Australian Government

Australian Submission to the UN Special Rapporteur on the Rights of Indigenous Peoples

Study: *"Indigenous Women and the Development, Application, Preservation and Transmission of Scientific Knowledge"*

Contents

About CSIRO

CSIRO is an Australian Government statutory authority within the Industry, Science, Energy and Resources portfolio, operating under the provisions of the Science and Industry Research Act 1949 (SIR Act). CSIRO is Australia's national science agency and innovation catalyst. CSIRO is Australia's most trusted research institution and most connected innovator, working with Australian universities, government departments and major Australian industries.

CSIRO is one of the largest and most multidisciplinary mission-driven research agencies in the world. Its more than 5,200 people are based across 58 sites in Australia and around the world, and it manages state-of-the-art research facilities for the nation. Its collaborative research turns science into solutions for food security and quality; clean energy and resources; health and wellbeing; resilient and valuable environments; innovative industries; and a secure Australia and region.

CSIRO delivers around A$7.6 billion of benefit to the nation each year as a result of its science, securing future national prosperity as well as environmental and social benefits one of the largest and most multidisciplinary mission-driven research organisations in the world, we unlock a better future for everyone.

To align with its Portfolio Budget Statement outcome statement, CSIRO describe its purpose as: *Solving the greatest challenges through innovative science and technology*. For over 100 years, it has been a mission-led national science agency, collaborating across the innovation system. Its primary objectives, guided by the SIR Act, help CSIRO to deliver on its purpose:

1. **Conduct and encourage the translation of Australia's world-class scientific research into impact.**
2. **Create and manage Australia's national laboratories.**
3. **Stimulate innovation for Australian industry, academia and government.**

CSIRO has identified six national challenges as the areas of greatest importance to Australians. Together the challenges and missions will drive Australia's recovery and resilience following recent national crises.

Health and wellbeing - Enhancing health for all through preventive, personalised, biomedical and digital health services.

Food security and quality - Achieving sustainable regional food security and growing Australia's share of premium Agri-food markets.

A secure Australia and region - Safeguarding Australia from risks such as war, terrorism, pandemics, disasters and cyber-attacks.

Resilient and valuable environments - Enhancing the resilience, sustainable use and value of our environments.

Sustainable energy and resources - Unlocking our energy and resources potential and supporting the transition to a low emissions future.

Future industries - Creating Australia's future industries and jobs by collaborating to boost innovation performance and promote science, technology, engineering and mathematics (STEM) skills

Indigenous Science & Engagement Program (ISEP)

CSIRO has a long history of project-based work with Aboriginal and Torres Strait Islander communities, predominantly through its Land and Water, Health & Biosecurity and Oceans & Atmosphere Business Units (and their predecessors). This work led to some development of its internal capability and the establishment of trusted relationships with some communities. For example, during the period 2016-2019, there were more than 60 projects undertaken by CSIRO with Australian Indigenous communities. These research projects were undertaken with varied levels of cultural respect and maturity.

In 2019, CSIRO engaged deeply with key internal and external stakeholders to develop a whole of organisation strategic approach that applies best practice models for undertaking research and engagement. This will shift CSIRO away from a "science push" approach, with minimal co-development with the customer, to a co-design model incorporating Indigenous leadership and control underpinned by principles of co-design and long-term partnerships with Aboriginal and Torres Strait Islander people and communities

The vision of its new Indigenous Science & Engagement Program (ISEP) is:

> *A science landscape in respectful partnership with Indigenous Australia delivering innovative, sustainable, holistic solutions to meet our greatest national challenges.*

This vision will be realised through the implementation of several key strategies focused on achieving long-lasting change at CSIRO. The ISEP will include a robust data reporting framework that is broadly shared across the organisation and will complement the *CSIRO 2021-2023 Reconciliation Action Plan*.

