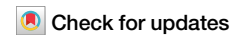


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Recognizing First Nations' values in natural capital accounting benefits all



Anna Normyle¹ ✉, Diane Jarvis², Emma Woodward³, Daniel Grainger⁴, Ewamian Ltd⁵, Ewamian People Aboriginal Corporation RNTBC⁶, Nyamba Buru Yawuru⁷, Tagalaka Aboriginal Corporation RNTBC⁸, Dean Mathews⁷, Julie Melbourne⁷, Bruce Doran¹ & Michael Vardon¹

First Nations' values are frequently overlooked in public and private sector decision-making. Natural Capital Accounting is increasingly promoted for decision-making but overlooks First Nations' values, limiting its potential. Here, we present three Australian case studies highlighting the approaches, challenges, and progress made towards integrating First Nations' values into accounting, aiming to distil lessons and help realize accounting's potential to achieve transformative change in how decisions affecting First Nations people are made globally. We conclude that collaboration, respecting data sovereignty, and prioritizing First Nations' voices are needed for comprehensive accounting. We recommend establishing an international working group under the auspices of the United Nations to include recognition of these values in accounting and how this recognition can inform decision-making. Recognizing First Nations' values in Natural Capital Accounting benefits all by making these values visible and providing First Nations people, literally and figuratively, a "seat at the table" in the decisions affecting them.

Achieving inclusive and just sustainable development requires the values of all people to be central to social, economic, and environmental development to "leave no one behind"¹. For this, actions to re-position diverse values so that they are at the core of decision-making in the public and private sectors are required. This is important for First Nations people who own or manage over 40% of Earth's terrestrial land mass, playing a leading role in governing ecosystems and biodiversity and in delivering the global climate change mitigation goals^{2,3}. Yet the values, knowledge, perspectives, and traditional land and sea management activities of First Nations people are often excluded from decision-making processes^{4,5}. This lack of recognition means First Nations' values risk being sacrificed for the benefit of others, perpetuating injustice⁴. Unequal decision-making processes have implications for the sustainable use and management of ecological systems and our capacity to ensure equitable and just responses to environmental change.

Failure to incorporate diverse knowledge, cultures, and ways of knowing is seen in the widely promoted Natural Capital Accounting (NCA)^{6,7}. NCA is the systematic organization of environmental information for decision-making, and is standardised in the public sector in the System of Environmental-Economic Accounting (SEEA)⁸, and in private sector initiatives⁹ including the Taskforce on Climate-related Financial Disclosures (TCFD), Taskforce on Nature-related Financial Disclosures (TNFD), and

the Global Reporting Initiative. This omission of diverse values in NCA limits the opportunity for the approach to drive truly inclusive support for decision-making towards nature-based solutions and nature-positive outcomes that reflect the aspirations of First Nations people.

We argue that bringing together diverse knowledge and values, including First Nations knowledge systems in NCA, will have wide-ranging benefits. The benefits are direct, through better information for public and private sector decision-making around land management and use, and indirect, by giving First Nations people a voice and increasing agency and control over their lives, land, and sea. Our case is based on several years of collaborative NCA development between First Nations land and sea managers and researchers in Australia, related global research, and NCA initiatives in the public and private sectors.

NCA for transformative change

The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) defines transformative change as a "fundamental, system-wide reorganization across technological, economic and social factors, including paradigms, goals and values, needed for the conservation and sustainable use of biodiversity, good quality of life and sustainable development"¹⁰. Achieving such change requires ambitious policies, course

¹Fenner School of Environment and Society, The Australian National University, Canberra, ACT, Australia. ²James Cook University, College of Business, Law and Governance, Nguma-bada Campus, Cairns, QLD, Australia. ³CSIRO – Environment Research Unit, Waterford, WA, Australia. ⁴CSIRO – Environment Research Unit, ATSIP, Townsville, QLD, Australia. ⁵Ewamian Ltd, Mareeba, QLD, Australia. ⁶Ewamian People Aboriginal Corporation, Mareeba, QLD, Australia. ⁷Nyamba Buru Yawuru, Broome, WA, Australia. ⁸Tagalaka Aboriginal Corporation, Croydon, QLD, Australia. ✉e-mail: anna.normyle@anu.edu.au

corrections where inequality is identified, and a genuine commitment to stretch boundaries to “make sustainability the norm rather than the altruistic exception”¹¹.

NCA emerged in the 1980s as a way of addressing the limited capacity of conventional accounting to reflect social well-being and account for environmental losses¹². By providing information about the changes in the extent and condition of ecosystems (quantity and quality of the natural capital) and the ecosystem services they supply, NCA reveals the interactions between people, land use, and nature⁶. These approaches are increasingly formalized in both government and private sector decision-making and have the potential to catalyze transformative change by increasing the diversity of information used in decision-making.

The SEEA has two main parts: the SEEA Ecosystem Accounting (SEEA EA) and the SEEA Central Framework (SEEA CF), adopted by the United Nations (UN) as International Statistical Standards in 2021 and 2012, respectively^{8,13}. Whereas the SEEA CF accounts for individual environmental assets (such as minerals, water, and timber) and environmental protection and resource management activity, the SEEA EA accounts for collections of these individual environmental assets (such as a forest which comprises the interaction between water, plants, animals, and other natural assets). In 2023, the SEEA CF had been implemented in over 90 countries, and the SEEA EA in 41 countries¹⁴.

