed gives the following overarching definition:

- Agreements made between a landowner and a conservation body to ensure the protection of natural or heritage features on the land
- Private and voluntary agreements made in the public interest
- Tied to land title, that is, effective even when land changes hands (Rodgers & Grinlinton, 2020, p. 374).

Covenants differ from AES agreements because they create perpetual obligations with regard to land, breaching the limitations imposed in many national legal systems on the imposition of enduring restrictions on the use of land (Rodgers & Grinlinton, 2020, p. 374). In these areas, long-term rather than perpetual agreements would be more appropriate. While common law covenants can only be taken “for the benefit of neighboring land which the covenant touches and concerns,” conservation covenants are taken for the wider public good and are enforceable by a “responsible body” (Rodgers & Grinlinton, 2020, pp. 374–375). There are generally a limited number of bodies that can hold a covenant, typically statutory authorities and designated conservation charities.

As the benefits of conservation covenants are intended to be effective beyond the boundaries of the covenanted land, they could offer a useful means to deliver and secure long-term environmental and public benefits that AES are not able to. However, few covenants seem to explicitly consider wider ecosystem objectives, with any such benefits often being deemed as indirect or incidental to the covenant's main aim(s) (Archibald et al., 2021, p. 104). In addition, most tend to only consider the flow of ecosystem services to the covenantor, and not to wider society (Archibald et al., 2021). To address this, there is a strong case for establishing holistic oversight by public bodies, alongside public consultation in the negotiation and execution of covenants (Rodgers & Grinlinton, 2020, p. 392).

Given the private and voluntary nature of conservation covenants, they may have limited utility for the strategic implementation of public policy to protect landscapes (Rodgers & Grinlinton, 2020, p. 377). Yet they could be a useful supplementary mechanism in conjunction with other policies. Moreover, if environmental recovery programs, such as LR, are ambitious in their goals, and attractive enough in their incentives to a diverse range of land managers, the voluntary nature of covenants need not be a barrier to their successful implementation across a landscape that consists of multiple landowners and land uses (Barkley, Chivers, & Short, 2022a, p. 11). Furthermore, it should be noted that legislation in New Zealand allows for the use of several different types of covenant,¹ and these can be used in combination to take advantage of the strengths of each (Rodgers & Grinlinton, 2020). Despite the limited geographical range of the literature reviewed here, it suggests they can be adopted for a range of targeted actions that would be suitable for environmental recovery.

4.2 | Assessing covenant measures and financing

Conservation covenants largely focus on restrictive measures such as preventing development or proscribing land use change, rather than fostering active or adaptive land management (Capano et al., 2019, p. 195). In the US, which has a long-standing covenant system, covenants are used by conservation groups and federal, state, and local governments to restrict development and promote biodiversity on agricultural land (Comerford, 2013); over 8.8 million acres of land in the United States were under agreements in 2012 (Law Commission, 2012). However, the use of solely restrictive agreements is a drawback in the context of environmental management at the landscape-scale (Rodgers & Grinlinton, 2020, p. 374). In Australia, where covenants are also well-established, they are often used within conservation programs to direct land management, yet again, this is often of a restrictive nature (Lindsay, 2016). Although not currently commonplace, covenants could instead comprise both positive and restrictive measures (Rodgers & Grinlinton, 2020, p. 402).

We found that covenants that reward land managers with ongoing payments are rare. Instead, tax relief is the most commonly used economic incentive (Law Commission, 2012). As this allows the financial benefit of covenant participation to be spread across part or all of its duration, it is often an attractive proposition for landowners. Indeed, Rodgers and Grinlinton (2020, p. 394) state that in the United States, federal tax concessions on covenanted land have been the primary driver for covenant uptake. This is also common in Australia, with one scheme offering annual tax reductions of up to 60% (Moon & Cocklin, 2011). When LTAs are publicly funded, granting landholders concessionary tax rates of this nature is possible and attractive from a budgetary perspective, since it does not require a large initial capital outlay; this is, however, not an option for privately-funded initiatives. Upfront payments may also be used, especially where capital works are required. Penalties for non-compliance or withdrawal from such a scheme can, however, be extensive, and covenantors should expect to repay any grants or relief they have received if this occurs. Indeed, the substantial penalties typically contained within covenant legislation act as a deterrent to transgression and are one way of ensuring lasting success (see Law Commission, 2012; Rodgers & Grinlinton, 2020, p. 383). These penalties are not, however, universal; for example, in England, the enforcement approach included in the Environment Act (2021) is in line with standard mechanisms for enforcement of contractual agreements, thus penalties are likely less severe than in LTAs in countries such as New Zealand.

