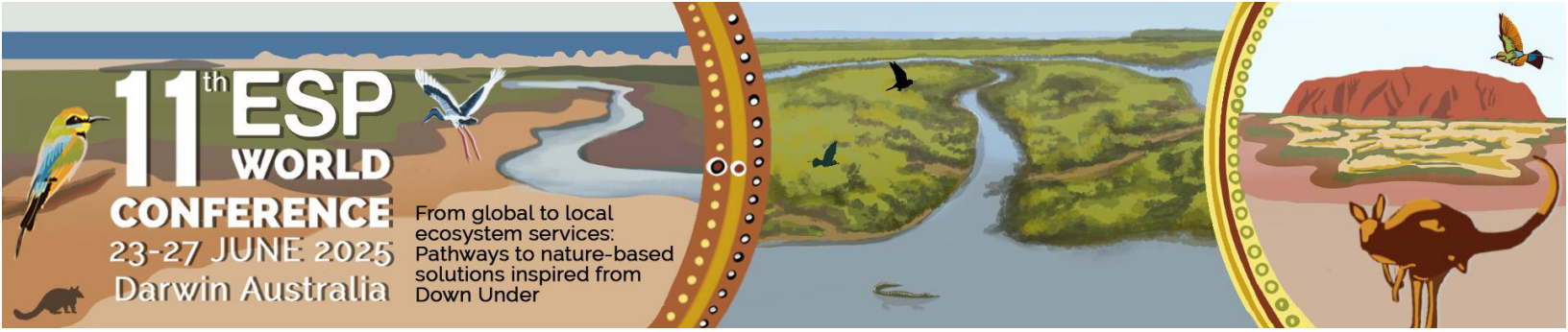


BOOK OF ABSTRACTS

I. SESSION DESCRIPTION

ID: S9a

Breaking Down Barriers – Incorporating Indigenous Knowledge on Ecosystem Services into Natural Resource Management, Policy, Planning

	Name	Organisation	E-mail
Host:	Simone Maynard	Griffith University and IUCN Commission on Ecosystem Management	maynardsimone@gmail.com
Co-host(s):	Kamaljit Sangha Jeffrey Thomas Hamid Arrum Harahap Nick Conner	Charles Darwin University Tahoma Indian Centre University Andalas IUCN Commission on Environmental, Economic and Social Policy	Kamaljit.Sangha@cdu.edu.au Jeffrey.Thomas@puyalluptribe-nsn.gov arrumhrp22@gmail.com nicholas.conner1753a@gmail.com

Abstract:

Indigenous people rely heavily on natural ecosystems for a variety of needs, including food, health, a sense of place, cultural heritage, social cohesion and livelihoods, making them particularly susceptible to the adverse effects of climate change (e.g. increased temperatures, rainfall, sea level rise, storms) and non-climate changes (e.g. development, new technologies and communication services). Whilst many Indigenous people live in highly urbanized areas, many live in remote or isolated locations. In both urban and isolated locations climate change and non-climate changes can disrupt the delivery of and Indigenous people's access and connection to ecosystem services.

Although they contribute the least to them, Indigenous people are among the most vulnerable to climate and non-climate induced changes that impact ecosystems and species. Not only because of their direct dependence on ecosystem services, but because they are often underrepresented in decision-making processes that directly influence them, such as in natural resource management, land use planning, the installment of infrastructure, climate change adaptation strategies and economic development. Yet Indigenous people play a vital role in

