



Evaluating capacity building for sustainability scientists: Pathways for early career researchers

September 2024

Lisa Walker
Peat Leith







Valuing Sustainability Future Science Platform



Valuing Sustainability Future Science Platform





Valuing Sustainability Future Science Platform

“Co-designs and co-develops science and technology”

“Builds the next generation of science”

“Evidence based sustainability”

“Underpin rigorous measures”

“Create multiple knowledge platforms”

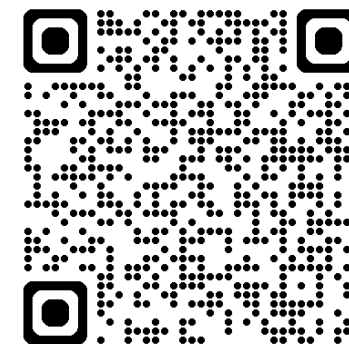
“Leading to better outcomes for our land, water and people.”

“Measures are useable and impactful”

“Integrated at different scales”

“Facilitating data dialogue between science and decision-makers”

“Works across industries and communities”

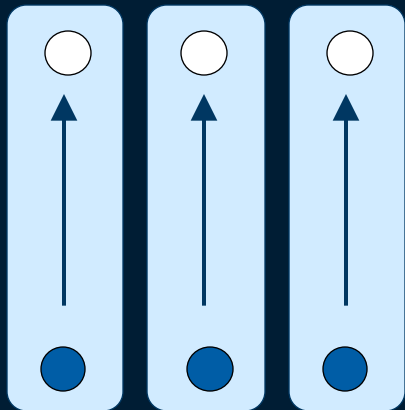


<https://research.csiro.au/vsfsp/>



Beyond scientific disciplines

Disciplinarity



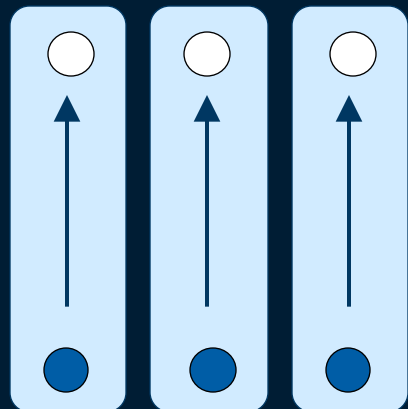
Separate research
outputs

- Research problem
- Scientist



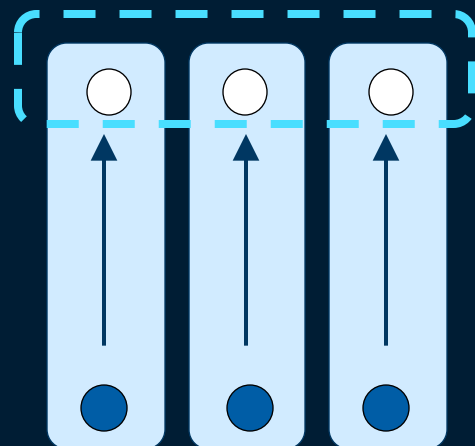
Beyond scientific disciplines

Disciplinary



Separate research outputs

Multidisciplinary



Multiple disciplines cooperating, separate research outputs

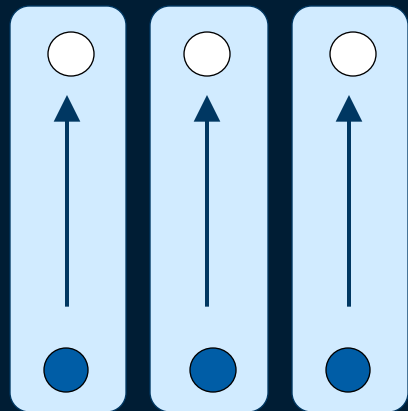
● Research problem

● Scientist



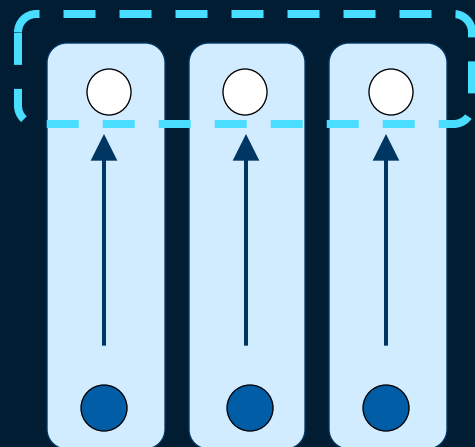
Beyond scientific disciplines

Disciplinary



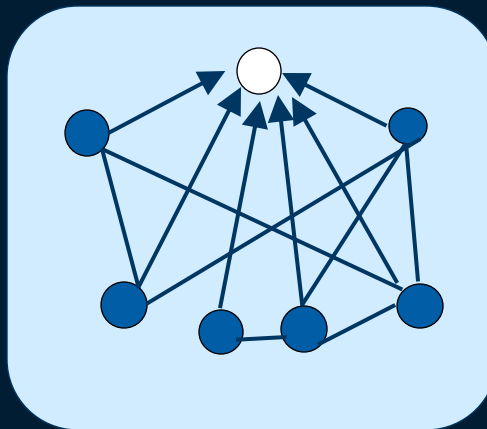
Separate research outputs

Multidisciplinary



Multiple disciplines cooperating, separate research outputs

Interdisciplinary

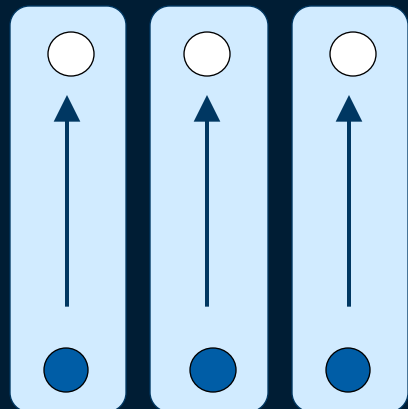


Multiple disciplines collaborating on integrated research output

- Research problem
- Scientist