The literature revealed little precedent for LTAs between private companies and landowners. Nevertheless, such agreements may become increasingly common as private companies seek to meet their own environmental agendas. While these agreements may be less about the delivery of public goods than conservation covenants typically are, this does not preclude their efficacy for achieving environmental recovery at scale. Given the limited public funds available through government bodies, it is increasingly likely that private companies will play a role here (Defra, 2023; Box 1).

Where ongoing payments rather than reliefs are required, this poses particular problems for funders. Many organizations are likely to be unwilling and/or unable to commit to funding an LTA across its lifetime, due to their funding cycles and financial horizons (Barkley, Chivers, & Short, 2022b, p. 9). In addition, any increases to payments over time

BOX 1 Key actors that may become involved in LTAs

Governmental bodies (e.g., environmental departments), national park authorities, environmental NGOs, private utility companies, natural capital companies, and environment banks. It is important to note that privately-funded landscape-scale land management depends on organization type; some types of private companies are more likely to encourage environmental management at the landscape-scale than others. For example, water companies in England may adopt LTAs to aid their implementation of catchment-scale approaches to land management. Those more concerned with offsetting activities would be less inclined to ensure consistency of land management across a landscape, or to secure contiguous parcels of land.

(e.g., due to inflation) could leave funders unable to uphold their commitments. Indeed, the literature finds that budget cuts and shifting spending priorities often negatively impact covenant providers (Groce & Cook, 2022, p. 7). Further, covenants with ongoing positive management prescriptions have been found to be off-putting for some land managers too, with concerns over the continued stability of funding the main reason for their reluctance (Comerford, 2013). The financial considerations discussed in the literature are displayed in Figure 2; many of these considerations are applicable to both covenanting bodies and individual covenantors.

Given the high levels of compensation required to encourage and enable reductions in agricultural outputs, funders must consider the cost-effectiveness of using LTAs for environmental recovery in agriculturally intensive landscapes. Instead, a portfolio of short- and long-term contracts may offer greater efficiencies (Lennox & Armsworth, 2011), although this may increase implementation costs. However, since covenanted land often remains under the management of the landowner, the covenanting authority do not have the same level of ongoing management costs that would accompany the acquisition of land through purchase (Comerford, 2013). The cost to funding bodies would likely be substantially lower in a covenant than in direct purchase of the land, however, their long-term nature may increase costs relative to shorter-term management agreements such as those commonly found in AES (Drechsler et al., 2017).

Adams et al.'s (2014) study found that properties that would be least costly to manage under a covenant model—generally larger properties—were also least likely to participate. This creates a tension between the cost-efficiency of schemes and the delivery of environmental benefits at the landscape-scale. It also poses particular problems for the design of incentive schemes. Common policy simplifications, such as fixed payment rates and non-competitive contract allocation, are shown to result in a significant reduction in biodiversity benefits for a given level of investment, relative to the optimal policy (Armsworth et al., 2012). This suggests that more complex, tailored policies should be implemented, even where administrative costs are higher. Additionally, LTAs should be prioritized for highly targeted conservation programs rather than for more general, less targeted schemes (Lennox & Armsworth, 2011). Although less targeted schemes may not deliver transformative environmental action in isolation, they will continue to play an important role in conjunction with longer-term, specific, landscape-scale approaches, which are not always possible or appropriate.

4.3 | Land manager motivations to covenant

The literature suggests that covenants tend to be attractive to a narrow subset of landholders (Comerford, 2013). Absentee and non-production landholders appear considerably more likely to participate in covenanting schemes than those who derive their primary income from the land (Bond et al., 2018, p. 414). In addition, one study found that those with the highest proportions of agricultural production were more likely to require a higher compensation payment and also most likely to withdraw from a covenant (Comerford, 2013, p. 181). For those who derive their primary income from agricultural production, financial concerns are key; appropriate incentives must be designed if land is to be removed from production. In addition, ongoing concerns over global food security may increase reluctance among land managers where LTAs require land to be removed from agricultural production. Where the price of crops is high or prone to large fluctuations, it is, therefore, likely that those considering an environmental LTA will seek substantial compensation payments. Thus, the appeal of LTAs must be broadened if they are to be used for environmental recovery at the landscape-scale.