In the private sector, NCA is emerging as a way to support business data and information needs related to nature, including the disclosure of financial risk caused by climate change and biodiversity loss⁹. Offering credible, regular, consistent, and structured data, NCA can assist business efforts to understand, manage, and report on nature-related dependencies and impacts, and disclose nature-related risks and opportunities aligned with the TNFD⁹. This is already seen in practice in the Forestry sector¹⁵, and is being piloted by the mining sector¹⁶. As sustainability reporting by major companies is increasingly viewed as “business-as-usual” practice, it is

expected that demand for NCA and related information systems will continue to expand.

First Nations’ values and NCA

First Nations’ values encompass a holistic view of the environment, where people, nature, and culture are interconnected and principles such as stewardship, belonging, responsibility, and oneness with nature guide human decision-making⁵. The IPBES provides valuable methodological guidance for a better conceptualization of the multiple values of nature and their benefits, integrating and being informed by the knowledge and values of First Nations people¹⁷. This research recognizes that First Nations’ values offer unique perspectives on nature’s contributions to people and these values should be considered in policy, management, and planning to ensure more inclusive and effective environmental outcomes¹⁸.

The UN Declaration on the Rights of Indigenous Peoples identifies the contributions of Indigenous knowledge, cultures, and traditional practices to sustainable and equitable development and the management of the environment¹⁹. Although the SEEA was developed via UN processes with the promise to: “answer important, overarching questions on the relationship between the economy, society, and the environment and how we measure well-being and social progress”²⁰, the SEEA fails to adequately consider First Nations’ values. The framework’s development was dominated by European values and perspectives, with virtually no mention of First Nations people and knowledge⁷. There are also no examples of First Nations people or values in the SEEA EA (e.g., in the ecosystem services reference list). A core concept of the SEEA EA model—the one-way flow of services from ecosystems to people—is at odds with the reciprocal relationships between many First Nations people and lands seen in Oceania²⁰⁻²⁶, North and South America²⁷⁻³⁰, Europe³¹, Africa^{32,33}, and Asia³⁴. This conceptual oversight and lack of First Nations involvement in the SEEA development process are critical deficiencies in a framework that claims to

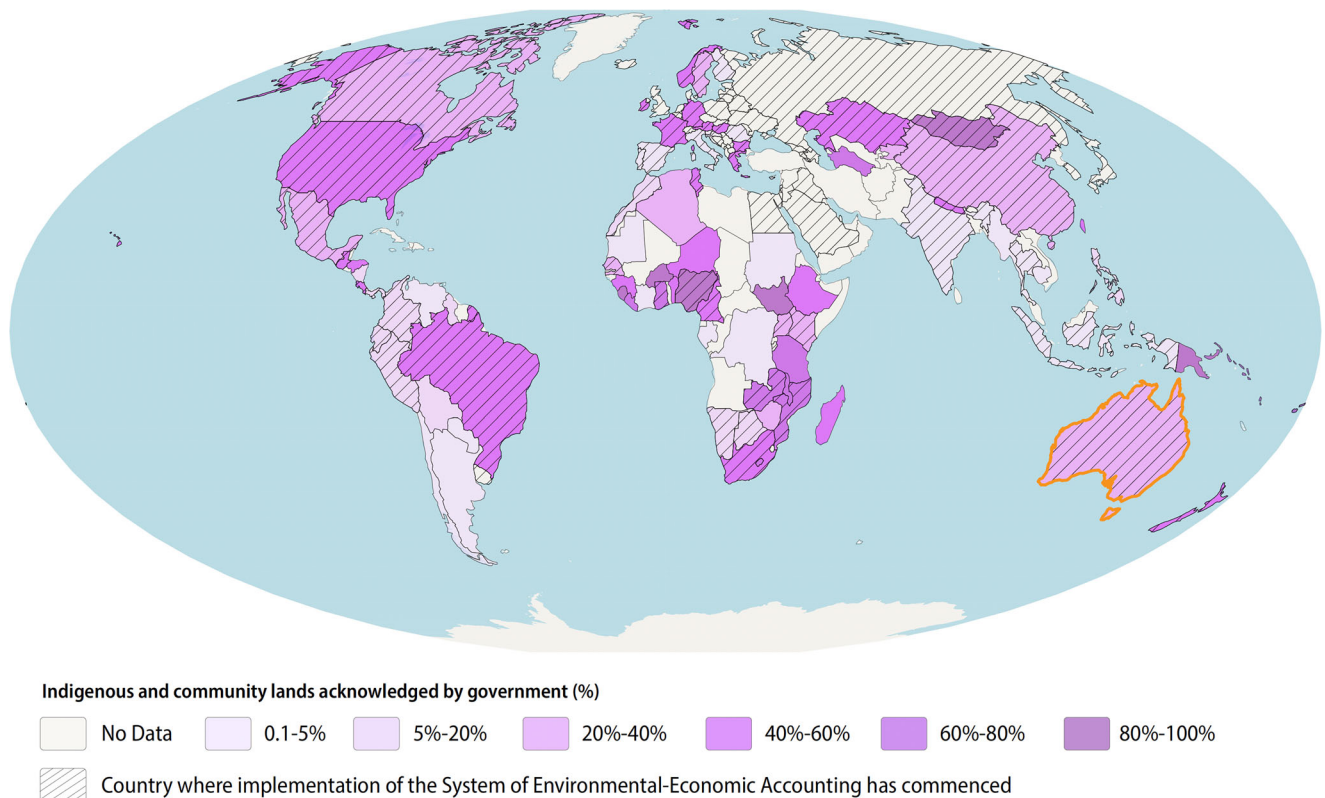


Fig. 1 | Percentage of Indigenous and community lands acknowledged by governments globally by country and countries implementing the System of Environmental Economic Accounting. Australia, highlighted in orange, is the first country to formally engage with First Nations values and the System of

Environmental Economic Accounting through a range of case studies. Note data is indicative only, showing the estimated area of land held or used by Indigenous Peoples and local communities as recognized by the State. Data derived from: LandMark⁵⁸, UNCEEA¹⁴.

be a “comprehensive and inclusive process of detailed testing, consultation and revision”³⁵.