The intended outcomes from the program that will provide the realisation of the plan's vision - 'what will it look like when we get there?' are:

- ***Aboriginal and Torres Strait Islander people lead CSIRO research***
- ***Indigenous Cultural and Intellectual Property is protected***
- ***CSIRO research includes Aboriginal and Torres Strait Islander people and their perspectives***
- ***CSIRO inclusion within International Indigenous research partnerships***
- ***Aboriginal and Torres Strait Islander scientists in CSIRO***
- ***CSIRO capability is enabled with Aboriginal and Torres Strait Islander staff***
- ***CSIRO's procurement with Indigenous enterprises meets Australian Government standards***
- ***Aboriginal and Torres Strait Islander people benefit from the Indigenous Estate with CSIRO support***
- ***Aboriginal and Torres Strait Islander communities initiate and co-design CSIRO projects.***

The ISEP also recognises and responds to key contemporary changes in the national and international science policy environments. These include the UN Declaration on the Rights of Indigenous Peoples, the Nagoya Protocol, native title, treaty developments, the Uluru Statement, the 2020 Close the Gap Agreement, the AIATSIS Code, and developing Indigenous cultural knowledge and intellectual property legislation.

The ISEP will enable CSIRO to expand existing collaborations and develop new best practice models across the organisation. It will equip us to undertake large scale multi-disciplinary science for the priorities identified by Aboriginal and Torres Strait Islander people, communities and their organisations.

Aboriginal and Torres Strait Islander people in CSIRO

Aboriginal and Torres Strait Islander employment at CSIRO is 1.5% and we aim to achieve 3% by 2023.

Dr Cass Hunter is an example of an Indigenous scientist with a successful career at CSIRO that began in high school and has led to her leadership in recognising and highlighting the Indigenous-led environmental management unfolding across Australia. More information about Dr Hunter and her work is here.

Young Indigenous Women's STEM Academy

The Young Indigenous Women's STEM Academy (the Academy) gives young Aboriginal and/or Torres Strait Islander women the tools and support they need to succeed in an exciting STEM career. It does this through targeted, long-term support to help overcome the barriers that discourage Indigenous women from pursuing STEM careers.

The Academy takes a holistic, streamlined approach to support and promote access to STEM careers for high achieving students. Students are recruited in year 8, to ensure support starts before students choose critical high school subjects that enable relevant study and career progression into STEM fields.

The Academy recognises that Aboriginal and Torres Strait Islander peoples have an ongoing relationship with STEM that dates back thousands of years. The program is co-designed with participants, communities, and Indigenous leaders to ensure that Aboriginal and Torres Strait Islander perspectives are embedded in all aspects of the program's delivery.

More information about the Academy is here.

Indigenous STEM Awards

The Indigenous STEM Awards recognise and reward the achievements of Aboriginal and Torres Strait Islander STEM professionals and students as well as schools, teachers and mentors working in Indigenous STEM Education.

Since the awards were launched in 2016, 44 winners and 120 finalists have been recognised for their outstanding contributions in science, technology, engineering and mathematics (STEM). In 2021, there are seven categories of awards that cover high school and undergraduate students, STEM professionals, schools, teachers and mentors. Aboriginal and Torres Strait Islander women recognised through the Indigenous STEM Awards include Taylor Griffin, an Indigenous Aerospace Engineer.

More information about the Indigenous STEM Award winners is here.

Attachment One: Examples of Current Projects

Empowering Indigenous rangers to use data and Artificial Intelligence (AI) to monitor the impact of land management efforts

Project Name	Healthy Country AI program
Project Partners	CSIRO, Microsoft, Telstra Foundation, North Australia Land and Sea Management Alliance, Djurruburu rangers; Jawoyn rangers; Ngalmukar rangers; Mimal Land Management; Aak Puul Ngantam rangers, Normanby Aboriginal Land Management; Kakadu National Park rangers
Location	Kakadu National Park; Arnhem Land, Cape York
Project Start	Commenced in 2018. Ongoing

Project Purpose:

- To support women rangers to use digital technologies, data and AI to support Indigenous land and sea management and enterprises.
- To develop a digitally enabled Indigenous land and sea management workforce and economy.
- To empower Indigenous land and sea managers to effectively monitor and respond to complex environmental challenges

Context:

Across the world, Indigenous people manage more than 80 per cent of its vital ecosystems and threatened species. In Australia, about four million square kilometres of combined land and sea Country are Indigenous-titled lands. That's over half of Australia's total land area. At the same time, Indigenous people face many challenges in managing their lands, including threats to significant species and habitats.