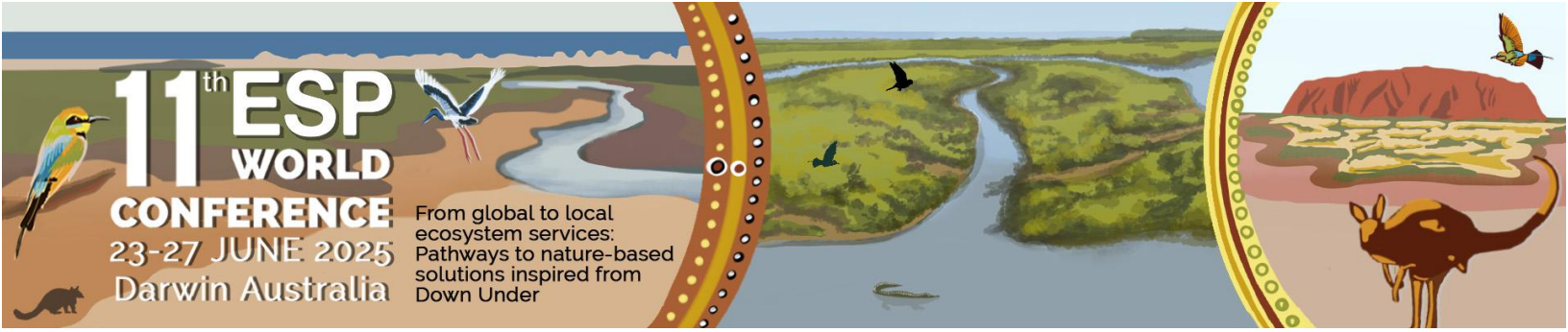
managing community natural resources and contributing to local, regional, state and national economies (e.g. through cultural and eco-tourism).

Across the world many Indigenous people are also still living with or healing from policies and practices associated with colonisation, dispossession, assimilation and loss of spiritual and religious freedoms. This has instilled a nervousness and a lack of understanding in researchers, government and business of Indigenous people's connections to nature and how to engage and collaborate with relevant Indigenous groups in meaningful and respectful ways. Hence Indigenous perspectives are often overlooked in research and decision-making processes. But Indigenous people hold valuable traditional knowledge and practices and incorporating this knowledge into research designs, project outcomes and high-level decision-making can strengthen research, strategies, plans and policies. Western sciences should be complimentary, not substitutable, for local traditional knowledge.

Understanding how ecosystem services contribute to the traditional and cultural roles of Indigenous people; how climate and non-climate induced changes have and will influence their ability to receive, access and utilize essential ecosystem services; and combining western science with traditional knowledge on ecosystem management and climate change, is vital to developing inclusive, effective and equitable plans and policies that empower both Indigenous and non-Indigenous people to sustainably manage ecosystems, species and culture. This session focuses on ecosystem service approaches that capture Indigenous connections to nature, traditional knowledge and practices to managing ecosystems and species, and that apply or incorporate this knowledge in environmental management, policy, planning and decision making. It aims to identify global examples of the challenges, barriers, opportunities and solutions to building relationships and genuine collaborations with Indigenous people and incorporating and using traditional knowledge in ways that provide nature-based solutions.

Presentations are encouraged that show how Indigenous knowledge, values towards nature and their dependence on ecosystem services are being identified or used in the following ways (see dot points below). Presentations should focus not only on methods but provide examples of the challenges, barriers, opportunities and solutions to achieving outcomes.

- how Indigenous knowledge is identified, assessed and included in decision making.
- how Indigenous knowledge is being optimized to provide net benefits to society and the economy.
- how Indigenous knowledge is raising awareness of potential social and economic implications and averting unintended negative consequences arising from decision-making.
- how Indigenous knowledge is being used to communicate the broader ramifications of decisions, policies, strategies and plans to the community, industry or treasury.
- how Indigenous knowledge is broadening the scope of environmental and social impact assessments.
- how Indigenous knowledge is being incorporated into conservation and protection through park management plans, planning schemes and natural resource management strategies.



- how Indigenous knowledge is serving as a foundation for better collaborative and cross-stakeholder or jurisdictional management of nature.

- how Indigenous knowledge is being utilized to better engage local Indigenous communities in nature conservation, facilitating greater local action and strengthening their connections with nature.

- how Indigenous knowledge is being used to influence investment in nature within government departments and treasury.

- how Indigenous knowledge is being used to increase the long-term resilience of business decisions, policies and actions, sustaining economic growth.

- how Indigenous knowledge is being used to recognise and determine the value of the environment for Indigenous mental and physical health outcomes.

Goals and objectives of the session:

Through knowledge exchange we will build the capacity of conference participants and non-attending colleagues to include Indigenous values to nature and Indigenous knowledge in their research or decision making.