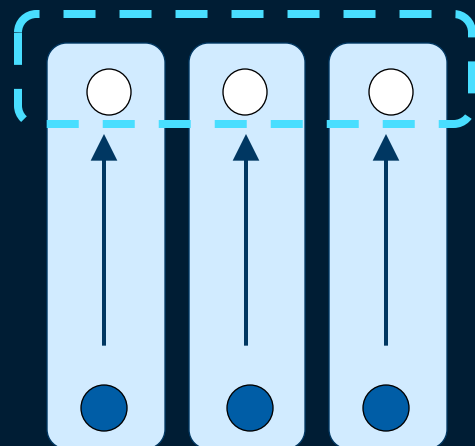
Beyond scientific disciplines

Disciplinary



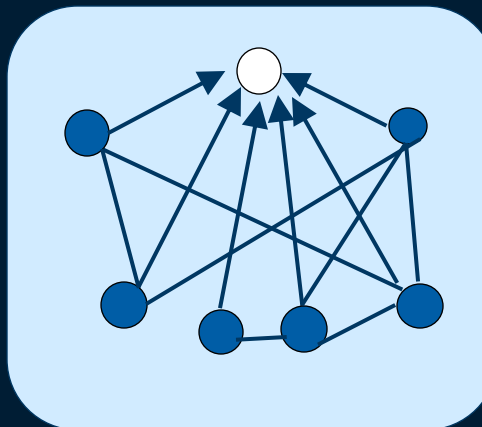
Separate research outputs

Multidisciplinary



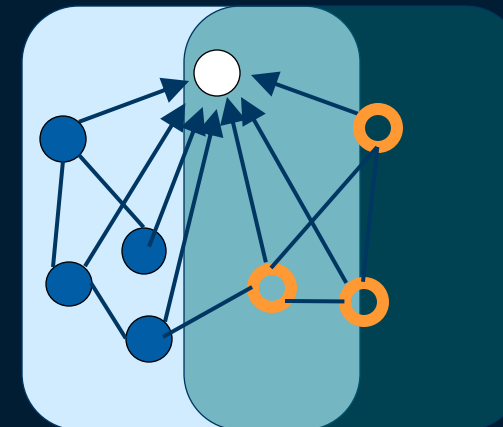
Multiple disciplines cooperating, separate research outputs

Interdisciplinary



Multiple disciplines collaborating on integrated research output

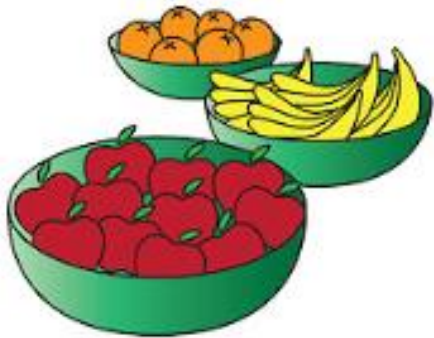
Transdisciplinary



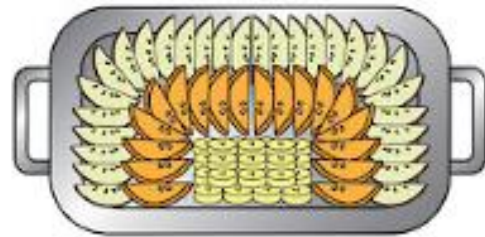
Actors, investors, policy makers, community members collaborating on integrated research outputs & innovative solutions

- Research problem
- Scientist
- Societal actors

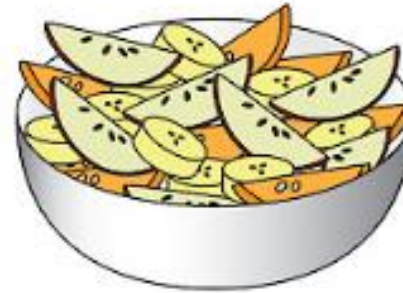
Disciplinary



Multi-disciplinary



Inter-disciplinary



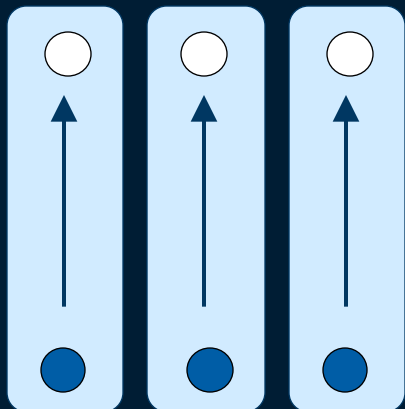
Trans-disciplinary



Disciplinary vs. inter-disciplinary vs. multi-disciplinary vs. transdisciplinary, represented by fruit. Diagram credit: Emily Nastase

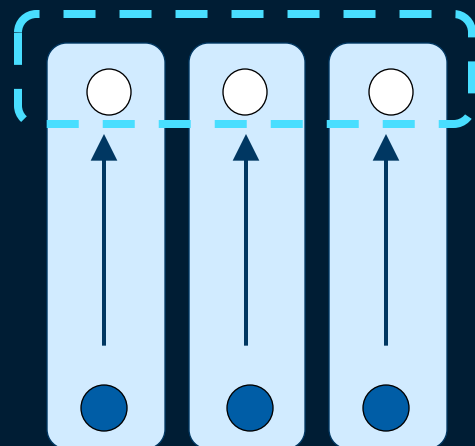
Beyond scientific disciplines

Disciplinary



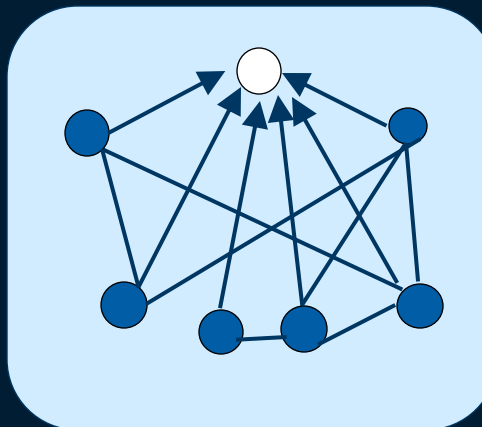
Separate research outputs

Multidisciplinary



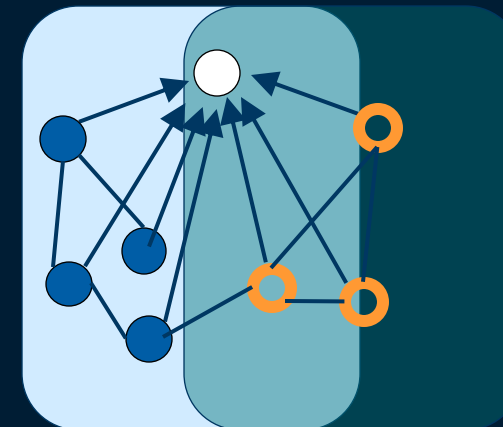
Multiple disciplines cooperating, separate research outputs

Interdisciplinary



Multiple disciplines collaborating on integrated research output

Transdisciplinary



Actors, investors, policy makers, community members collaborating on integrated research outputs & innovative solutions

- Research problem
- Scientist
- Societal actors

Implications for evaluation

- Formative
- Multi-method, triangulating data
- Contribution to change in place of attribution
- Creating space for reflexivity and learning
- Impacts beyond scientific publications