In 2023, the United Nations Committee of Experts on Environmental-Economic Accounting (UNCEEA) Working Group, for the first time, noted research on this topic is needed “to take a range of perceptions of value into account in ecosystem accounting, including those of indigenous peoples”³⁶.

Private sector initiatives, like the TCFD, also failed to include First Nations’ voices and values in their initial development. The TNFD, a more recent initiative, recognises First Nations’ values, with the TNFD producing “Guidance on engagement with Indigenous Peoples, Local Communities and affected stakeholders”³⁷. The guidance mentions values but does not provide information on how to record or account for First Nations’ values.

Immediate action is needed to place First Nations’ values into public and private sector NCA frameworks if these frameworks are to provide comprehensive information for their decision-making processes to aid the social, economic, and environmental aspirations of First Nations people. As the first country to engage actively with First Nations’ values and the SEEA, we think Australia’s experience can provide insights for other nations implementing NCA, particularly those nations where a high portion of land is formally recognized as held or used by First Nations people (Fig. 1). The experience is also likely to inform the development of private sector NCA initiatives.

Benefits from recognizing First Nations values in NCA

In Australia, First Nations people hold rights to around 5 million square kilometres, or 67% of the nation’s terrestrial land mass (Fig. 2). These rights include ownership rights, Native Title rights, management rights, and other special rights³⁸. Despite this, First Nations Australians suffer ongoing injustices; the personal income of First Nations Australians in 2024 was 60% less than other Australians, 40% of First Nations Australians live without two or more essentials for a decent standard of living (compared to 11% of other Australians born in Australia), and only 0.7% of senior leadership positions across Australian employers are occupied by First Nations people³⁹.

Australia is the first country to commence research to include the values of First Nations people in the SEEA, beginning in 2018 in Yawuru Country²³, Ewamian Country²¹, and Tagalaka Country⁴⁰. In Australia, the concept of “Country” reflects the intricate relationships of relational values that encompass humans, more-than-humans, and all that is tangible and intangible⁴¹. In this, “Country” (used as a proper noun) is an Indigenous living place where, for First Nations people, intimate physical, ecological, emotional, spiritual, social, and cultural connections exist and people are inseparable from nature⁴².

This research is embedded within long-standing relationships between First Nations people, their representative organisations, and researchers. The research focused on account development to identify the benefits and needs of First Nations land and sea managers engaging with NCA and was undertaken through On-Country Workshops, site visits, and pilot account development^{21,23,40,43}. Perspectives from First Nations partners were documented in written and verbal formats throughout this process, with the key benefits and challenges for including First Nations’ values in NCA identified from each partnership provided in Supplementary Table 1. The examples we draw on (Fig. 3) are a subset of the exploratory work, some of which is not yet public knowledge or published.

Benefits identified from Australian partnerships

Our joint development of NCA by First Nations people and researchers identified several benefits of recognizing First Nations’ values (Fig. 4). For First Nations land and sea managers, accounts offer practical benefits for supporting management by providing a structured framework for recording economic and environmental information about landscapes and ecosystems alongside the values, insights and knowledge of First Nations people. Combined, such information delivered in standard formats, helps to bridge the gap between Indigenous and Western scientific and socioeconomic knowledge systems. This enables First Nations people to lead metric

development for management that aligns with cultural and ecological values and indicators. This was seen in the development of experimental ecosystem accounts, which considered Yawuru *liyan* (wellbeing) metrics alongside ecological condition scores to provide a more holistic, Yawuru-centred understanding of wetland change on Yawuru Country⁴³.

Our First Nations partners highlight the importance of their inclusion in NCA development to provide a “seat at the table”²³ with a capacity to influence outcomes where accounting is developed and used. In this, we propose that incorporating First Nations knowledge, values and data in NCA would have flow-on benefits, increasing the power and influence of First Nations voices in decision-making processes at local, regional, and national scales in the public and private sectors. Inviting First Nations people to be part of such discussion ensures richer negotiation, reduces risk of marginalizing diverse values, and broadens the knowledge base from which solutions are found.

Acknowledging First Nations’ values in NCA also strengthens partnerships between First Nations communities and the public and private sectors. By working together to develop and implement NCA frameworks, these partners can build trust, collaboration, and a shared commitment towards effective environmental management for mutual benefit. The collaborative partnership between Ewamian People Aboriginal Corporation, Tagalaka Aboriginal Corporation, researchers, and government, which informed Australia’s Regional Ecosystem Accounting Pilot projects⁴⁰, demonstrates the value of two-way knowledge sharing. This approach also drives public policy evolution to account for the non-monetary benefits of ecosystems, such as the social and cultural values central to many First Nations people, fostering a more inclusive and holistic approach to environmental and socioeconomic decision-making.

Benefits for all

The benefits of NCA identified in Australia (e.g., Fig. 4) are reflected in global experiences where First Nations values have been considered in monitoring and reporting frameworks. For example, in the United States (US), Heller et al.²⁸ advocated for the benefits of including detailed information about First Nations’ stewardship with biophysical data in ecosystem health assessments for improved understanding of the relationships amongst land stewardship, ecosystem health, and conservation. Likewise, Sze et al.⁴⁴ described the importance of Indigenous lands globally in frameworks for reducing deforestation, given the benefits of partnering with, monitoring from, and enabling Indigenous people and organizations. Private sector NCA-related initiatives, such as the TNFD, have also advocated for the benefits to organizations of engaging with the perspectives of First Nations people over the medium- and long-term by assisting “organizations to reach a fuller understanding of nature-related issues, manage these issues effectively and establish relationships of trust, based on transparency and mutual respect”³⁷.