The Healthy Country AI program has been empowering Indigenous people to respond to environmental challenges. Co-developed with Traditional Owners, the program is a world-first and award-recognised. Its overall aim is to survey species and habitats of cultural and ecological significance to Indigenous people. By mixing ethical AI and modern science with Indigenous knowledge, it's delivering practical solutions for conserving precious ecosystems on Indigenous lands.

Approach:

- Today, the Healthy Country AI program is proudly tackling a range of complex environmental issues. These solutions are being delivered for Indigenous rangers and on-country enterprises. Though it continues to expand, it has held fast to its key principles around ethical data collection and data analysis. This ensures that the program's efforts:
    - are governed by Traditional Owners,
    - reflect the priority areas of concern for local Indigenous communities, and
    - support on-ground adaptive management efforts.

A component of the Healthy Country AI program focuses on empowering Indigenous women to be trained and supported to be part of this effort

Outcome:

Bininj Traditional Owners have used Healthy Country AI to guide effective weed management efforts in Kakadu's floodplains. Using the data produced by ethical drone monitoring, the rangers were able to get accurate estimates of magpie geese populations, and of para grass sites. It meant that rangers could check how effective their weed management was. Within just nine months, the count of magpie geese in one wetland jumped from 50 to 1,800.

A couple of years later, in Cape York, Wik Elders and Aak Puul Ngantam (APN) Cape York rangers worked with CSIRO, Microsoft and other scientists, funded by NESP, to adapt Healthy Country AI to protect turtle nests in the area. They were able to efficiently analyse tens of thousands of helicopter and drone images to monitor turtle nesting sites and target management of feral pig populations in the area which led to pig predation on turtle nests in key areas falling by up to 90 per cent.

On-ground training program for local Indigenous communities and land managers. This training will enable Indigenous rangers to drive and develop AI and digital tools themselves

Empowering Indigenous businesses to develop their competitive advantage

Project Name	Yellow Crazy Ant Project
Project Partners	CSIRO, Yolngu Business Enterprises (YBE2), Australian Government's Entrepreneurs' Programme, Innovation Connections service
Location	North-East Arnhem Land, Northern Territory
Project Start	Commenced in 2014. CSIRO has an ongoing relationship with YBE2

Project Purpose:

- To support a small business Yolngu Business Enterprise (YBE2) to gain competitive advantage in mine site rehabilitation with a niche skill set.
- Develop capability to control destructive ant infestations.
- To effectively manage yellow crazy ants on the Gove mine site in addition to broader regional efforts by other Indigenous land management groups in collaboration with CSIRO.

Context:

YBE2 is 100% owned by the Yolngu people of North-East Arnhem Land specialising in mine site rehabilitation and environmental management. CSIRO's SME Engagement Centre supported YBE2's business growth to develop protocols to monitor and manage a specific invasive ant infestation on the Gove bauxite mine. The yellow crazy ant is a significant threat to the local environment and wildlife and greatly interferes with mine site rehabilitation. The project included:

- Developing specialist skills and knowledges in rehabilitating mining sites by mitigating invasive species and informing land use change and management.
- Providing a niche and unique service in the mining industry.
- Building positive business relationships with the Yolngu team.

Approach:

- Consultation and collaboration with the YBE2 team on the ground to develop protocols and processes to continuously monitor ant infestations.
- Identify the ant, collect data, and accurately map ant infestations using GPS systems.
- Deliver the most suitable eradication treatments.
- Assess treatment efficacy.

Outcome:

- 200 hectares infested with Yellow crazy ants were mapped and treated by the YBE2 team.
- Improved mine site rehabilitation processes for future contract work.
- Further business opportunities – an additional 200 hectares was mapped and treated.

In addition to its standard mine rehabilitation work, YBE2 is now contracted to control ants in new areas at the Gove site on an ongoing basis.