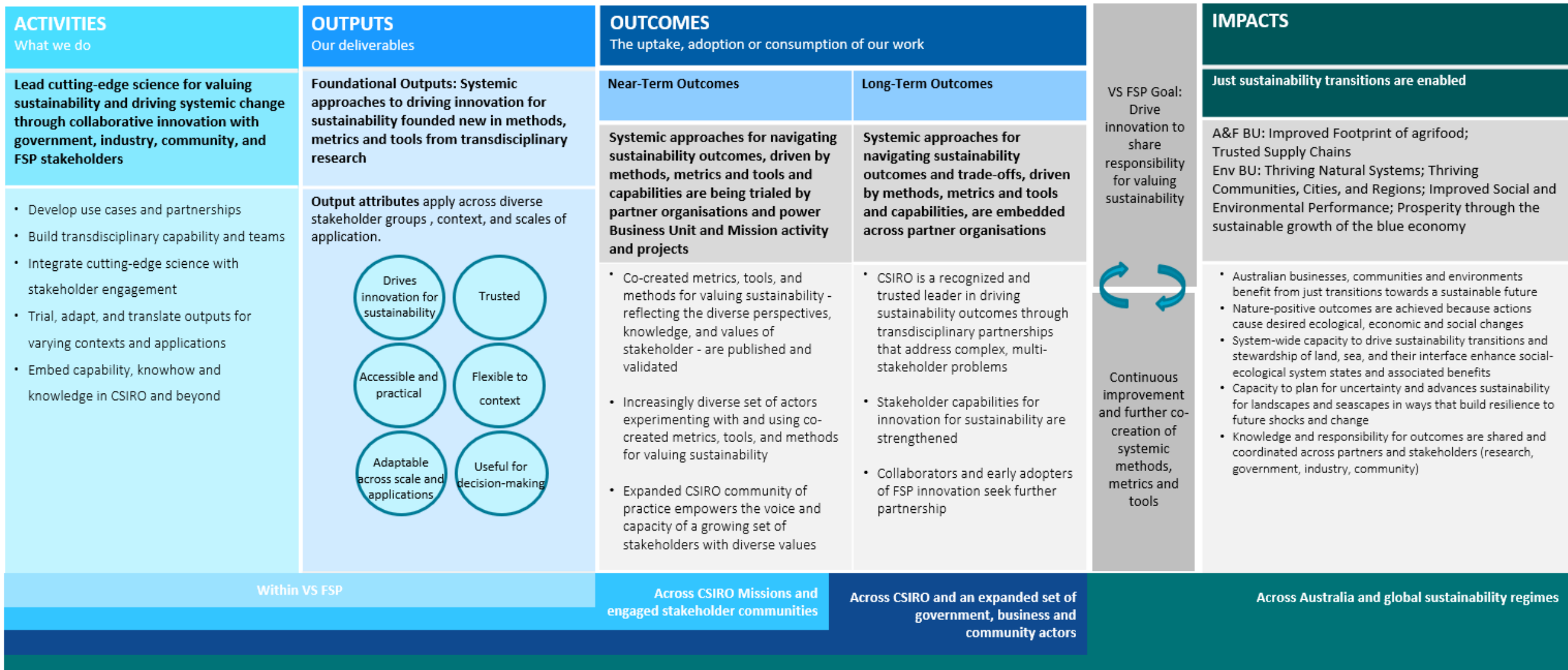




Valuing Sustainability Future Science Platform Impact Pathway

Years 2021 – 2024

Years 2024 – 2031



Across CSIRO Missions and engaged stakeholder communities

Across CSIRO and an expanded set of government, business and community actors

Across Australia and global sustainability regimes



Valuing Sustainability Future Science Platform Impact Pathway

Years 2021 – 2024

Years 2024 – 2031

ACTIVITIES

What we do

Lead cutting-edge science for valuing sustainability and driving systemic change through innovation with government, industry and FSP stakeholders

- Develop use cases and partnerships
- Build transdisciplinary capability and teams
- Integrate cutting-edge science with stakeholder engagement
- Trial, adapt, and translate outputs for varying contexts and applications
- Embed capability, knowhow and knowledge in CSIRO and beyond

Individual and institutional capacity

Quality sustainability science

Outcomes & impact



OUTCOMES

The uptake, adoption or consumption of our work

Near-Term Outcomes

Systemic approaches for navigating sustainability outcomes, driven by methods, metrics and tools and capabilities are being trialed by partner organisations and power Business Unit and Mission activity and projects

- Co-created metrics, tools, and methods for valuing sustainability - reflecting the diverse perspectives, knowledge, and values of stakeholder - are published and validated

Increasingly diverse set of actors experimenting with and using co-created metrics, tools, and methods for valuing sustainability

Expanded CSIRO community of practice empowers the voice and capacity of a growing set of stakeholders with diverse values

Long-Term Outcomes

Systemic approaches for navigating sustainability outcomes and trade-offs, driven by methods, metrics and tools and capabilities, are embedded across partner organisations

- CSIRO is a recognized and trusted leader in driving sustainability outcomes through transdisciplinary partnerships that address complex, multi-stakeholder problems
- Stakeholder capabilities for innovation for sustainability are strengthened
- Collaborators and early adopters of FSP innovation seek further partnership

VS FSP Goal: Drive innovation to share responsibility for valuing sustainability

Continuous improvement and further co-creation of systemic methods, metrics and tools

IMPACTS

Just sustainability transitions are enabled

A&F BU: Improved Footprint of agrifood; Trusted Supply Chains
Env BU: Thriving Natural Systems; Thriving Communities, Cities, and Regions; Improved Social and Environmental Performance; Prosperity through the sustainable growth of the blue economy

- Australian businesses, communities and environments benefit from just transitions towards a sustainable future
- Nature-positive outcomes are achieved because actions cause desired ecological, economic and social changes
- System-wide capacity to drive sustainability transitions and stewardship of land, sea, and their interface enhance social-ecological system states and associated benefits
- Capacity to plan for uncertainty and advances sustainability for landscapes and seascapes in ways that build resilience to future shocks and change
- Knowledge and responsibility for outcomes are shared and coordinated across partners and stakeholders (research, government, industry, community)

Within VS FSP

Across CSIRO Missions and engaged stakeholder communities

Across CSIRO and an expanded set of government, business and community actors

Across Australia and global sustainability regimes



Valuing Sustainability Future Science Platform Impact Pathway

Years 2021 – 2024

Years 2024 – 2031

ACTIVITIES

What we do

Lead cutting-edge science for valuing sustainability and driving systemic change through innovation with government, industry and FSP stakeholders

- Develop use cases and partnerships
- Build transdisciplinary capability and teams
- Integrate cutting-edge science with stakeholder engagement
- Trial, adapt, and translate outputs for varying contexts and applications
- Embed capability, knowhow and knowledge in CSIRO and beyond

Individual and institutional capacity

Quality sustainability science

Outcomes & impact

OUTCOMES

The uptake, adoption or consumption of our work

Near-Term Outcomes

Long-Term Outcomes

Systemic approaches to sustainability methods, metrics, capabilities and tools from transdisciplinary research

- Co-created methods for valuing sustainability reflecting the diverse perspectives, knowledge, and values of stakeholder - are published and validated

Increasingly diverse set of actors experimenting with and using co-created metrics, tools, and methods for valuing sustainability

Expanded CSIRO community of practice empowers the voice and capacity of a growing set of stakeholders with diverse values

Projects are weaving together various disciplines, networks, values and individuals. As a result, each project will follow a unique trajectory through the Impact Pathway.

