

Placing Sustainability at the Centre of the Water, Sanitation and Hygiene Sector: A Transdisciplinary Inquiry

by Naomi Carrard

Thesis submitted in fulfilment of the requirements for
the degree of

Doctor of Philosophy

under the supervision of Professor Juliet Willetts and
Emeritus Professor Cynthia Mitchell

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September 2022

Certificate of original authorship

I, Naomi Carrard declare that this thesis is submitted in fulfilment of the requirements for the award of Doctor of Philosophy, in the Institute for Sustainable Futures at the University of Technology Sydney.

This thesis is wholly my own work unless otherwise referenced or acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

This document has not been submitted for qualifications at any other academic institution.

This research is supported by the Australian Government Research Training Program.

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Date: 07 September 2022

Acknowledgements

In the course of completing this PhD I welcomed a family member, and said goodbye to another. Undertaking this research through the ups and downs of life has driven enormous professional and personal learning, which would not have been possible without an exceptional community of scholars and friends.

Thank you to Juliet Willetts, for saying yes to this ‘wild idea’ and for guiding, inspiring and enabling me at each step of the way. Our conversations are always rich, challenging, and fruitful. And your support through good times and tough has been unfailing and deeply appreciated. Thank you for fifteen years of mentorship. I look forward to our future adventures.

I have the remarkable luck of having a second wonderful mentor in Cynthia Mitchell, who has also profoundly influenced my thinking and learning since I joined ISF. To Cynthia – your ability to see the bigger and deeper picture always prompts fresh ideas, and I thank you for bringing your insights to this research. Thanks also for reminding me to stay focused on what really matters when ambition and curiosity tempt.

Thank you to my other co-authors Nilanthi Jayathilake and Tim Foster for providing collaborative spaces to explore, challenge and develop ideas. And thanks to the wider network of people who supported various aspects of data collection, validation and sensemaking – each of whom is acknowledged in relevant publications. I particularly acknowledge the Australian Government’s Endeavour Leadership Program and the International Water Management Institute (IWMI). Funding from the Endeavour Program, and support from IWMI, enabled me to spend an enriching six months researching in Sri Lanka.

While too numerous to name, I wish to thank all the WASH professionals I have had the privilege to work with. I have learnt from, and been inspired by, each and every interaction. Our collective capacity to learn, evolve and contribute is what inspired me to undertake this research.

Thank you to ISF and IWMI colleagues who discussed ideas and provided critical feedback, in particular Jess MacArthur, Kumi Abeysuriya, Freya Mills, Jeremy

Kohlitz, Jo Chong, Pay Drechsel, Jerastin Dubash, Anna Gero, Monique Retamal and my GAS buddies Rupert Legg and Ed Langham. And thanks to the whole ISF team for making a workplace feel like a home.

Thank you to my Responsible Academic Officer Jason Prior and stage assessment panellists Mark Moran and Bem Le Hunte for critical questioning and suggestions at key points in the research process. Thank you to Kathleen Gregory for perceptive guidance and Kathleen Austin-Gifford for impeccable copyediting.

To the many friends who have offered both intellectual and emotional support while running, walking, swimming, playing in the park or otherwise adventuring – the PhD plus parenting double act would not have been possible without you. Particular thanks to Alanna, Anna, Ciska, Claire, Jemima, Jill, Julia, Karin, Lauren and Rowena.

I thank my parents Barbara and George and my sister Ginette for unconditional support, and for teaching me to be curious, to question, and never forget to laugh.

Thank you to Ben – for everything. And to Henry and Sacha, for the love and learning you bring to my life every day.

The final parts of this thesis were written while grieving the death of my mother. The support and compassion of family, friends and colleagues made this both possible and fulfilling. I will be forever grateful to my mother, and all the people in my life, who have shown me the wisdom of sitting with sadness and uncertainty while also holding onto joy, love, hope and the agency to seek positive change.

Format of the thesis and included publications

Format of the thesis

This thesis is a ‘thesis by compilation’ as described in the University of Technology Sydney’s *Graduate Research Candidature Management, Thesis Preparation and Submission Procedures 2021* (section 10.1.2), comprising a combination of chapters and published/publishable works.

Included publications

1. Carrard, N., & Willetts, J. (2017). Environmentally sustainable WASH? Current discourse, planetary boundaries and future directions. *Journal of Water Sanitation and Hygiene for Development*, 7(2), 209–228.
<https://doi.org/10.2166/washdev.2017.130>
2. Carrard, N., Foster, T., & Willetts, J. (2019). Groundwater as a source of drinking water in Southeast Asia and the Pacific: A multi-country review of current reliance and resource concerns. *Water (Switzerland)*, 11(8).
<https://doi.org/10.3390/w11081605>
3. Carrard, N., Jayathilake, N., & Willetts, J. (2021). Life-cycle costs of a resource-oriented sanitation system and implications for advancing a circular economy approach to sanitation. *Journal of Cleaner Production*, 307, 127135.
<https://doi.org/10.1016/j.jclepro.2021.127135>
4. Carrard, N., Willetts, J. & Mitchell, M. (2022). Placing sustainability at the centre of water, sanitation and hygiene: Knowledge co-production for sectoral transformation. *Current Research in Environmental Sustainability*.
<https://doi.org/10.1016/j.crsust.2022.100154>

Declarations of co-authorship

Publication 1 — Environmentally Sustainable WASH? Current discourse, planetary boundaries and future directions

In the case of the publication *Environmentally Sustainable WASH? Current discourse, planetary boundaries and future directions* (published in the *Journal of Water, Sanitation and Hygiene for Development*), the undersigned agree that the nature and extent of the contributions to the work was as follows:

Co-author	Nature of contribution	Extent of contribution (%)	Signature	Date
Naomi Carrard	Led all aspects including conceptualisation, research, writing and revisions. Defined research questions, approach and methodology, undertook data collection and analysis, identified implications and recommendations based on research findings.	95	Production Note: Signature removed prior to publication.	10/08/2017
Juliet Willetts	Provided feedback and input during fortnightly meetings and critical review of drafts.	5	Production Note: Signature removed prior to publication.	10/08/2017

Publication 2 — Groundwater as a source of drinking water in Southeast Asia and the Pacific: A multi-country review of current reliance and resource concerns

In the case of the publication *Groundwater as a source of drinking water in Southeast Asia and the Pacific: A multi-country review of current reliance and resource concerns* (published in the journal *Water*), the undersigned agree that the nature and extent of the contributions to the work was as follows:

Co-author	Nature of contribution	Extent of contribution (%)	Signature	Date
Naomi Carrard	Led all aspects including conceptualisation, research, writing and revisions. Defined research questions, approach and methodology, undertook data collection and analysis, sought expert validation, identified implications and recommendations based on research findings.	90	Production Note: Signature removed prior to publication.	02/08/2019
Tim Foster	Provided feedback and input at key points in the study design, research and writing, and critical review of drafts.	5	Production Note: Signature removed prior to publication.	02/08/2019
Juliet Willetts	Provided feedback and input during fortnightly meetings and critical review of drafts.	5	Production Note: Signature removed prior to publication.	02/08/2019

Publication 3 — Life-cycle costs of a resource-oriented sanitation system and implications for advancing a circular economy approach to sanitation

In the case of the publication *Life-cycle costs of a resource-oriented sanitation system and implications for advancing a circular economy approach to sanitation* (published in *Journal of Cleaner Production*), the undersigned agree that the nature and extent of the contributions to the work was as follows:

Co-author	Nature of contribution	Extent of contribution (%)	Signature	Date
Naomi Carrard	Led all aspects including conceptualisation, research, writing and revisions. Defined research questions, approach and methodology, undertook data collection, analysis and validation. Identified implications based on research findings.	90	Production Note: Signature removed prior to publication.	04/05/2021
Nilanthi Jayathilake	Facilitated data collection in Sri Lanka, supported validation of data and emerging findings, provided feedback and review of drafts.	5	Production Note: Signature removed prior to publication.	05/05/2021
Juliet Willetts	Provided feedback and input during supervision meetings and critical review of drafts.	5	Production Note: Signature removed prior to publication.	06/06/2021

Publication 4 — Placing sustainability at the centre of water, sanitation and hygiene:
 Knowledge co-production for sectoral transformation

In the case of the publication *Placing sustainability at the centre of water, sanitation and hygiene: Knowledge co-production for sectoral transformation* (published in *Current Research in Environmental Sustainability*), the undersigned agree that the nature and extent of the contributions to the work was as follows:

Co-author	Nature of contribution	Extent of contribution (%)	Signature	Date
Naomi Carrard	Led all aspects including conceptualisation, research, writing and revisions. Defined research questions, approach and methodology, undertook data collection and analysis. Identified implications based on research findings.	90	Production Note: Signature removed prior to publication.	01/04/2022
Juliet Willetts	Provided feedback and input during supervision meetings and critical review of drafts.	5	Production Note: Signature removed prior to publication.	01/04/2022
Cynthia Mitchell	Provided feedback and input during supervision meetings and critical review of drafts.	5	Production Note: Signature removed prior to publication.	01/04/2022

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Abstract

Globally, efforts to realise the human rights to water and sanitation are continuing in a context of rapid environmental change and pressing sustainability concerns. The water, sanitation and hygiene (WASH) sector has long grappled with complex challenges of ensuring safe, lasting services for all. Yet WASH sector engagement with sustainability imperatives has been partial and focused on continuity of access to services. There is opportunity for the WASH sector to both benefit from, and contribute to, thinking and action towards sustainability transformations.

The transdisciplinary inquiry documented in this thesis explored how WASH professionals can translate and implement sustainability concepts in sectoral research and practice. A problem-solving transdisciplinary orientation shaped the approach, engaging with sustainability transformations in a normative way. Application of conceptual frames and analytical heuristics reflected a pragmatic research perspective, and included planetary boundary thinking as well as frames and tools from circular economy and systems thinking scholarship.

The inquiry comprised four studies that each contribute novel research at the intersection of WASH and sustainability, and together informed synthesised insights. A review of WASH sustainability discourse with reference to the planetary boundaries framework identified four themes and four opportunities for strengthening sectoral contributions to sustainability. Analysis of groundwater reliance and resource concerns in Southeast Asia and Pacific nations demonstrated why and how WASH professionals should engage in groundwater resource management. Life-cycle costing of a resource-oriented sanitation system in Sri Lanka contributed critical data on how much it costs, and who pays, to prioritise a resource-orientation in sanitation service delivery. The fourth and final study brought a select group of WASH professionals together to co-produce knowledge about foregrounding sustainability in the WASH sector, building on findings from each of the previous studies. The process generated ideas for individual and sectoral action towards sustainability transformations, and

demonstrated the value of knowledge co-production as a mechanism for progressing WASH sustainability discourse.

Synthesis of insights across the inquiry identified three emergent themes for informing WASH professional practice: (i) *reframing* sector perspectives towards a deeper resource-orientation; (ii) *reimagining* purpose to foreground longer-term goals and imperatives, such that they inform WASH professionals' everyday actions; and (iii) *reflexively researching*, exploring how researchers can ethically shape WASH discourse in line with the ideals of sustainability transformations. The latter theme positions WASH researchers within the wider sector context, articulating a compass for future critiquing and reimagining of WASH in line with the ideals of sustainability transformations.