Planned output / Deliverables:

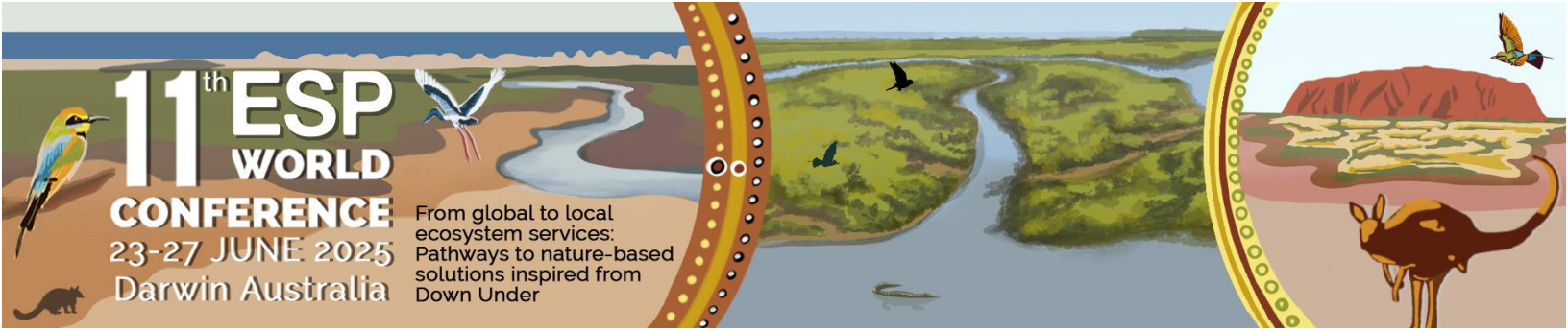
- Through a journal article, showcase Indigenous people's connections to nature and dependence on ecosystem services, and present researchers' experiences engaging and collaborating with Indigenous people and including traditional knowledge in research, decision making and practices. By highlighting challenges, barriers, opportunities and solutions for building relationships and genuine collaborations and using traditional knowledge, the article will broaden the knowledge of professionals unable to attend the conference and build their capacity to incorporate such values into research and decision making.

- Through a short relevant brief for distribution to governments, we will develop a business case for why incorporating Indigenous values towards ecosystem services into decision making will add value to current approaches.

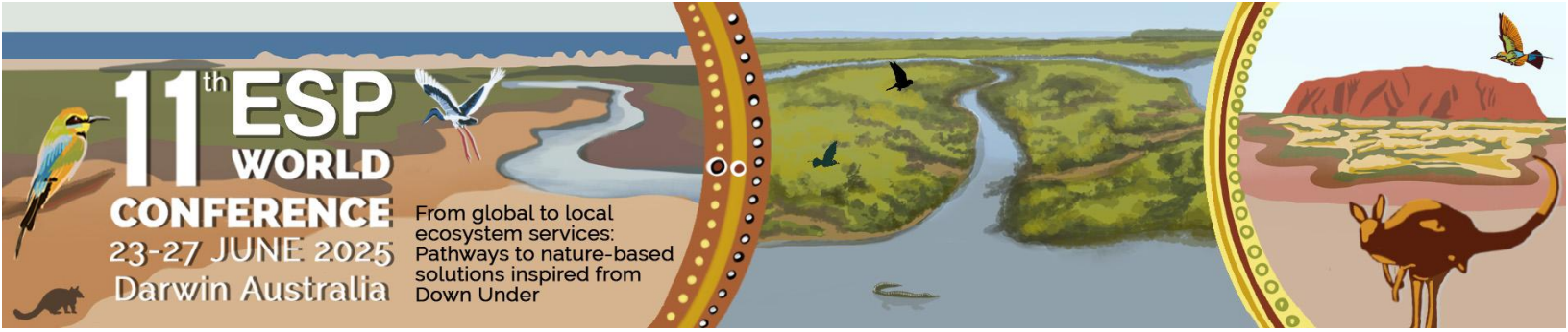
II. SESSION PROGRAM

Room: Bundirrik 4
Date of session: Tuesday 23 June
Time of session: 15:30 – 18:00

Timetable speakers:



Time	First name	Surname	Organization	Title of presentation
15:30 – 15:50	Simone Kamaljit	Maynard Sanghat	Griffith University/IUCN CEM Charles Darwin University	Session Organisers' introduction to workshop – agenda, aim, outputs
15:50 – 16:05	Jeffrey	Thomas	Puyallup Tribe & Tahoma Indian Center	Takhoma's NDN Center: Sacred Circle Views
16:05 – 16:15	Nicholas	Crameri	School of Natural Sciences, Macquarie University, Sydney, NSW, Australia	Managing invasive ungulates and carbon on coastal floodplain wetlands of northern Australian Indigenous Protected Areas
16:15 – 16:30	Simone	Maynard	Griffith University/IUCN CEM	Ecosystem-Based Adaptation to Climate Change of Indigenous Women in Indonesia (Sumatra) and Australia (Queensland)
16:30 – 16:40	Nick	Conner	IUCN CEESP	Summary of the first stage of the session, goals and objectives; Introduction to the second stage of the session
16:40 – 16:55	Chen	Ly	Centre for Environmental Policy, Imperial College London	Environmental Defenders and Global Environmental Governance: A feminist political ecology analysis
16:55 – 17:10	Arrum	Harahap	Universitas Andalas	No Cent in Incentives: Sustaining Ecosystem Services through Indigenous Payment Practices in Tapanuli, Indonesia
17:10 – 17:25	Samy	Leyton Flor	Research Institute for the Environment and Livelihoods, Charles Darwin University, Darwin, Australia	Beyond Ecological Recovery: Embedding Indigenous Knowledge in Mine Rehabilitation for Sustainable Futures
17:25 – 18:00	Session Organisers			Session Organisers wrap-up presentation session, and



Time	First name	Surname	Organization	Title of presentation
				participant drafting of journal article and policy brief

III. LIST OF ABSTRACTS

The first author is the presenting author unless indicated otherwise.

1. Takhoma's NDN Center: Sacred Circle Views

First authors(s): Jeffrey Thomas

Other author(s): No

First author affiliation: Puyallup Tribe & Tahoma Indian Center

Contact: jeffery.thomas1958@gmail.com

Keywords: Indigenous, Ecocultural, Assessment, Identity, Decision-making

The Takhoma NDN Center Model depicts ecocultural restoration, identity, and well-being concepts and cultural ecosystem service concepts as being related, using four (4) embedded circles to create the model. The model depicts “ecocultural spiritual health identity” as being the central feature of Native peoples’ personal, family, and/or community ecological health, identity, and restoration dynamics today. An ecocultural identity interface is used to connect 12 core health themes to 12 outlying ecosystem service themes (and then other outlying ecocultural restoration universe themes extending from there). This “NDN” Center model portrays Native public health concepts being tied to the ecocultural identity and cultural ecosystem service concepts associated with any (and all) geographic area(s). The Takhoma model is arranged to be similar to the glacial river geographies of Mount Takhoma whose differing glaciers and river drainages radiate from around the mountains’ central axis as they each flow out towards their more distant areas, making them both related to each other and their mutual central core. These radiating glacial fields extending out as rivers passing through their outlying territories and peoples onto distant lands are emulated through the model dynamics depicting ecocultural

spiritual health identity as being the central axis of system composed of 12 critical public health fields tied to 12 outer cultural ecosystem service concepts through an ecocultural identity layer interfacing between the two. The model integrates Native health, identity, and cultural ecosystem service precepts all together, to strengthen the foundations needed for locally-focused ecocultural restoration work today.

The Puyallup Tribal Timber, Fish & Wildlife Program ardently touts cultural ecosystem service assessments, facilitating connections and actions, collaborating, decision-making, economic growth, and ecocultural health and wellbeing using collaborative partnerships right now, and is working to build its' abilities to strengthen the awareness of alternate management strategies, net benefits, and decision ramifications - and/or the need to invest in nature, and to incorporate Native ecocultural values into local decision-making. This presentation will spotlight different partnerships the PTFW program is using to tout these basic cultural ecosystem services today.

2. Managing invasive ungulates and carbon on coastal floodplain wetlands of northern Australian Indigenous Protected Areas

First authors(s): Nicholas Crameri

Other author(s): Emilie Ens, Lanydjana Mununggurr, Yanbatji Mununggurr, Yirralka Rangers

First author affiliation: School of Natural Sciences, Macquarie University, Sydney, NSW, Australia

Contact: nicholas.crameri@mq.edu.au

Keywords: Cross-cultural ecology, Indigenous-led restoration, feral ungulates, carbon finance.