Recognizing First Nations values in NCA ultimately benefits sustainable development by providing the public and private sectors with a comprehensive framework to evaluate whether decisions are achieving the desired social, cultural, and environmental outcomes of all parties. Because better information benefits decision-making processes⁴⁵, more inclusive accounts would add value to society by enabling trade-offs to be assessed in a consistent manner⁴⁶. For First Nations groups involved in account development, incorporating First Nations’ values in NCA helps to ensure that First Nations interests are documented and visible. For broader society, reflecting these values provides richer, more comprehensive data on the interconnections between people, land, and ecosystems meaning that all stakeholders are better positioned to negotiate and make informed decisions around potential win-win or future scenarios where trade-offs are necessary⁴⁶.

Proposed actions

The inclusion of First Nations values in NCA has been slow to date, but has enjoyed recent traction in partnerships between the research community

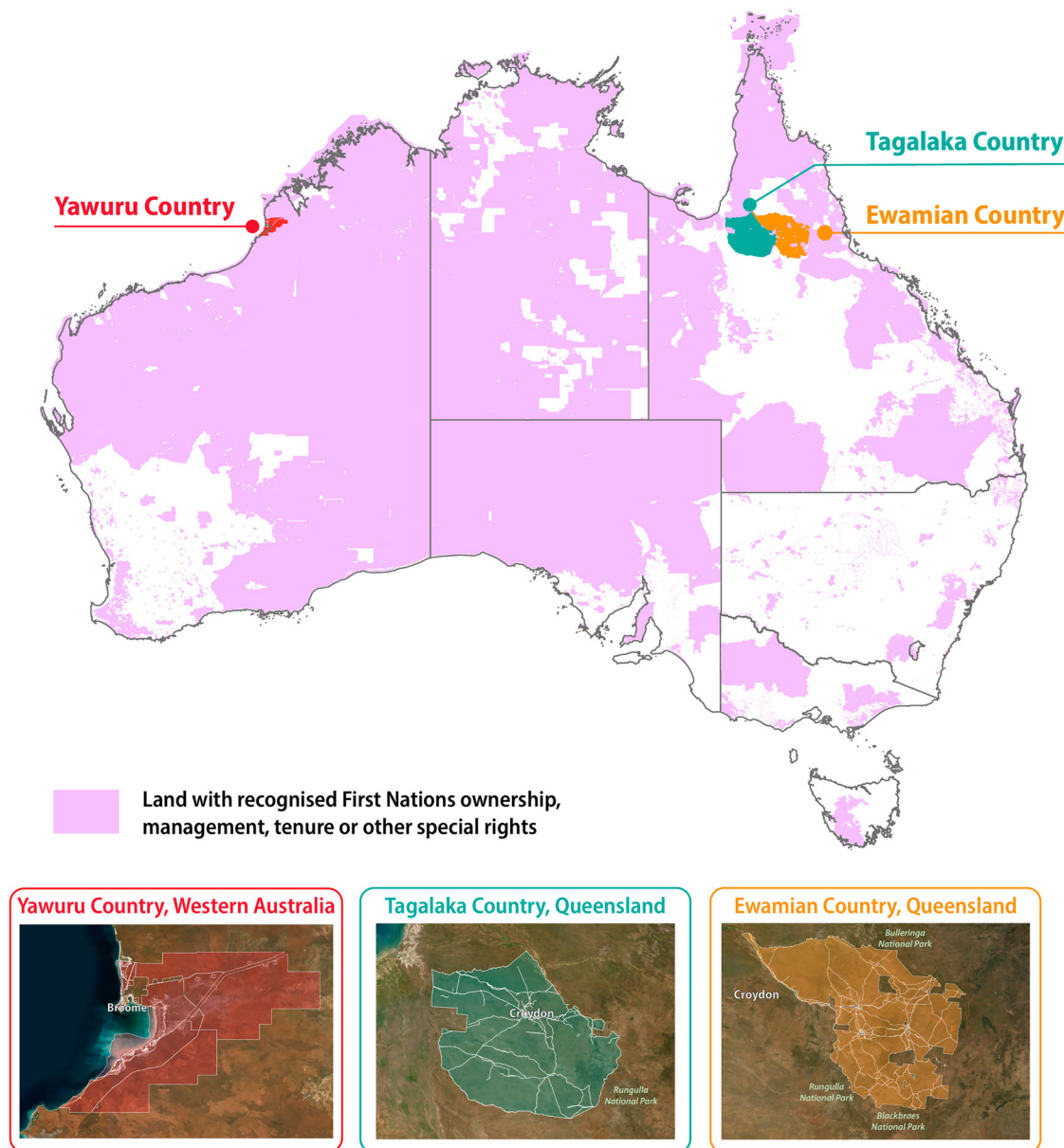


Fig. 2 | First Nations land tenure and management in Australia and partnership studies where exploration of the System of Environmental Economic Accounting has commenced. Land tenure derived from: Jacobsen et al.⁵⁹, NNTT⁶⁰.

and First Nations’ organizations. This slowness and challenge is not unique to Australia, or to NCA. Globally, First Nations inclusion in key frameworks for assessment, monitoring, and management remains limited without proactive efforts to ensure meaningful collaborative spaces for engagement and change^{44,47}. Having recognized the problem³⁶, the international NCA community must now take action on First Nations’ values and move beyond researchers and a small number First Nations partners, and the development of “experimental” accounts. This requires enabling and prioritising First Nations people’s direct involvement in NCA framework development and account creation. Only through such actions will NCA be: (1) accepted by First Nations people and be useful for achieving their environmental, economic, and social aspirations, and (2) ensure First Nations values are properly represented in the decision-making process of the public and private sectors informed by NCA. Action from stakeholders at local, national, and international levels is required.