IMPACTS

Just sustainability transitions are enabled

A&F BU: Improved Footprint of agrifood; Trusted Supply Chains
Env BU: Thriving Natural Systems; Thriving Communities, Cities, and Regions; Improved Social and Environmental Performance; Prosperity through the sustainable growth of the blue economy

- Australian businesses, communities and environments benefit from just transitions towards a sustainable future
- Nature-positive outcomes are achieved because actions cause desired ecological, economic and social changes
- System-wide capacity to drive sustainability transitions and stewardship of land, sea, and their interface enhance social-ecological system states and associated benefits
- Capacity to plan for uncertainty and advances sustainability for landscapes and seascapes in ways that build resilience to future shocks and change
- Knowledge and responsibility for outcomes are shared and coordinated across partners and stakeholders (research, government, industry, community)

Within VS FSP

Across CSIRO Missions and engaged stakeholder communities

Across CSIRO and an expanded set of government, business and community actors

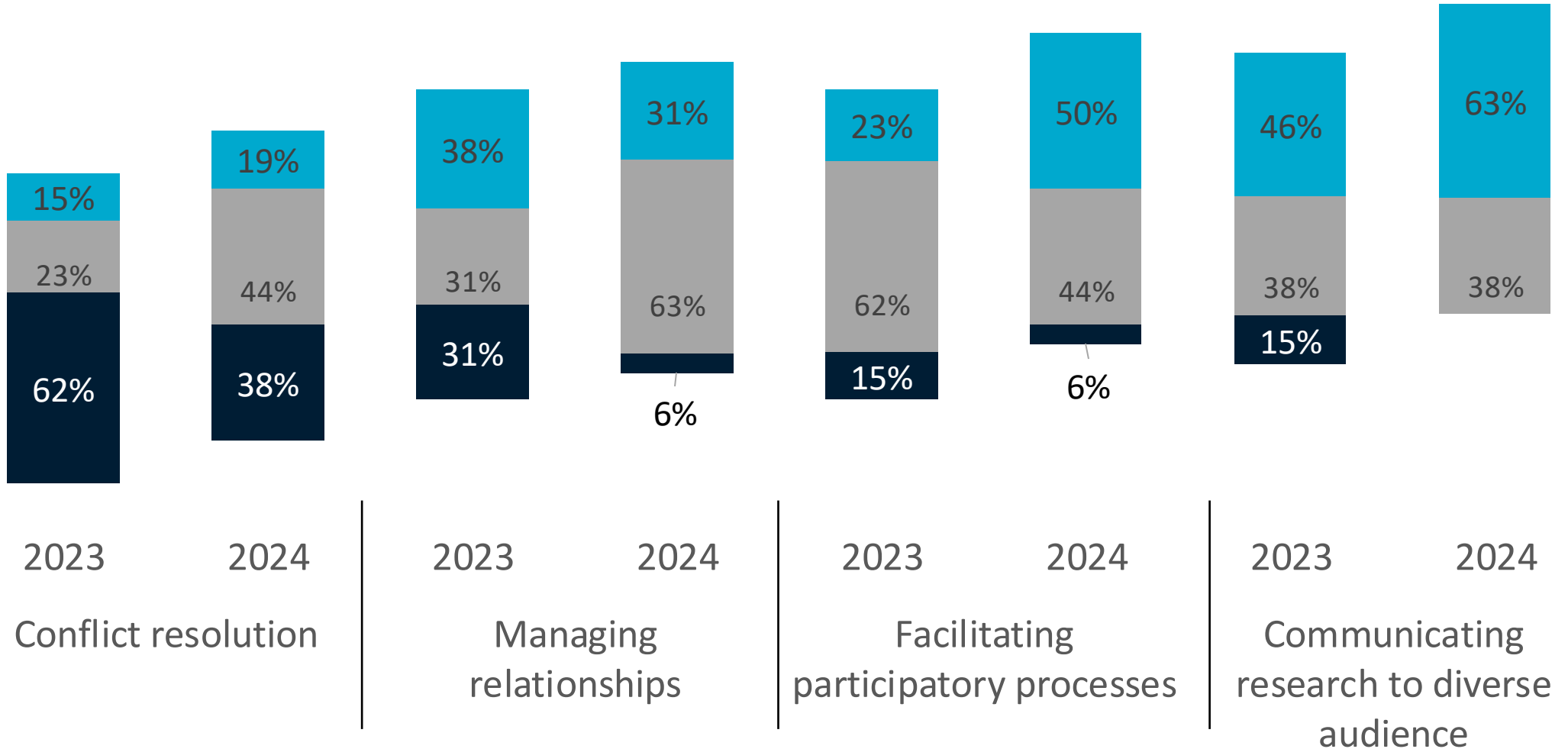
Across Australia and global sustainability regimes



Early Career Researchers - Self-reported confidence levels

(2023 VS FSP survey, n=13 2024 VS FSP survey, n=16)

■ Very or quite confident ■ Somewhat confident ■ Not at all or a little confident