Linking Indigenous knowledge and science with western scientific systems

Project Name	Noongar-Wudjari Project
Project Partners	CSIRO, Noongar Boodjar Language Centre, Noongar-Wudjari Elders, Australian Tropical Herbarium, Queensland Herbarium, Atlas of Living Australia, University of Western Australia, Australian Government's Indigenous Languages and Arts program
Location	Fitzgerald River National Park, Western Australia
Project Start	2020

Project Purpose:

- To successfully link Indigenous language and knowledge with Western scientific names and knowledge for plants and animals on Noongar-Wudjari Country.
- To re-build layers of ancestral and ecological knowledge by preserving Noongar-Wudjari language for future generations on an online platform.
- To build genuine and positive relationships between Indigenous communities, Indigenous and Western scientists by integrating it with the need of the community.

Context

CSIRO collaborated with Atlas of Living Australia (ALA), Noongar Boodjar Language Centre, Elders and other partners to create a digital, living Noongar-Wudjari language database. This included:

- Reclaiming and revitalising Noongar-Wudjari language from Indigenous perspectives and Knowledge holders.
- Ensuring words, language and written content used to describe plants, animals and places are appropriate.
- Linking biodiversity with Indigenous culture and interactions with the environment to increase the health of the country.

Approach

- Initial consultation and engagement with Noongar Boodjar Language Centre, Elders and ALA to develop an online platform that showcased a shared understanding of Indigenous and western based knowledge and systems.
- In May 2020 the project team, scientists and linguists travelled to Fitzgerald River National Park to record the Noongar-Wudjari names and knowledge for plants and animals.
- Knowledge includes what species look, feel, smell and taste like, when and where they can be found and how they are connected to people, culture and Country.
- Knowledge Holders, western science-trained biologists, and ethnobotanists worked collaboratively with the linguist to link Noongar-Wudjari names to western science names

Outcome:

- In November 2021, 99 Noongar-Wudjari names of plants and animals along with 91 profiles containing Noongar-Wudjari knowledge about these plants and animals were included in the Atlas of Living Australia and are now publicly accessible (https://profiles.ala.org.au/opus/noongar).

- The ALA improves accessibility for all to be able use Noongar-Wudjari names to search for plants or animals and learn both Indigenous and western science knowledges.

Supporting Indigenous community-controlled health services to improve primary healthcare

Project Name	Cardiovascular Disease (CVD) management and education in Indigenous communities
Project Partners	CSIRO, Wuchopperen Health Service (Cairns, Nth Qld), Mulungu Aboriginal Corporation Primary Health Care Service (Mareeba Nth Qld), Queensland Aboriginal and Islander Health Council (QAIHC), Australian e-Health Research Centre
Location	Brisbane
Project Start	2019

Project Purpose:

- To improve access to culturally safe primary healthcare to support patients with CVD.
- To improve the management of and reduce the prevalence of CVD in Indigenous communities utilising remote monitoring.
- Trial an mHealth platform developed that utilises innovative technologies integrated with a smartphone App, clinician portal, measurement devices and multimedia content to support patients with hypertension throughout the diagnosis and management journey.

Context:

CVD has long been a significant health problem among Aboriginal and Torres Strait Islander peoples. Statistics show that the condition remains the leading cause of death for the population, and that Indigenous adults are almost twice as likely as non-Indigenous adults to be hospitalised with CVD.

Approach:

- CSIRO partnered with Queensland Aboriginal and Islander Health Council (QAIHC) to work with our scientists at the Australian eHealth Research Centre (AeHRC).
- AeHRC partnered with two Indigenous community-controlled health services in Nth Qld, Wuchopperen Health Service (Cairns, Nth Qld) and Mulungu Aboriginal Corporation Primary Health Care Service (Mareeba Nth Qld).
- Co-designed with Aboriginal and Torres Strait Islander community-controlled health leaders and their clinicians, CSIRO researchers are exploring the feasibility of a mobile health platform to support existing models of care and facilitate better access to clinical services.
- Embed features of the mobile health platform include patient education, self-management of blood pressure and manage medication. The platform has the potential to support the management of a wide range of CVD risk factors.

Outcome:

- This project aims to reduce the prevalence of CVD through improved awareness, understanding and clinical management of hypertension for Aboriginal and Torres Strait Islander people.
- In December 2021, we commenced a trial of the smartphone and Internet based system (mHealth platform) for the management of high blood pressure at Wuchopperen and Mulungu Health services.
- Preliminary findings have contributed to a publication currently under peer review.