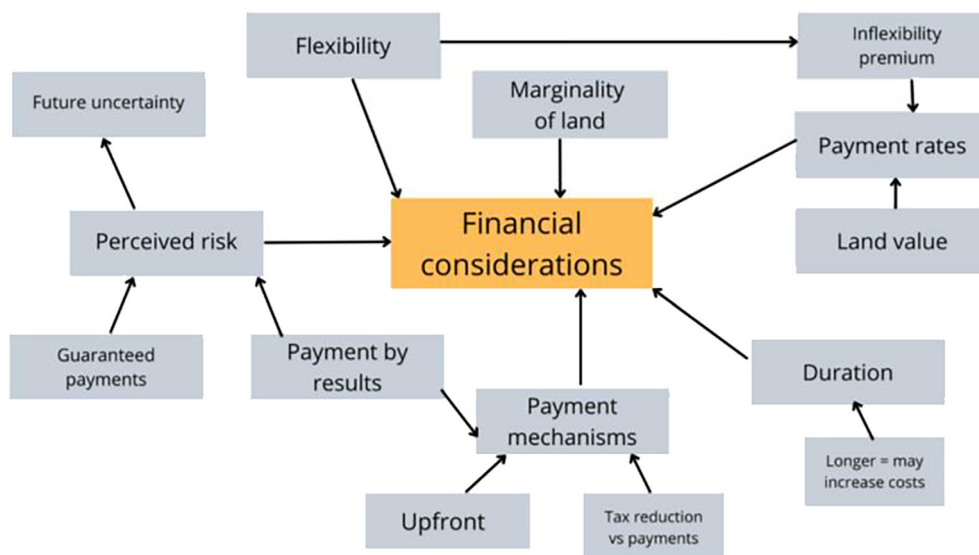


FIGURE 2 Overview of the topics which arose within literature surrounding financial considerations in relation to conservation covenants.

There is conflicting research surrounding financial motivations for adopting a covenant. Comerford (2013, p. 179) found that covenantors in Australia tended to be highly educated with higher incomes than average. In contrast, Groce and Cook (2022) found that original covenantors often earned less than average, but that successive owners tended to have slightly higher incomes. This research also found that one-third of respondents executed a covenant for financial reasons (Groce & Cook, 2022). Further, landowners also tend to demand higher compensation payments for longer or perpetual contracts relative to shorter ones; this “inflexibility premium” can significantly increase costs for funding bodies (Drechsler et al., 2017). However, Adams et al. (2014) suggest that authorities would be willing to pay a premium to secure permanent land protection, as opposed to engaging landholders in shorter management agreements. The main concern in such an approach is that participation rates are negatively correlated to both an increase in contract length and an increase in the proportion of property required to be under an agreement (Adams et al., 2014). These findings emphasize the difficulties of applying landscape-scale environmental recovery programs where agricultural production predominates. Indeed, production landholders are more likely to experience a greater degree of financial insecurity than their non-production counterparts (Moon & Cocklin, 2011, p. 499) and thus may be under increased pressure to maximize productivity; therefore, designating parcels of land for conservation activities may be perceived as too big a financial risk (Harrington et al., 2006, p. 201; Moon & Cocklin, 2011, p. 499). It should be emphasized, however, that LTAs’ appeal may lie in the future financial certainty they can offer land managers.

Covenantors often exhibit strong pro-environmental attitudes (Groce & Cook, 2022; Harrington et al., 2006, p. 202), suggesting that they may be predisposed to adopting formal conservation arrangements. This raises issues of additionality, since landholders often contribute land already set aside for conservation, or their least productive land (Moon & Cocklin, 2011). However, this also demonstrates that the behavioral differences associated with differing land-ownership structures render production-oriented and single-ownership models insufficient for understanding the barriers to the adoption of LTAs. A wider range of landowner circumstances and motivations must be considered when designing policy to achieve the participation rates required to make landscape-scale programs effective. Although she cautions against making generalizations regarding the types of landholders who participate in environmental incentive programs, Comerford (2013) notes that landholders from communities that are more accepting of environmental measures and where high levels of social trust exist, appear more willing to participate. Indeed, Harrington et al. (2006) demonstrate that community networks play an important role in shaping the values, aspirations, and actions of landholders with regards to the environment; underlying socio-cultural factors should not, therefore, be underestimated. Moreover, government policy has been shown to play an important role in creating the conditions that underpin these favorable attitudes (Kabii & Horwitz, 2006, p. 12).

