



## Indigenous benefits and carbon offset schemes: An Australian case study



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### ABSTRACT

The nexus between human rights and the environment is a key issue for climate policymakers and Indigenous peoples around the world. We combine national spatial, social and biological datasets from Australia to describe where Indigenous carbon projects are happening, why Indigenous people are participating, and how effective these schemes might be at marrying Indigenous co-benefit, biodiversity and carbon emission mitigation goals. Our study shows that many Indigenous people engage in carbon offset schemes as part of their broader cultural responsibility for landscapes, and that they seek to grow the relationship between social and ecological benefits. It also highlights the challenges associated with designing carbon offset schemes that address the impacts of climate change and respond to Indigenous peoples' world views about what is required to sustain cultural-social-ecological systems.

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### 1. Introduction

In recent decades, Indigenous communities have partnered with multiple government and non-government organizations (NGOs) to drive and support their Indigenous cultural and natural resource management (ICNRM) aspirations and activities (Colchester, 2004; Bark et al., 2012; Hill et al., 2012; Robinson and Wallington, 2012). Indigenous people are highly motivated to undertake ICNRM work because it provides a range of co-benefits that help to enable and/or re-establish traditional obligations to their Indigenous estates, including knowledge sharing and cultural activities.

Payment for ecosystem services (PES) – which involves a voluntary transfer of incentives from beneficiaries to providers of

ecosystem services, conditional on service provision and voluntary participation – has provided a valuable pathway for supporting ICNRM enterprises (Whitehead et al., 2009; Zander and Garnett, 2011). Recognized as a key mechanism for meeting offset standards and their co-benefit requirements, many countries, NGOs and corporations have engaged in PES partnerships to deliver carbon offset projects with local Indigenous and rural communities (Muradian et al., 2013).

In principle, carbon markets and associated PES schemes allow Indigenous landholders and managers to achieve co-benefits through the development of carbon sequestration and abatement projects. In practice, however, designing carbon offset programs and policies that achieve both carbon and associated co-benefits has proved challenging (Howe et al., 2014). Efforts have been frustrated both by a lack of understanding about the parameters under which benefits for Indigenous communities can be sought, and by the realization that there may be fewer opportunities than anticipated to simultaneously realize a full suite of carbon and Indigenous co-benefits (Reed, 2011; Robinson et al., 2014).

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Australia's Carbon Farming Initiative (CFI) and associated incentive schemes provide an opportunity to examine Indigenous people's motivations for participating in PES schemes supported through greenhouse gas mitigation strategies. The CFI was a government-regulated voluntary carbon offsets scheme, which includes a mechanism for selling carbon credits by reverse auction to the Australian government (Commonwealth of Australia, 2011). The Australian government encouraged Indigenous peoples' participation in the CFI through a \$AU 22 million 'Indigenous carbon farming fund' (ICF) and \$AU 1 billion Biodiversity Fund.

We begin by providing a national-level analysis of Indigenous community co-benefit motivations for participating in carbon offset projects. We then focus on Indigenous tree-planting CFI projects to investigate both their carbon sequestration potential and their capacity to deliver Indigenous co-benefits. We reflect on these results to consider the challenges associated with designing and evaluating national and international standards and programs that seek to deliver effective carbon emissions mitigation, whilst also making a significant contribution to human rights, poverty alleviation and biodiversity conservation. While empowering Indigenous peoples and addressing climate change are issues of global concern, the connection between mitigating climate change and strengthening Indigenous peoples' rights to and interests in their traditional estates is rarely made.

## 2. Methods

The study captured Indigenous peoples' perspectives on the benefits they wish to achieve through participation in carbon offset projects (hereafter 'Indigenous carbon co-benefits'). First, data were collected from interviews with representatives from all (128) Indigenous agencies and representative bodies that could be involved in carbon offset projects across Australia (see [Supplementary methods](#)). A map of Indigenous land across Australia was also compiled. The data sources, classes and description of tenure interests used to create the map are documented in [Supplementary Table 1](#).