Our case studies and broader research on First Nations values highlight that management frameworks must be adaptable to meet the specific needs, values, and perspectives of First Nations people and organizations. One size

does not fit all, and account development must, at the local level, reflect the values and needs that matter to the people involved if they are to be useful, used, and add value. This requires action to shift NCA development away from top-down approaches where accounting systems are imposed from the outside (e.g., by government or research groups). Instead, account development should be a collaborative process that reflects the values and priorities of the account users⁴⁵.

Account development processes should also be cognisant of, and designed in alignment with, existing ecosystem-focused management initiatives and plans, and First Nations-led programs such as Indigenous Land and Sea Management strategies on the ground. In Australia, First Nations leaders have identified opportunities to improve these programs⁴⁸ and building on existing knowledge networks can support current land and sea management goals, reducing potential duplication and contributing to improved accounting information by increasing coordination across programs and funding organisations⁴⁰. Similar programs recognizing the contributions of First Nations knowledge to the conservation and management of ecosystems exist around the world. For example, Canada’s

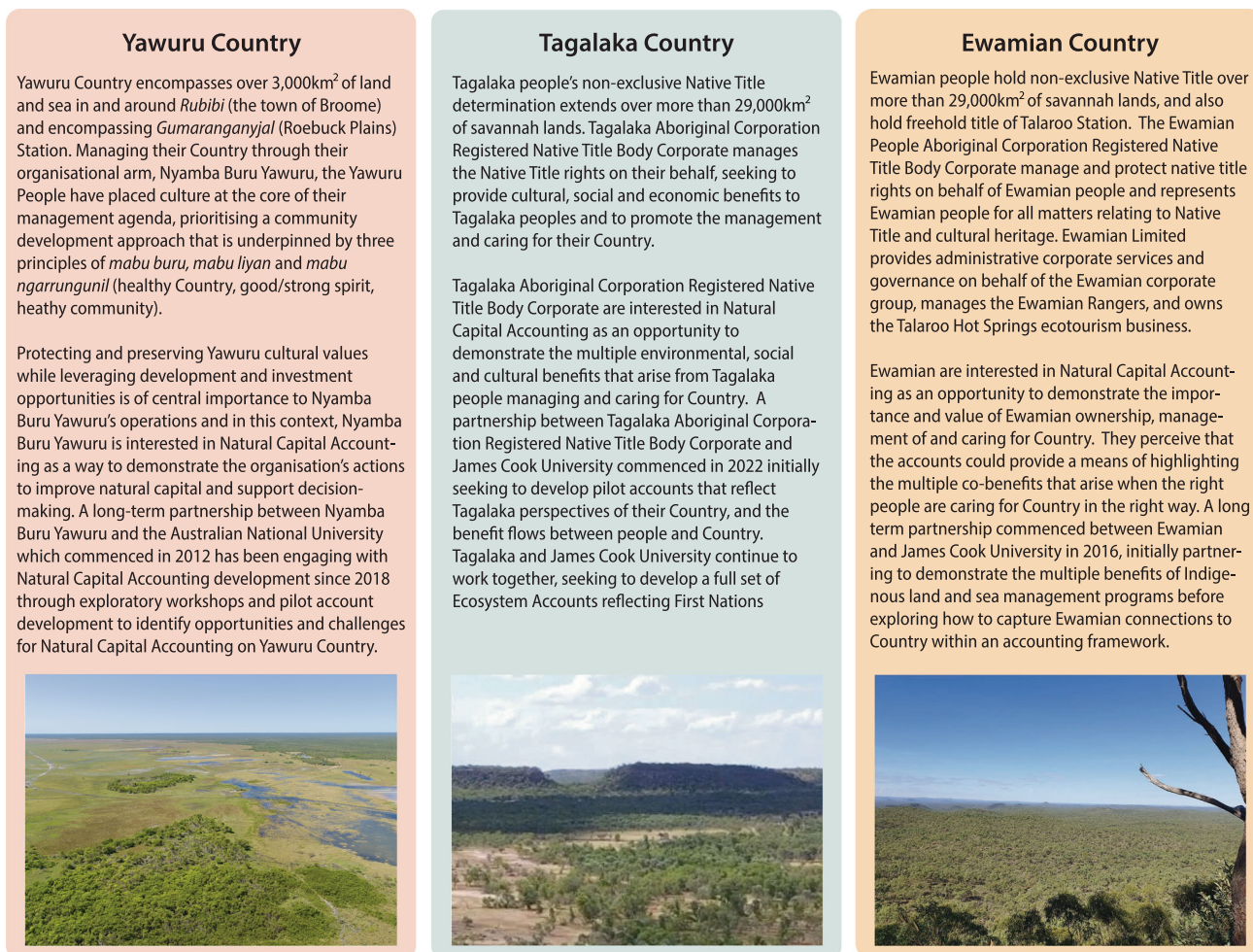


Fig. 3 | First Nations organisations engaged as research partners exploring perspectives on Natural Capital Accounting. See Supplementary Table 1 for the detailed benefits and needs for Natural Capital Accounting identified by each partnership.