The literature recommends that remuneration must respond to shifts in opportunity costs related to land management options, thus rewarding environmental results at a level comparable to the profit margin involved in producing a

market product (commonly referred to as income foregone; Herzon et al., 2018). Examples that demonstrate this principle in real-world, long-term contexts are, however, currently lacking. Pricing the environmental benefits and public goods that can accrue from landscape recovery schemes is especially challenging given the non-rival and non-excludableⁱⁱ nature of these benefits. This presents a particular challenge when valuing such goods, as markets must be created specifically for them. Bundling payments for harder to value public goods such as biodiversity with more easily marketed services such as carbon credits can aid with the pricing of the former (Bryan, 2013, p. 128), but until this routinely happens, land managers will not be sufficiently incentivized to prioritize the delivery of environmental benefits at scale.

4.4 | Covenant characteristics for encouraging uptake

Other key concerns for those considering LTAs include their duration and potential impact on land value (Barkley, Chivers, & Short, 2022a, p. 9; Comerford, 2013). However, covenants are not always perpetual, and if the legal framework of a country allows, landholders can specify an agreement's duration; this ability to stipulate an end point may increase attractiveness for some landholders. Fixed-term agreements such as these have become increasingly common in Australia, promoted by market-based conservation schemes (Lindsay, 2016). The legalities of how agreements operate will be specified by the jurisdictional context in which they operate, but it is important to note the variations that are possible within a covenant model.

While concerns over the impact of covenants on the future value of land have been identified as a key barrier to participation, as the impact only takes effect when the property is sold, it is the *perceived* impact on land values that matters when landowners consider a covenant (Comerford, 2013; Moon & Cocklin, 2011). Limited-term agreements are likely to alleviate some landowner concerns about the possible impacts of an LTA on land value, but they may endanger the long-term security of any environmental recovery achieved. In addition, leasehold land brings a further element of complexity into long-term environmental planning. Tenancies will likely pose a significant challenge to LTAs, as agreements on tenanted land cannot burden the land beyond the length of tenancies. In many cases, this likely excludes their participation. Any boundary-spanning scheme for environmental recovery must therefore consider the multi-ownership and multi-function aspects of landscapes, or risk fragmented, and thus ineffective, environmental delivery.

Although initial motivations for adopting an LTA are important, the duration of such agreements makes it essential to ensure agreement-holder satisfaction is maintained throughout its term. Rates of ongoing satisfaction with covenants appear to be lowest among successive owners and those who covenanted for financial reasons (Groce & Cook, 2022). Considering that in the case of agreements tied to land title the number of successive owners will increase as original covenantors sell their properties, maintaining satisfaction among agreement-holders is vital to ensuring the longevity of covenants as a mechanism for achieving positive conservation outcomes (Groce & Cook, 2022; Harrington et al., 2006, p. 204).

Existing literature surrounding the impact of landholder risk profiles on decisions to covenant is contradictory. Comerford (2013, p. 177) found that more risk-averse landholders may be more willing to adopt a covenant because they offer guaranteed payment(s) if conditions are met; in such cases, a covenant with a large upfront payment is preferred to a shorter-term agreement with regular payments. However, Moon and Cocklin (2011, p. 495) found that landholders who perceive their current and future income to be uncertain prefer shorter-term programs as these are generally seen as lower risk. This presents an interesting dilemma for funding bodies, as it suggests that the offer of financial certainty may not be enough, on its own, to encourage commitment to an LTA. As a result, funding bodies may need to pay above the true costs of environmental delivery to secure participation. If environmental recovery is sought at the landscape-scale, securing the participation of reluctant parties whose participation is required to provide contiguous parcels of land could significantly increase scheme costs.

4.5 | The importance of flexibility

The perceived inflexibility of covenants can significantly impair uptake; one study found the inclusion of permanent covenants within a conservation scheme reduced participation by 57% (Comerford, 2013, p. 177). This can have a negative impact on scheme effectiveness, since competition between applications may be lacking and covenanting authorities are forced to choose from a limited pool of potential covenants (Comerford, 2013, p. 179). However, other research

suggests covenants can be designed with flexibility in mind. For example, Lindsay (2016) analyses the nature and design of covenants used to achieve ecological protection on private land in Australia. Shorter-term agreements such as those traditionally found in AES are characterized by their transactional qualities that ensure an “exchange of promises,” generally within an inflexible scheme framework, while covenants are shown to exhibit *relational* qualities, making them more suitable for long-term and landscape-scale environmental governance (Lindsay, 2016). These relational qualities:

- Seek to maximize benefits from cooperation between parties
- Provide flexibility between the agreement's outcomes and the practices used to achieve these
- Can account for future uncertainties
- Enable adjustment of agreements to accommodate change.