The Laynhapuy Indigenous Protected Area (IPA) in northeast Arnhem Land, tropical northern Australia, includes culturally significant floodplains that support diverse coastal wetlands. Coastal floodplain wetlands play a critical role in the lives of the local Yolŋu peoples. The Yolŋu have intimate spiritual and cultural connections to wetlands through ceremony, songlines and customary harvest of species such as räkay (water chestnut, Eleocharis dulcis), gurrumaṯtji (magpie goose, Anseranas semipalmata) and minhala (Northern snake-necked turtle, Chelodina

rugosa). Beyond their cultural significance, these wetlands play a crucial role in climate change mitigation by sequestering large amounts of carbon in their vegetation and sediments, providing valuable ecosystem services. The Yirralka Rangers and Yolŋu Traditional Owners have identified hotspots of damaged and degraded wetlands because of feral ungulates and saltwater intrusion. Using this knowledge, the Yirralka Rangers and Macquarie University researchers established a fenced plot array in 2018, across a supratidal paperbark forest and sedgeland on the Gurrumuru Ninydjiya floodplain. To assess impacts to the carbon cycle in these wetlands, above- and below-ground carbon stocks and greenhouse gas (GHG) emissions across the plot array were quantified. The findings revealed up to 4-fold higher GHG emissions (combined CO2 and CH4) in areas damaged by invasive ungulates compared to those where ungulates were excluded. Additionally, herbaceous vegetation cover was significantly reduced by ungulate activity. These estimates have since been upscaled to the floodplain level using remote sensing techniques. By integrating on-ground and satellite-derived carbon estimates, this research aims to contribute to the development of new Australian carbon crediting methods aimed at reducing disturbances to coastal floodplain wetlands. Such credits could help fund well-resourced management efforts that align with both Indigenous and Western priorities.

3. Ecosystem-Based Adaptation to Climate Change of Indigenous Women in Indonesia (Sumatra) and Australia (Queensland)

First authors(s): Simone Maynard

Other author(s): No

First author affiliation: National Parks Association of Queensland

Contact presenting author: maynardsimone@gmail.com

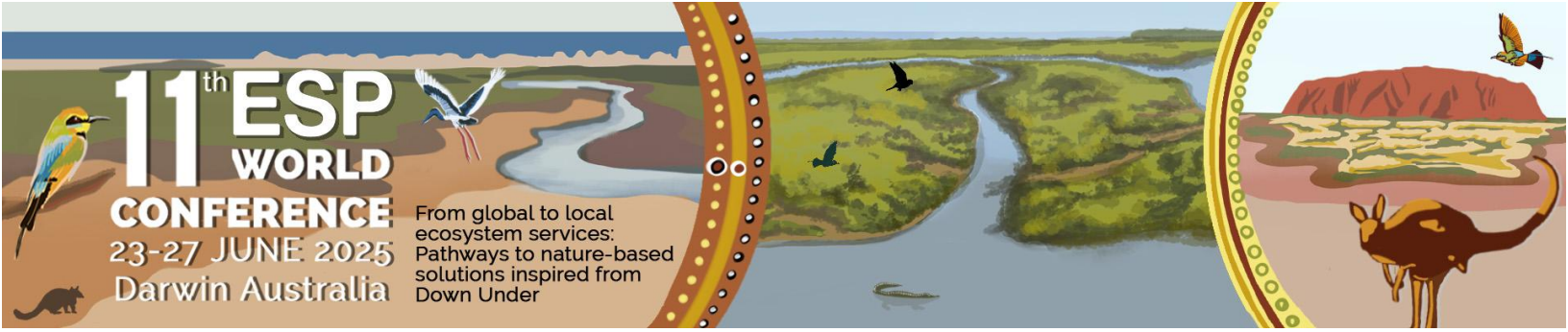
Keywords: ecosystem-based adaptation, indigenous women

The contributions of ecosystems to human well-being are commonly referred to as ecosystem services. Indigenous women rely heavily on ecosystem services for their food, physical and mental health, and livelihoods, making them particularly vulnerable to the effects of climate change. Our