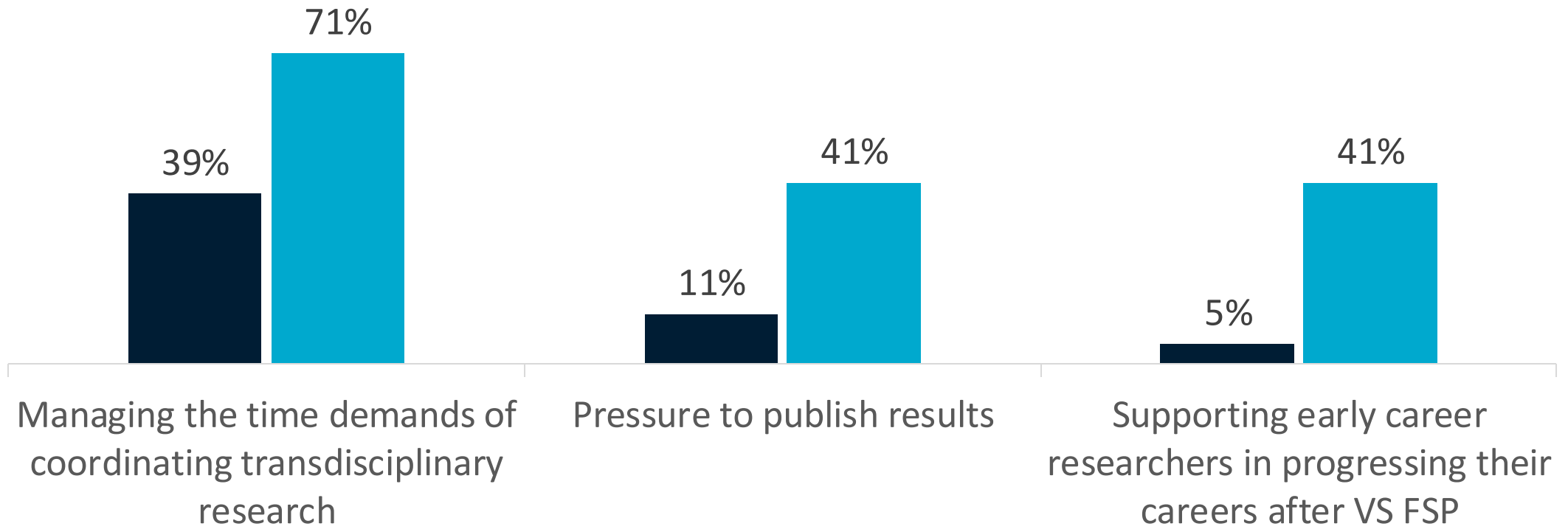


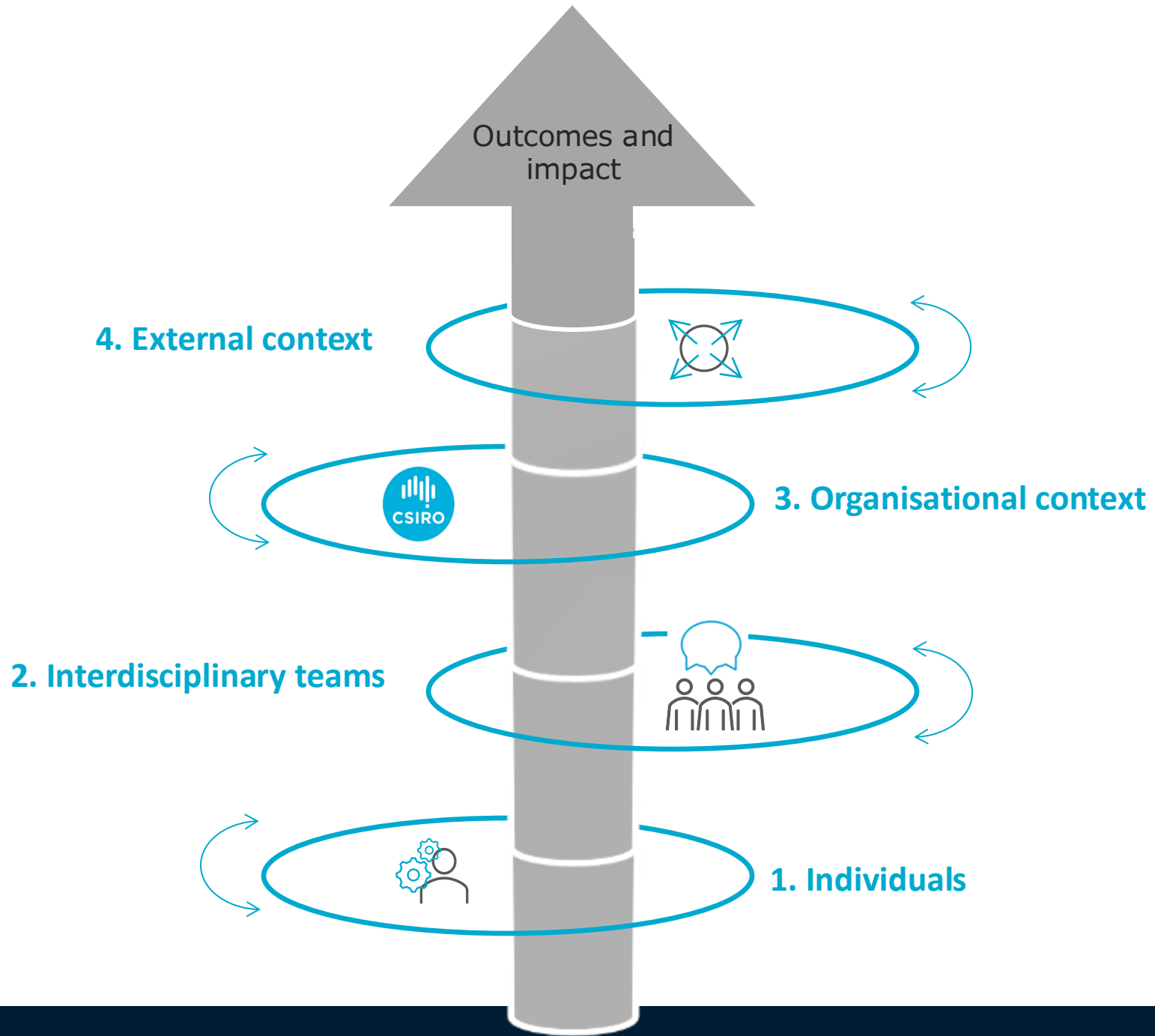


Proportion of researchers rating activities as 'significantly' or 'severely' challenging

(2023 survey, n=45, 2024 survey, n=34)