Since covenants can be tailored to each landholding, they can seek a holding-specific balance between the landowners' and the funders' needs. This flexibility is limited, though, by the legislative background that underpins covenant use, and varies between jurisdictions (Rodgers & Grinlinton, 2020). New Zealand's Open Space Covenant may provide a model here, being a flexible covenant that, while based on a standard template, can be tailored to suit individual arrangements (Rodgers & Grinlinton, 2020, p. 384). In some instances, conservation programs may include covenants that are consistent regardless of location or ecosystem type (Bond et al., 2018, p. 413). This approach is unlikely to deliver optimum results in terms of participation rates or environmental benefits when compared with tailored agreements (Miljand et al., 2021).

Many sources of uncertainty and variability could affect the success of LTAs, including changes in landownership, economic cycles, climate-related events, or shifts in ecosystem dynamics. If these can be factored into conservation planning, agreements could be robust to future change (Lennox & Armsworth, 2011). LTAs would likely, therefore, require mechanisms for adjustment to be built into the terms of agreement, while discouraging outright withdrawal. In the United States, modifications and discharges to conservation covenants are controversial, and only considered in a limited range of extenuating circumstances (Law Commission, 2012). The adjustment of perpetual agreements to accommodate dynamic conditions has been considered in the United States, but adaptive management of this nature requires stringent assessment and application of baselines, indicators, and goals (Lindsay, 2016, p. 701). While appropriate for agreements with positive management obligations, this is less appropriate for restrictive covenants; yet even these should incorporate some flexibility so that their original purpose is met.

Crucially, LTAs require a context of cooperation in the pursuit of conservation outcomes, and a stable framework of relations between landholders and funding agencies (Lindsay, 2016, p. 700). Moreover, communication between land managers, funders and other stakeholders involved in cross-holding schemes is crucial to their success; in situations where access to information is limited, for both land managers and authorities, environmental programs tend to fall short of their intended outcomes (Ferraro & Pattanayak, 2006). To be successful, LTAs must therefore be underpinned by suitable socio-cultural, economic, and political frameworks. Further, statutory and institutional instruments should be put in place to collect, coordinate, and disseminate information at local, regional, and national levels (Moon & Cocklin, 2011).

A balance must be sought within an LTA between flexibility and legal certainty and coherence. Significantly, there may be greater scope to adjust agreements while still providing this certainty under a multi-party rather than single-party agreement (Lindsay, 2016, p. 700). For example, if one area or land manager requires adjustments to be made to their individual agreement, other members may be able to take on additional obligations; a collaborative approach of this nature should ensure environmental gains can continue to be made across the landscape. In such cases, having a robust legal framework in place to safeguard individuals against potential non-compliance or a lack of success by others will be critical. Given the complexities of landscape-scale land management, disputes raised as a result of this might involve a wide range of stakeholders not directly party to the agreement (Lindsay, 2016, p. 701). As such, dispute provisions should be adaptive and include scope for graduated and corrective action, but further work on the modeling and testing of dispute management and adaptive agreements is required (Lindsay, 2016).

4.6 | Spatial considerations

Landscape-scale land-use changes in densely populated areas such as northern Europe will likely require collaboration, co-operation, or co-ordination between land managers. Boundary-spanning agreements involve particular issues and

therefore, AES—especially those that exhibit collaborative elements—have important learnings for the design of multi-party, landscape-scale agreements. While collaboration is not a prerequisite to delivering environmental outputs at the landscape-scale, schemes exhibiting a strong collaborative approach appear to produce greater benefits, including those related to social learning and behavioral change (Wheeler et al., 2021).

A lack of coherency across conservation schemes generally is a key barrier to the achievement of successful environmental outcomes through LTAs (Fitzsimons & Carr, 2007); this is likely to be exacerbated if schemes are not integrated at the landscape-scale. Overseeing bodies must ensure that the land entered into scheme is of an adequate size and that it is sufficiently contiguous to avoid fragmentation of environmental benefits (Franks, 2016). Moreover, while applying market logic to LTAs may appear the best way to attract private funding and promote innovation in management practice, competition between land managers may be undesirable in such a context (Cooke & Corbo-Perkins, 2018, p. 173). Indeed, Cooke and Corbo-Perkins identify a particular tension between the way in which PLC schemes position private property as the foundation around which policy is conceived, even as such schemes seek to address environmental issues at a cross-holding scale. If AES continues to target and reward farmers for their efforts at the field- or farm-scale, there will remain little incentive for them to collaborate beyond their property boundaries (Franks & McGloin, 2007, p. 243); this could be a further barrier to the development of an effective LTA.