Nature-Smart Climate Solutions program is engaging First Nations communities to conserve, restore, and improve land management to sequester carbon and enhance biodiversity⁴⁹, while New Zealand's National Policy Statement for Indigenous Biodiversity guides local councils to collaborate with *tangata whenua* (Māori as people of the land) to uphold indigenous values and traditions in biodiversity management⁵⁰. At the local level, these, and similar programs and networks should be leveraged to share training opportunities, skills development, and resources. Such networks could play a powerful advocacy role, eliciting context-specific priorities for NCA development and raising First Nations' voices in the development of NCA.

Building the capacity of First Nations people and organizations to understand, use, and effectively engage with NCA development is essential. Dedicated funding and programs to foster education and knowledge exchanges within and between First Nations communities and others are needed. Knowledge exchanges allow different stakeholders (e.g., First Nations, researchers, accounting experts, and decision-makers in the public and private sectors) to learn from their diverse experiences. Ongoing support is also needed to enable First Nations people and organizations to build and maintain accounts.

The substantial land management activities performed by First Nations land and sea managers is aligned with, and thus able to be extended to, NCA activities and suitable investments. For example, in Australia, government funded First Nations' rangers collect ground truthing information to assess remotely sensed data used in NCA. The ability to leverage opportunities from NCA is critical for First Nations people and organizations to

recognise the benefits of the emerging frameworks (e.g., SEEA and TNFD). Prioritizing programs and mechanisms that support First Nations' engagement with emerging opportunities linked to account development, such as the newly established Nature Repair Market in Australia⁵¹ and the voluntary carbon markets envisaged in Article 6 of the Paris Agreement⁵², is needed.

Actions to develop and apply protocols for upholding principles of free, prior, and informed consent and Indigenous Data Sovereignty to protect the Indigenous cultural and intellectual property of First Nations people and organizations contributing data in NCA development are also essential. Central to Indigenous Data Sovereignty is the "right of Indigenous peoples and nations to decide what data development occurs and the controls over the collection, governance, ownership, and application of data about their peoples, Territories, lifeways, and natural resources"⁵³. First Nations partners must participate in account development and have the right to decide how their data are aggregated and used in NCA. For this, we recommend that protocols be developed that: (1) are informed by existing principles such as Collective benefit, Authority to control, Responsibility and Ethics⁵⁴; (2) emphasize First Nations leadership, and; (3) are supported by the public and private sectors to ensure that First Nations voices are heard and influence decision-making processes from inception to implementation of NCA. This means moving beyond providing opportunities to comment on pre-developed plans or working documents. Once protocols are established to protect Indigenous cultural and intellectual property in NCA, these protocols would scaffold the planning process and catalyze account development with First Nations peoples.

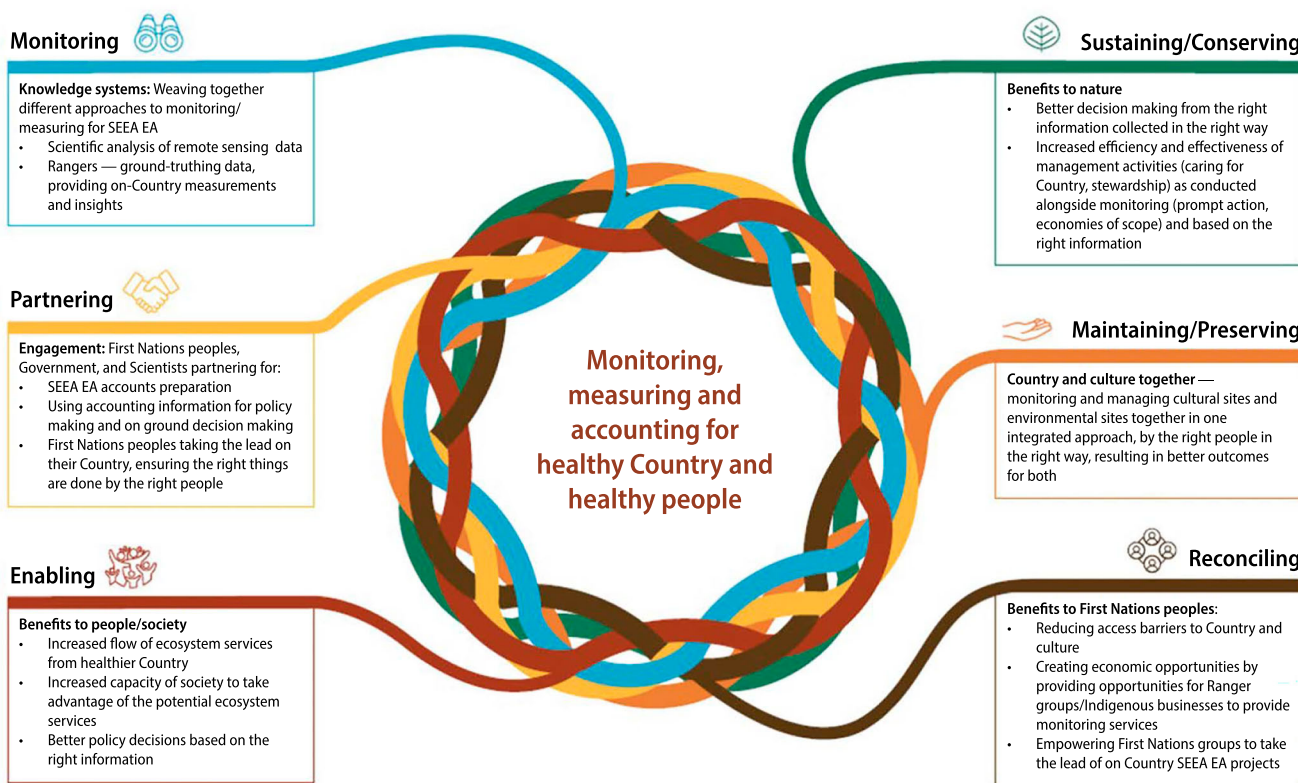


Fig. 4 | Benefits of ecosystem account development identified by Tagalaka Aboriginal Corporation and Ewamian Ltd (First Nations research partners) in Australia. The interwoven strands of the circle represent the weaving together of (1) knowledge systems for measuring (for the System of Environmental Economic Accounting Ecosystem Accounting) and managing Country; (2) the holistic benefit flows between people and nature, summarised as: (i) inseparable caring for Country and Country caring for people, and (ii) inseparable ecosystem services and