Representatives from Indigenous organizations were contacted, 91% of whom participated in the telephone interview. Indigenous organizations selected for interview included representative bodies recognized under Australian legislation and Indigenous land management groups that can provide carbon offset services (e.g. tree planting and fire management). Semi-structured interviews were conducted with each organizational representative (selected by the organization). In this study, we focused on responses to the question, "What benefits are desired by the local Aboriginal community participating, or interested in engaging, in a carbon PES scheme?" These relate to self-assessments of capacity (e.g. appropriate tenure interests and levels of access to land rights, resources and relevant expertise; see also [Robinson et al., 2014](#)) and the types of benefits sought.

Interviews were transcribed and imported into NVivo for coding and analysis. This analysis was informed by grounded theory to enable generic themes and relationships to be identified and understood from the interview data ([Boyatzis, 1998](#)). Transcripts were pre-coded to identify important segments of the text, and themes were identified and checked for overlap and duplication before further theme categories were identified and refined. The results of this analysis are presented in [Table 1](#).

Anticipated benefits from supported CFI Indigenous carbon projects were analyzed using a subset of CFI Indigenous carbon sequestration projects that involved planting native trees ('Indigenous CFI environmental planting projects'). At the time of our analysis, there were 24 successful Indigenous CFI environmental planting projects; 16 funded through the Biodiversity Fund and 8 through the Indigenous carbon farming fund. These projects

were mapped to determine where they were located in relation to carbon sequestration potential using data supplied by the Australian Government. CFI-funded projects were classified as either 'feasibility' or 'operational' projects. Feasibility projects primarily assess the viability of proposed activities or governance and legal issues. Operational projects are associated with on-the-ground work and Indigenous land management activities.

The carbon sequestration potential of successful Indigenous CFI environmental planting projects was then assessed. The potential carbon that could be sequestered by planting native vegetation in areas that were historically (pre-1750) covered by vegetation at least 1.3 m tall (tall enough to qualify for carbon planting) was estimated using data on carbon sequestration potential for mixed environmental tree plantings from [Polglase et al. \(2013\)](#). Using monthly climate data (air temperature, vapour pressure deficit, solar radiation, rainfall, number of frost days), site factors (latitude, soil texture, maximum available soil water storage, soil fertility), initial stocking rate and management conditions (e.g. fertiliser application), the 3-PG2 model of tree growth was used to estimate carbon sequestration rates per year, averaged over a 40-year period at a resolution of 1 km<sup>2</sup>. Sequestration rates beyond that period are considered negligible. The model was calibrated and validated against sites for environmental plantings, primarily in south-eastern Australia and lower rainfall zones (less than 800 mm). A detailed methodology on calculating rates of carbon sequestration can be found in [Polglase et al. \(2013\)](#). (We note that this model does not include soil nutrient limits and fire frequency, both of which have been shown to be important factors in afforestation carbon sequestration potential.)

We also assessed the biodiversity co-benefits of successful Indigenous CFI environmental planting projects. To determine whether carbon planting had the potential to produce biodiversity co-benefits, we used vegetation type as a surrogate. We identified 1886 unique vegetation types across Australia by intersecting the 63 major vegetation subgroups from the National Vegetation Information System (NVIS version 3.1) with the 85 Interim Biogeographic Regionalization of Australia (IBRA) bioregions ([Carwardine et al., 2008](#)). Within these vegetation types, 1185 contained trees of at least 1.3 m tall and thus qualified for carbon planting. The proportion of the remaining vegetation of each of these 1185 types was determined using the current and pre-1750 extent of each vegetation class. The extent of on-the-ground carbon projects in the area suitable for carbon sequestration and vegetation restoration was determined using Spatial Analyst in ArcMap version 10.2.

Finally, anticipated Indigenous co-benefits from Indigenous CFI environmental planting projects were identified based on NVivo coding and analysis of successful funding applicant information. Indigenous co-benefits were coded using the broad categories identified from the interview survey ([Table 1](#)).

## 3. Results

Results from the interview survey demonstrate that Indigenous organizations seek multiple benefits from participating in carbon sequestration and abatement projects. These benefits reflect concerted efforts on the part of these communities to pursue land management activities that support existing environmental, cultural and economic enterprises, as well as those that maintain human rights, in order to, as one Indigenous interviewee explained, 'sustain our cultural signature on the landscape'. As such, most interview respondents asserted that Indigenous communities were only interested in pursuing Indigenous CFI carbon projects if key preconditions were in place to:

- Preserve local landscapes and livelihoods (88% of respondents).

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