Given the administrative complexities of forming multi-party agreements, their transaction costs are likely to be significantly higher than those involved in single-party and non-customizable schemes. Higher compensation payments to land managers therefore seem to be a necessity, and paying a proportion of these up-front to cover administration costs is recommended (Franks & Emery, 2013, p. 858). The increase in contract lengths implies a commensurate increase in incentive payments (see, e.g., Comerford, 2013, p. 177), but research suggests that this is offset by the reduction in costs associated with the renewal of agreements and recruitment of participants to shorter-term schemes (Lennox & Armsworth, 2011, p. 2857; Moon & Cocklin, 2011, p. 502). It should also be noted that their inherently complex nature means multi-party LTAs will likely require significantly more focus on governance arrangements. A lack of time to manage the agreement was found to be a key impediment to the success of one Australian covenanting scheme (Fitzsimons & Carr, 2007) and, therefore, governance should not be overlooked, either by authorities seeking to administer LTAs or by those land managers considering committing to one.

As with AES, optimal policy design and implementation is likely to arise only when local expertise is built into scheme design (Prager et al., 2012). This expertise must span economic and social circumstances, not just environmental aspects (Herzon et al., 2018, p. 350; see also Cooke & Corbo-Perkins, 2018, p. 178). Encouraging land managers to use their specific local knowledge in agreement design may deliver a higher quantity and quality of environmental outputs, and appears to be especially impactful in multi-party AES agreements (Franks & McGloin, 2007, p. 238). Front-loading land manager participation within program design has been shown to build trust and cooperation, leading to more durable decisions and actions (Harrington et al., 2006, p. 190; Prager et al., 2012, p. 246).

Further, literature on collaborative agri-environment working identifies clear benefits to those farming groups that employ a facilitator with good local knowledge (Franks, 2016), as they can aid coordination among land managers and tailor agreements to the specific ecological conditions of an area. Westerink et al. (2017) determine that the complexities of a landscape-scale approach also necessitate the spatial coordination of such schemes to be overseen by a professional or professionalized organization, such as a governmental organization or formalized farmer group. In particular, facilitators may be needed to help stakeholders reimagine and manage the landscape in ways that overcome geographic or socio-economic boundaries, such as those of catchments and jurisdictions (Enloe et al., 2017, p. 584). Crucially, this helps address the scale mismatches that threaten the implementation and sustainability of landscape-scale schemes.

Additionally, collaborative governance modelsⁱⁱⁱ seem to be a prerequisiteⁱⁱⁱ for delivering successful landscape-scale environmental management, yet there is very little literature addressing real-world examples of this. Particularly appropriate when there is heterogeneity among stakeholders, collaborative governance encourages innovation and robustness within a scheme (Dedeurwaerdere et al., 2015, p. 27). While such governance networks can suffer from high implementation costs, the key message from literature is that a more diversified governance system, which has recourse to a combination of government, market, and collaborative networks, will have a higher adaptive capacity for tackling complex environmental management problems (Dedeurwaerdere et al., 2015, p. 27). Some established models of collaboration for environmental land management exist, such as the Netherlands' Environmental Co-operatives or France's Environmental and Economic Interest Groups (see Franks & McGloin, 2007; Westerink et al., 2017). However, “cutting and pasting” (Westerink et al., 2017, p. 177) governance arrangements from one country to another is unlikely to be successful, given the differences in socio-cultural and political frameworks between nations. Approaches to the governance of