■ 2023 ■ 2024

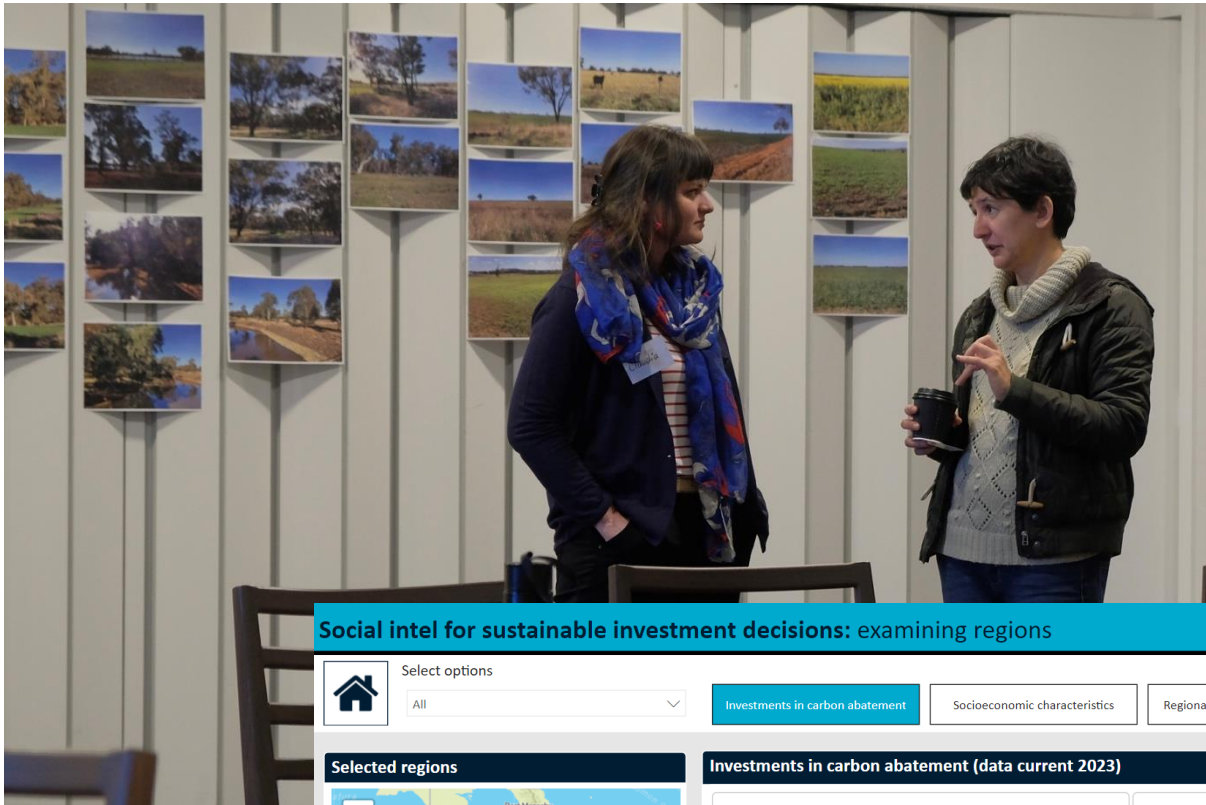




Key points

- Need for transdisciplinary efforts to tackle the multiple interconnected challenges we face
- This requires a new set of skills, capabilities and facilitating institutional environments
- Evaluation has a key role to play in not only demonstrating impact in complex settings but also contributing to ongoing learning





Social intel for sustainable investment decisions: examining regions



Select options: All

Investments in carbon abatement | Socioeconomic characteristics | Regional transitions and benefits | Key characteristics

Selected regions

Investment (\$ AUD) for the selected projects

\$79.9M

Investments in carbon abatement (data current 2023)

Land Restoration Fund

LRF projects by method in selected regions

Australian Carbon Credit Unit Scheme

ACCU Scheme project status for selected regions

If multiple regions are selected, there could be double counting of projects that operate across regions

Expected co-benefits for LRF projects in selected regions

Legend: First Nations (orange), Environmental (green), Employment and skills (pink), Community resili... (blue), Absent (grey)

R1015: Central Cape York Regional Savanna Fire Pr...

Project breakdown for selected regions vs. Queensland

Legend: Project region (dark blue), Queensland (grey)



Some background literature

PERSPECTIVE
<https://doi.org/10.1038/s41893-019-0448-2>

nature sustainability

Principles for knowledge co-production in sustainability research

Albert V. Norström^{1*}, Christopher Cvitanovic^{2,3}, Marie F. Löf⁴, Simon West^{1,5,6}, Carina Wyborn^{7,8}, Patricia Balvanera⁹, Angela T. Bednarek¹⁰, Elena M. Bennett¹¹, ReINETTE Biggs^{11,12}, Ariane de Bremond^{13,14}, Bruce M. Campbell¹⁵, Josep G. Canadell¹⁶, Stephen R. Carpenter¹⁷, Carl Folke^{1,18}, Elizabeth A. Fulton^{3,19}, Owen Gaffney^{1,20}, Stefan Gelcich²¹, Jean-Baptiste Jouffray^{1,22}, Melissa Leach²³, Martin Le Tissier²⁴, Berta Martín-López²⁵, Elena Louder²⁶, Marie-France Loutre²⁷, Alison M. Meadow²⁸, Harini Nagendra²⁹, Davnah Payne³⁰, Garry D. Peterson¹, Belinda Reyers^{1,31}, Robert Scholes³², Chinwe Ifejika Speranza³³, Marja Spienburg^{34,35}, Mark Stafford-Smith³⁶, Maria Tengö¹, Sandra vander Hel³⁷, Ingrid van Putten^{3,19} and Henrik Österblom¹

NATURE SUSTAINABILITY | VOL 3 | MARCH 2020 | 182-190 | www.nature.com/natsustain

Environmental Science and Policy 125 (2021) 202–218

Contents lists available at ScienceDirect

Environmental Science and Policy

journal homepage: www.elsevier.com/locate/envsci

Is this what success looks like? Mismatches between the aims, claims, and evidence used to demonstrate impact from knowledge exchange processes at the interface of environmental science and policy

Denis B. Karcher^{a,*}, Christopher Cvitanovic^a, Rebecca M. Colvin^b, Ingrid E. van Putten^{c,d}, Mark S. Reed^e

^a Australian National Centre for the Public Awareness of Science, Australian National University, Canberra, ACT, Australia
^b Crawford School of Public Policy, Australian National University, Acton, ACT, Australia
^c Centre for Marine Socioecology, University of Tasmania, Hobart, Tasmania, Australia
^d CSIRO, Oceans and Atmosphere, Hobart, Tasmania, Australia
^e Thriving Natural Capital Challenge Centre, Department of Rural Economics, Environment & Society, Scotland's Rural College, King's Buildings, Edinburgh EH9 3JG, United Kingdom

Global Environmental Change 25 (2014) 204–220

Contents lists available at ScienceDirect

Global Environmental Change

journal homepage: www.elsevier.com/locate/gloenvcha

Evaluating knowledge exchange in interdisciplinary and multi-stakeholder research

Ioan Fazey^{a,*}, Lukas Bunse^a, Joshua Msika^a, Maria Pinke^a, Katherine Preedy^b, Anna C. Evely^c, Emily Lambert^c, Emily Hastings^d, Sue Morris^d, Mark S. Reed^e