project sought to investigate the impacts of climate change on ecosystem services important to Indigenous women in the Mentawai Islands and Aceh Singkil (Sumatra, Indonesia) and two sites in the Wet Tropics of Queensland (Australia). The aim of this project was to assist Indigenous women to identify potential ecosystem-based adaptation measures that could improve their resilience and future proof their communities. The study applied the Whole-of-System Value-Based Framework (developed by the Queensland Government) and outcomes from climate modelling to identify how climate change is changing ecosystems, ecosystem services, threats to and pressures on ecosystem services, the losses and damages caused by climate and non-climate change drivers and pressures, and potential environmental, social, economic and governance interventions. To populate the framework, we used a mixed-methods approach combining traditional and local knowledge with western science. First, we conducted ecological assessments, then open-ended and semi structured questionnaires and focus-group discussions with Indigenous women in each of the four case study areas, before applying outcomes of climate models. To empower Indigenous women to future proof their communities and cultural lands and safeguard their livelihoods and well-being, this research facilitated cross-cultural knowledge exchange between the women through visitations to each other's cultural lands where women learned from each other and developed their own robust evidence based and culturally sensitive ecosystem-based adaptation plans. The outcomes will provide policymakers, community leaders, and other stakeholders with insights that will aid in developing more effective, socially just and equitable climate change adaptation policies, strategies, programs. As well, nature conservation strategies and protected area management plans. This project will contribute to the Australian and Indonesian Government's commitment to achieving the SDGs 3, 5, 10, 13, 14, 15 and 17. As well, commitments under international agreements such as the United Nations 30 by 30 target, the Convention on Biological Diversity, Ramsar, UNESCO Biosphere Reserves and the Paris Agreement.

4. Environmental Defenders and Global Environmental Governance: A feminist political ecology analysis

First authors(s): Chen Ly



Other author(s): Caroline Howe

First author affiliation: Centre for Environmental Policy, Imperial College London

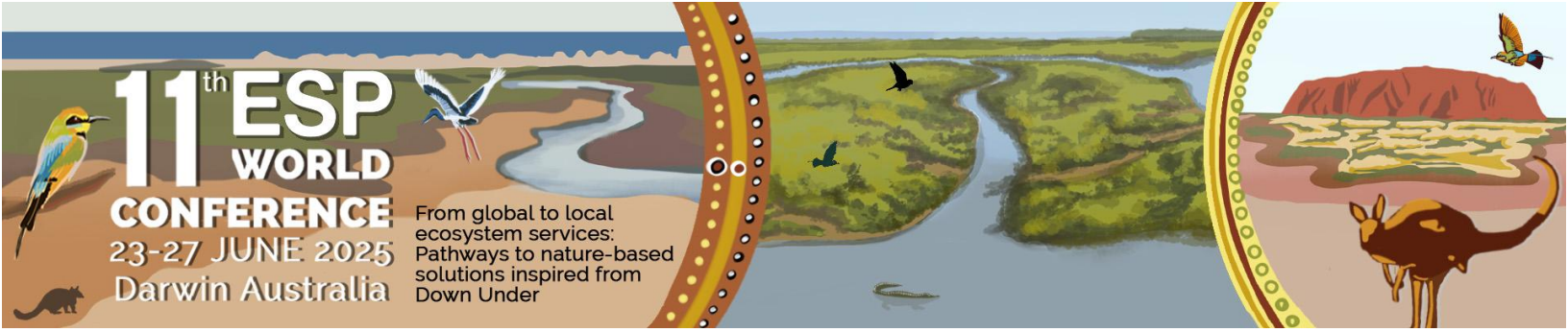
Contact: c.ly23@imperial.ac.uk

Keywords: gender, justice, environmental defenders, governance

Environmental defenders – those who protect land, biodiversity, and natural resources – play a crucial role in conservation efforts, yet they often face disproportionate risks, particularly women, Indigenous Peoples, and other marginalised groups. Female environmental defenders frequently experience gendered violence, legal threats, and sociopolitical exclusion, limiting their ability to participate in environmental decision-making. Recognising their importance, the UN Human Rights Council unanimously acknowledged environmental defenders as vital actors in global environmental governance in 2019. Yet despite this recognition, there is a lack of research on how environmental defenders and environmental governance structures interact and significant barriers remain in ensuring their equitable participation in international conservation efforts.

Using a feminist political ecology lens, this study fills this gap by conducting semi-structured interviews with environmental defenders and social network analysis to map their interactions with international institutions, focussing largely on the UN Environment Programme and the Convention for Biological Diversity. It explores the barriers female and Indigenous defenders face in influencing global conservation policies, including security threats, limited funding, and exclusion from high-level decision-making processes. The research also investigates how gender shapes these experiences and the extent to which UN-led conservation initiatives, including nature-based solutions, integrate the knowledge and priorities of grassroots activists.