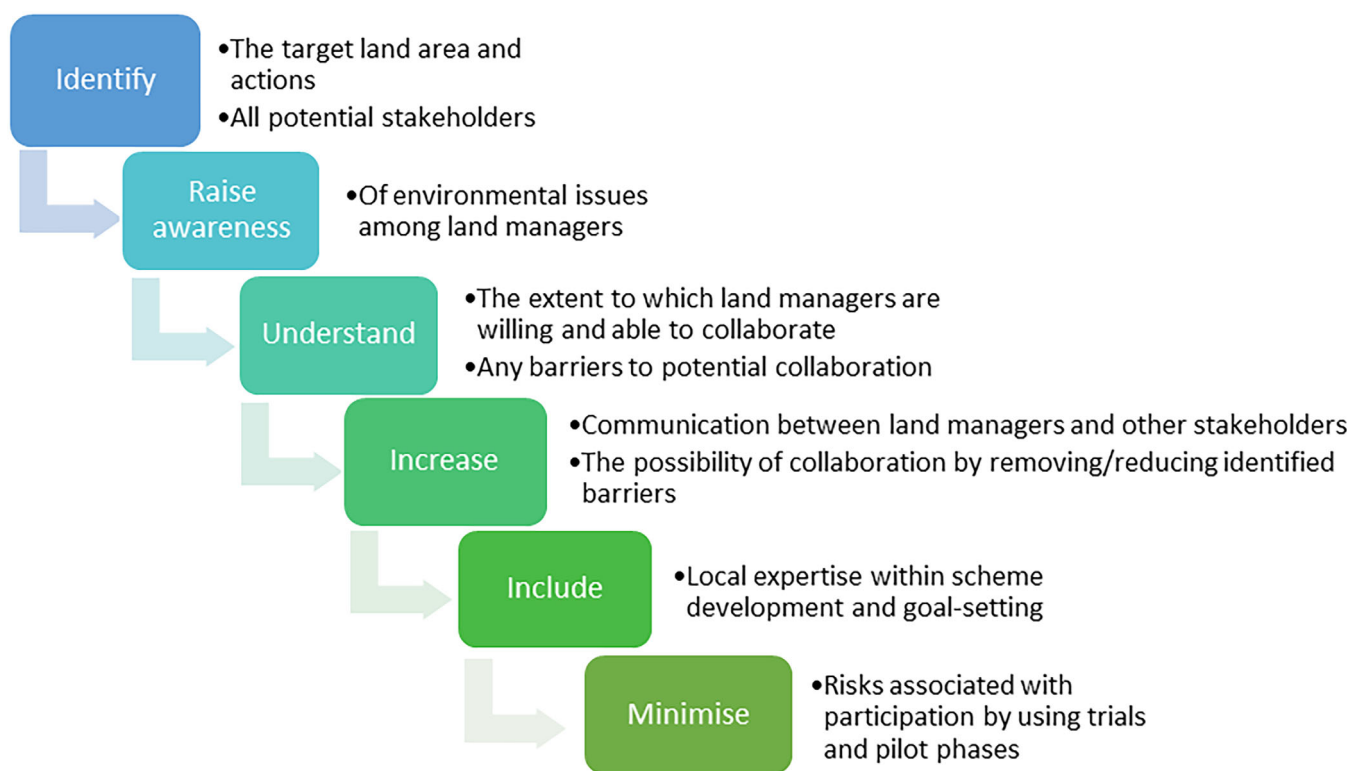


FIGURE 3 Key steps required for success in collaborative and cross-holding environmental land management schemes.

long-term and landscape-scale agreements therefore need to reflect the specific institutional structuring of a nation, as well as the existing spatial configurations of a particular region.

4.7 | Adaptation of agreements

Land managers and scheme facilitators can also use their combined local knowledge to fine-tune land management to off-set regional variations in conditions, both spatially and temporally (Franks & McGloin, 2007). Adaptive management of this nature is particularly important for LTAs, in which cycles of land management must be continually evaluated and learnings incorporated into future practices to achieve optimal results over time (Folke et al., 2005). Ongoing revision of agreements will also help mitigate the effects of environmental and climate changes, not only ensuring the continued delivery of environmental benefits but also reducing the need for costly and time-consuming non-compliance proceedings. Any LTA must therefore include a program of regular monitoring as an essential part of its clauses (Wheeler et al., 2021).

Relationships between land management and environmental outcomes can, however, be difficult to measure when monitored at landscape-scale. Neighboring land could have a detrimental impact upon covenant outcomes (Fitzsimons & Carr, 2007); therefore, the monitoring of agreements must consider factors outside land managers' direct control, and beyond property boundaries. Enloe et al. (2017) find that the most successful monitoring systems are co-constructed by stakeholders, resulting in an evaluative framework that all parties perceive as fair. They recommend moving a step beyond adaptive management, to "adaptive co-management" (adaptive governance by heterogeneous actors); this approach appears especially suited to multi-ownership contexts with complex land-use dynamics (Enloe et al., 2017). While adaptive management can be responsive in addressing any issues arising in land management and environmental delivery, co-management can help build engagement among diverse stakeholders, including with potential sources of project funding. Crucially, such an approach builds scheme resilience in multi-party contexts, improving the quantity, quality, and duration of scheme inputs and outputs. Additionally, Enloe et al. (2017) recommend instituting a program of social monitoring alongside the measurement of ecological metrics; this can assess behavioral change and aid with the continuation of good practice once agreements come to an end. Indeed, Race and Curtis (2013,

p. 1051) emphasize the importance of designing and implementing policy instruments that are effective in securing landholder commitment to behavioral change beyond their immediate participation in an environmental program. Figure 3 shows some of the key steps required for success in collaborative and cross-holding schemes, as derived from the literature reviewed here.