stewardship; and (3) recommendations for respectful engagement between government, scientists and First Nations, including collaboration and cross-validation. Reproduced with permission from Woodward et al.⁴⁰ © Commonwealth Scientific and Industrial Research Organisation (collaborating with partners under the national strategy and action plan for a common national approach to environmental-economic accounting, <http://eea.environment.gov.au>).

Recent international recognition of the need for further engagement with First Nations people’s values in the SEEA³⁶, and in TNFD are positive steps. A necessary next step for the SEEA is the formation of a taskforce under the UNCEEA specifically mandated to ensure First Nations’ organizations and knowledge holders are included in all aspects of account development. Australia is well-placed to lead such a taskforce and leveraging the Australia and the United States partnership on Cooperation on Natural Capital Accounting, Environmental-Economic Accounting and Related Statistics⁵⁵, which has recently been expanded to include Canada, could be a starting point for establishing strong partnerships to engage with low- and middle-income countries⁴³. It is imperative that such a taskforce is composed primarily of First Nations’ representatives with expertise in their respective cultural knowledge systems and data governance. The TNFD must move beyond the current recognition and guidance, including by having First Nations values represented in the taskforce.

Challenges for proposed actions

NCA is a powerful information framework, but requires interpretation for decision-making. A common thread across the Australian research partnerships identified that developing maps and accounts from satellite imagery without First Nations’ interpretation failed to consider the interaction and intrinsic relationship between the environment, culture (cultural heritage values and connection to the environment), and community^{40,56}. Such values are inherently context-specific, and accounts, like any information, will be viewed from different perspectives. As such, avoiding a cultural hegemony in NCA development is important. This must be understood by those developing and implementing accounts and accounting strategies as

without building knowledge within First Nations communities and organisations around how to use and interpret accounting outputs, NCA will not be useful to First Nations people. Current sector-led initiatives to develop and use accounts could also risk replicating colonial patterns of knowledge extraction if the accounts are not interpreted from a holistic lens, which includes First Nations’ perspectives.

Building genuine opportunities for First Nations inclusion in NCA development and related decision-making requires increased resourcing. Partnerships, including research-based partnerships, can take time to develop. Where these are based on trust and respectful relationships, they are more likely to result in positive outcomes. Short-term funding timelines of 12–18 months provide insufficient scope to establish place-specific culturally appropriate working methods, foster mutual understanding and agreement, and collect meaningful data for translation into accounts⁵⁷. Short-term funding hinders a comprehensive assessment of the appropriateness and usefulness of NCA for First Nations partners over time. For example, collecting data on the extent and condition of cultural and ecological assets probably requires multiple years of observation to establish a baseline. Governments and the private sector must be prepared to commit to longer and deeper funding and support structures that ensure the development of NCA is equitable, meaningful, the data collected is appropriate, and the methodologies and approaches taken are based on mutual trust and understanding by all parties.

Failure to act perpetuates a failure of NCA process in the public and private sectors. It is difficult to see how NCA can be accepted, implemented, and used without First Nations people’s involvement. If proactive initiatives are not undertaken to shift the inclusion of First Nations’ values in NCA and