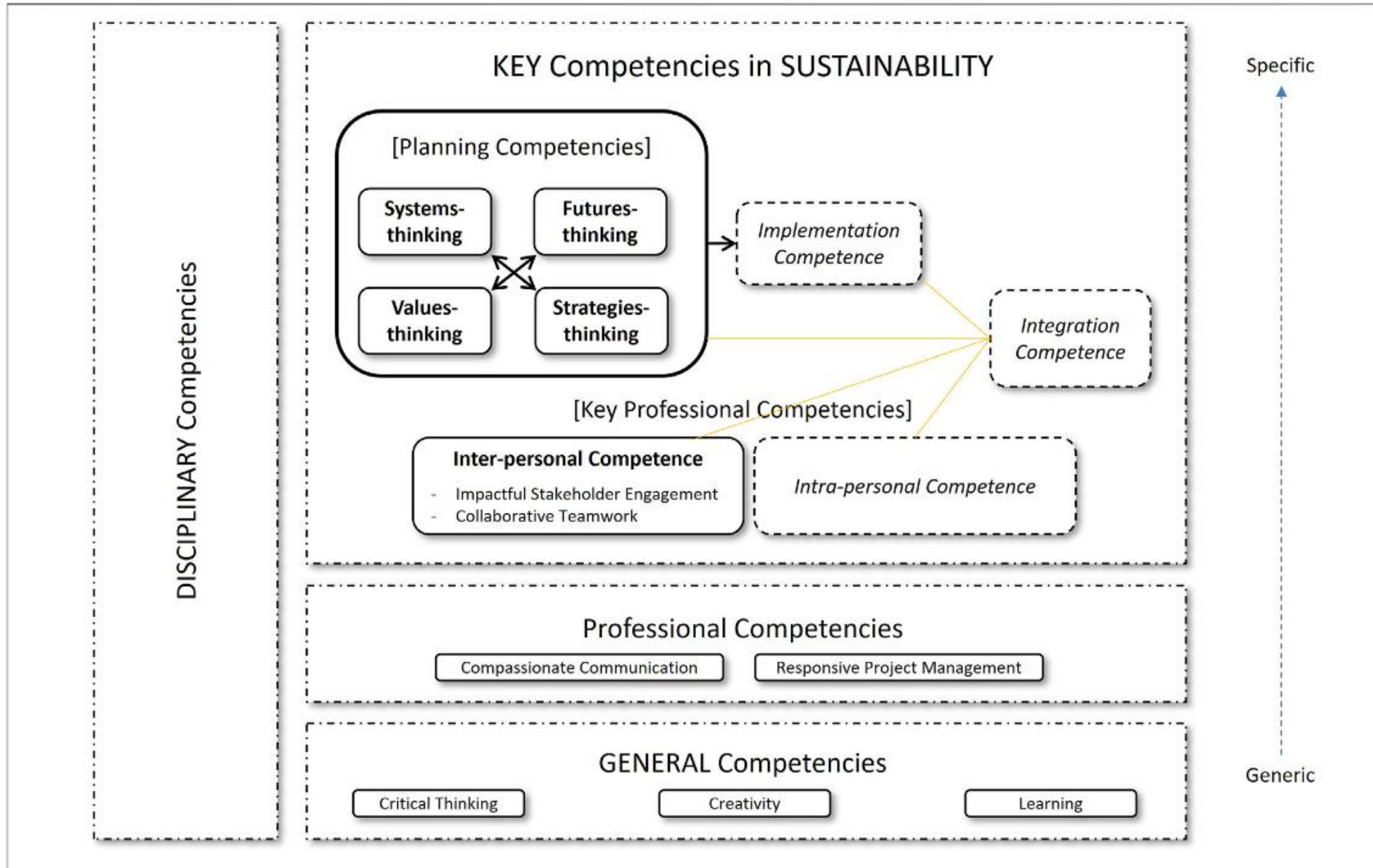
^a School of Environment, University of Dundee, Perth Road, Dundee DD1 4HN, UK
^b The James Hutton Institute, Invergowrie, Dundee DD2 5DA, UK
^c Project MAYA CIC, 54 Tetherdown, London N10 1NG, UK
^d The James Hutton Institute, Craigiebuckler, Aberdeen AB15 8QH, UK
^e Centre for Environment & Society Research, Birmingham School of the Built Environment, Birmingham City University, Millennium Point, Curzon Street, Birmingham B4 7XG, UK

Journal of Responsible Innovation, 2014
 Vol. 1, No. 3, 254–273, <http://dx.doi.org/10.1080/23299460.2014.963004>

RESEARCH ARTICLE

Quality criteria and indicators for responsible research and innovation: learning from transdisciplinarity