5 | CONCLUSION

The review revealed a limited range of literature in terms of geographical spread and scope, with most concerned with the use of restrictive conservation covenants within specific environmental programs. Other literature discussed the use of covenants more generally, focusing on the legal framework and processes underpinning these. There is agreement that LTAs of some form are necessary to secure lasting benefits at the landscape-scale, to meet the challenges presented by both climate change and biodiversity decline. The most significant gaps in the literature concern the development of LTAs as a positive environmental incentive, and their monitoring and evaluation as an effective environmental approach. However, it is clear that the suitability of LTAs to achieve this is affected by differing land ownership and management structures, and will, therefore, be geographically specific.

Conservation covenants, as one type of LTA, need to be thought of as an instrument to encourage dynamic land management practices, rather than just as a means to restrict certain activities. The optimal balance between differing land-use objectives across a landscape will determine how appropriate LTAs might be at achieving these objectives. Where LTAs for environmental recovery are utilized, these should be done synergistically across the landscape, to prevent agreements pulling against each other. Explicitly considering the ecosystem requirements of the wider landscape is an important first step to creating such agreements. Despite environmental interventions often delivering multifunctionality, conservation schemes tend to focus on single ecosystem services (Archibald et al., 2021; Bryan, 2013, p. 128). Allowing landholders to link environmental schemes or be rewarded for delivering multiple outcomes may ensure the long-term security of investments and returns both for funding bodies and agreement holders (Fitzsimons & Carr, 2007). Further, as ecosystem services markets expand, it will be vital for both funding bodies and agreement holders to consider how different forms of agreement might interact with one another (Archibald et al., 2021, p. 106).

While ambitious programs are required to enact environmental recovery at the landscape-scale, these will inevitably come at a financial cost. Shifting spending priorities and squeezes on budgets—both in the public and private sectors—could have a significant impact on the ability of funders to fulfill their financial obligations in relation to LTAs. This would not only increase agreement-holder dis-satisfaction, but could have a significant impact on expected environmental outcomes. LTAs for landscape-scale recovery must therefore be underscored by stable sources of funding and appropriate regulatory frameworks, to ensure land managers are rewarded for their conservation efforts and environmental returns are not jeopardized.

Conservation covenants will not be appropriate in every case, and thus other forms of LTA—especially those of limited duration and those that do not burden the land—must be explored. These should be drafted in a way that provides security both to land managers and in the environmental benefits achieved, while remaining flexible enough to encompass change when necessary. Adaptation, especially of agreement aims, must be based on robust monitoring and evaluation frameworks that consider the long-term nature of the agreement and its aims. Having a trial period or pilot phase may boost participation rates and deliver a higher quantity and quality of environmental benefits. Only by adapting to changing ecological and socio-economic conditions will such agreements remain relevant, attractive, and deliver the optimal environmental benefits.

AUTHOR CONTRIBUTIONS

Lucy Barkley: Formal analysis (equal); investigation (lead); methodology (equal); project administration (equal); visualization (equal); writing – original draft (lead); writing – review and editing (equal). **Christopher Short:** Conceptualization (supporting); funding acquisition (supporting); methodology (equal); project administration (equal); supervision (equal); writing – review and editing (equal). **Charlotte-Anne Chivers:** Conceptualization (lead); formal analysis (equal); funding acquisition (lead); investigation (equal); methodology (equal); project administration (equal); supervision (lead); visualization (equal); writing – review and editing (equal).

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The authors declare no conflicts of interest.

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Data sharing is not applicable to this article as no new data were created or analyzed in this study.

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ENDNOTES

ⁱ In New Zealand, covenants may be made under the Reserves Act (1977), the Conservation Act 1987, the Resource Management Act 1991, or the Queen Elizabeth II National Trust Act 1977 (Rodgers & Grinlinton, 2020, pp. 383–384).

ⁱⁱ The use of rival goods precludes use by others, while access to excludable goods can be restricted to those who pay (Bryan, 2013); many environmental and public goods do not easily fit into either of these categories.

ⁱⁱⁱ Westerink et al. (2017) use the following definition of collaborative governance: “the processes and structures of public policy decision making and management that engage people constructively across the boundaries of public agencies, levels of government, and/or the public, private, and civic spheres in order to carry out a public purpose that could not otherwise be accomplished.”

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