The findings will provide insights into how global governance mechanisms can better support and protect environmental defenders, ensuring that conservation policies are not only effective but also equitable and inclusive. This study contributes to ongoing discussions on gender justice in biodiversity conservation and offers recommendations for strengthening the role of environmental defenders in shaping sustainable and just environmental futures.



5. No Cent in Incentives: Sustaining Ecosystem Services through Indigenous Payment Practices in Tapanuli, Indonesia

First authors(s): Hamid Arrum Harahap

Other author(s): No

First author affiliation: Universitas Andalas

Contact: arrumhrp22@gmail.com

Keywords: Ecosystem Services, Forest Conservation, Natural resources management, Payment For Ecosystem Services, Sumatra

Despite their initial promise, Payment for Ecosystem Services (PES) schemes have been criticized for inequitably distributing benefits among communities, often marginalizing vulnerable groups, and oversimplifying complex ecosystem dynamics into tradable commodities. Responding to these critiques, there is a growing interest in integrating non-monetary incentives within PES frameworks to foster inclusive community engagement in conservation efforts, though challenges remain in ensuring their long-term viability and effectiveness in addressing socioeconomic issues. This study examines the Indigenous Practices on payment for Ecosystem Services (IPES) model in Tapanuli, Indonesia, where conservation practices are deeply embedded in community life of Batak people. Led by indigenous communities, IPES programs sustain local economies and ecological integrity without solely relying on monetary incentives. Employing a mixed-methods approach, the research investigates the objectives, implementation, and impacts of IPES in Tapanuli. Data collection included 60 semi-structured interviews with farmers, 10 key informant interviews with IPES implementers, and two focus group discussions to explore ecological and economic impacts. Analysis using SPSS for quantitative data and NVivo for qualitative insights offers a comprehensive understanding of how IPES supports ecological conservation, enhances local economies, and promotes community engagement through non-monetary incentives. Findings underscore significant influences on agricultural-economic factors, cultural heritage, forest management, and social capital in the Hatabosi and Simardangiang communities, with broader implications for local institutions, cultural dynamics, and safety and security considerations. The study provides valuable insights into IPES as a potential alternative or

complement to mainstream PES schemes, proposing recommendations for advancing sustainable practices and enhancing community well-being in Indonesia and similar global contexts.

6. Beyond Ecological Recovery: Embedding Indigenous Knowledge in Mine Rehabilitation for Sustainable Futures

First author(s): Samy Andres Leyton-Flor

Other author(s): Kamaljit Kaur Sangha

First author affiliation: Research Institute for the Environment and Livelihoods, Charles Darwin University, Darwin, Australia

Contact: samy.leyton@cdu.edu.au

Keywords: Mine rehabilitation, Indigenous knowledge, ecosystem services, environmental governance, cultural heritage

Mine site rehabilitation is often framed through a technical and ecological lens, with limited consideration of the cultural and social values that landscapes hold for Indigenous peoples. In northern Australia, large-scale mining has disrupted key ecosystem services (ES) that sustain Indigenous livelihoods and well-being. Using the McArthur River Mine (MRM) as a case study, this research explores how mine rehabilitation can better integrate Indigenous perspectives by restoring provisioning and cultural ES critical to local Indigenous groups.

Through focus group discussions with traditional owners from four Indigenous groups in the Gulf of Carpentaria, we identified 14 essential ES before mining that have since been degraded or lost. Participants emphasised that effective rehabilitation must go beyond ecological restoration, including access to sacred sites, bush tucker, water sources, and cultural landscapes necessary for knowledge transmission, ceremonies, and community cohesion. Key concerns included ongoing pollution, restricted access to Country, and a lack of Indigenous involvement in rehabilitation planning.

We argue for a more inclusive approach to mine closure and rehabilitation that prioritises Indigenous values and perspectives. This includes co-designing rehabilitation plans with traditional owners, ensuring long-term access to rehabilitated lands, and incorporating Indigenous-led ecological and cultural restoration practices, such as cultural burning and landscape monitoring. By embedding Indigenous governance and ES frameworks into rehabilitation strategies, mine closure can contribute to environmental and cultural healing, ensuring sustainable post-mining futures for Indigenous communities.