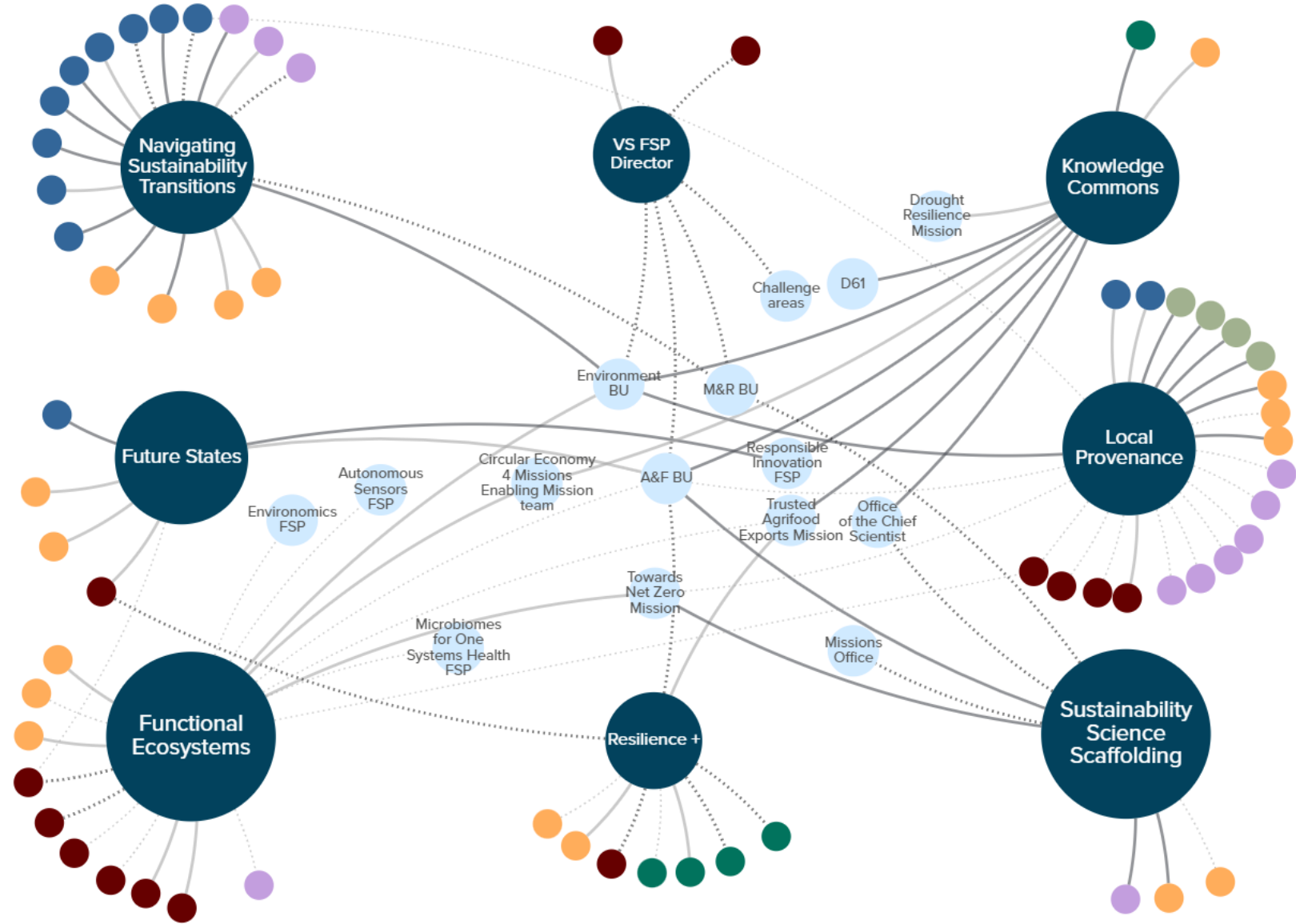
Fern Wickson^{a,b*} and Anna L. Carew^c





Search

Collaborate Involvement Consult Inform



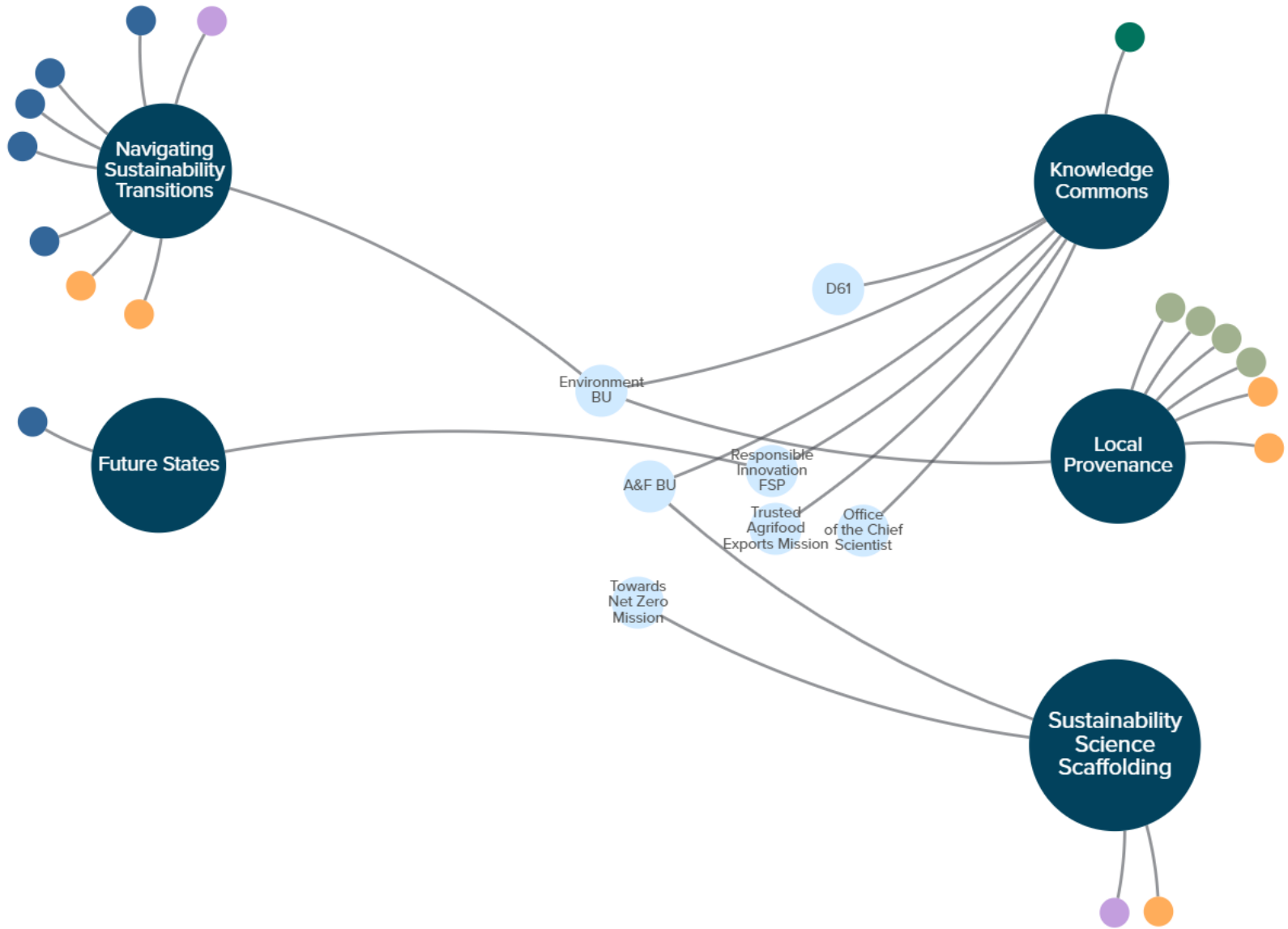
- Legend**
- VS FS
 - CSIRO
 - NGO
 - Government
 - Indigenous Organisation
 - University
 - Peak Body
 - Other
- Connection type: Collaborate
 - - - Connection type: Involve
 Connection type: Consult
 - . - . Connection type: Inform

Director KC FE FS LP NST R+ SSS



Search

Collaborate Involvement Consult Inform



Legend

- VS FS
- CSIRO
- NGO
- Government
- Indigenous Organisation
- University
- Peak Body
- Other
- Connection type: Collaborate
- Connection type: Involve
- Connection type: Consult
- Connection type: Inform

Director KC FE FS LP NST R+ SSS