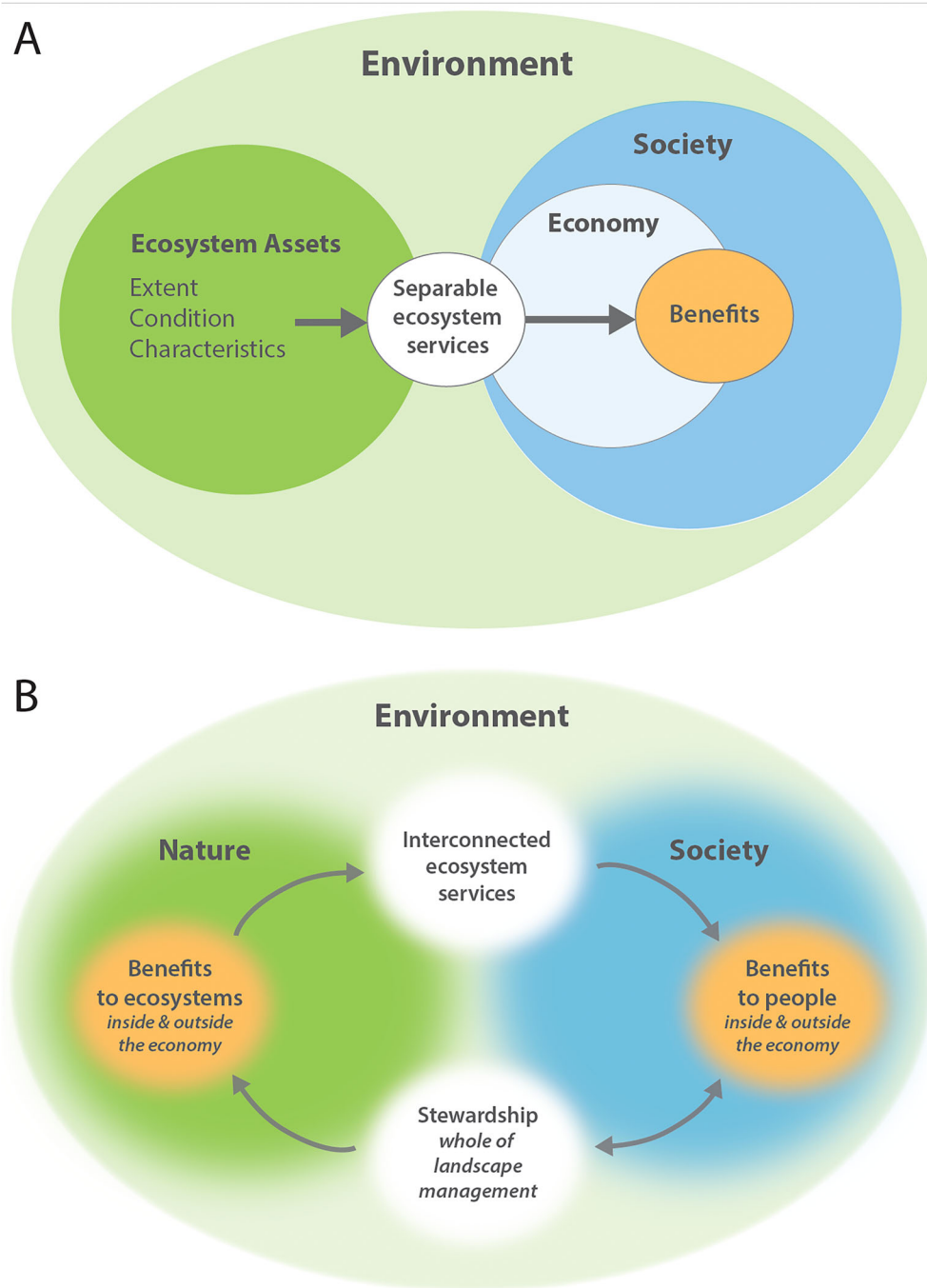


Fig. 5 | Incorporating First Nations perspectives into the System of Environmental Economic Accounting Ecosystem Accounting. In (A), the System of Environmental Economic Accounting Ecosystem Accounting conceptual diagram of ecosystem service flows¹¹ shows a one-way flow of benefits from ecosystems to people via the economy. In (B), the revised model informed by collaborative research

with First Nations partners emphasizes the reciprocal relationship between humans and nature. It highlights the two-way flows of benefits and the interconnectedness of nature and society, visually represented by the blurred boundaries. Adapted from: Normyle et al.⁷, Jarvis et al.²¹.

related private sector initiatives from research to practice, there is a real risk that these approaches will fail to meet their full potential for providing a comprehensive long-term information and monitoring system to support the achievement of national and global objectives.

Next steps

Including First Nations knowledge and values in the development, implementation, and use of NCA benefits all. First Nations people benefit by having more information for managing land and sea, which covers over 40% of the Earth’s surface. First Nations people also benefit by having

information for a seat at the table; recognising their values in NCA ensures they are visible and considered in decision-making. This is more likely to result in the identification of win-win scenarios and better outcomes where trade-offs are required.

By embracing the knowledge systems and ontologies of First Nations people, NCA can begin to address historical inequities in decision-making. This would shift our approach to sustainable development and move beyond simply considering First Nations’ values as optional extras. In co-creating models of NCA to reflect the interconnected understandings of value that underpin First Nations knowledge systems (e.g., Fig. 5), the

benefits will extend beyond informing public policy. Ultimately, NCA-informed choices would lead to more transparent negotiations and outcomes that respect and uphold the values of First Nations people equally alongside economic and ecological factors.

Building understanding and awareness within and between First Nations people, the NCA community and the public and private sectors are key to redressing past mistakes in NCA development and use. Immediate action is needed to leverage the emerging opportunities for First Nations people to use NCA to achieve their environmental, economic, and social aspirations, and the desire of many in the public and private sectors to integrate First Nations' values into their decision-making. Actions include integrating the understanding from local-level case studies like ours into the development and application of international NCA frameworks like the SEEA and TNFD, and having First Nations people and organizations actively involved in this process. Only when First Nations' values are incorporated in NCA, and First Nations people are included in its on-going development, can NCA deliver the full suite of information necessary for holistic decision-making towards an equitable and sustainable future for all.

Ethical approval

This research aligns with the Inclusion & ethical guidelines embraced by Communications Earth & Environment. This research, documented in the perspective article included local researchers throughout the research process, including design, implementation, and authorship of publications. The research was scoped and determined in collaboration with local partners. All research activities described were conducted under approved research ethics protocols.

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Author contributions

A.N. and M.V. conceptualized the manuscript. A.N., D.J., E.W., and M.V. wrote the manuscript with input from D.G. and B.D. Ewamian Ltd, Ewamian People Aboriginal Corporation RNTBC, Nyamba Buru Yawuru, Tagalaka People Aboriginal Corporation RNTBC, D.M., and J.M. provided the perspectives which informed the research. B.D. and M.V. provided supervisory support to A.N. Ewamian Ltd, Ewamian People Aboriginal Corporation RNTBC, Nyamba Buru Yawuru, and Tagalaka Aboriginal Corporation (Registered Native Title Body Corporate, RNTBC) are Prescribed Bodies Corporate (PBCs) under Australia's Native Title Act.

These PBCs serve as legal and cultural representatives of their Traditional Owner groups; they embody the collective cultural knowledge, rights, and responsibilities of their respective First Nations communities.

Competing interests

The authors declare no competing interests.

Additional information

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Correspondence and requests for materials should be addressed to Anna Normyle.

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