Transforming water scarcity conflict:

community responses in Yemen and Australia

Peter McArdle

Department of Peace and Conflict Studies

Faculty of Arts and Social Sciences

The University of Sydney

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Statement of originality

This is to certify that, to the best of my knowledge, the content of this thesis is my own work. This thesis has not been submitted for any degree or other purposes.

I certify that the intellectual content of this thesis is the product of my own work and that all the assistance received in preparing this thesis and sources have been acknowledged.

Peter McArdle

Abstract

When water is scarce, disputes over how to share it fairly and effectively are frequent. Understanding how people view and respond to water scarcity conflict is essential if it is to be addressed constructively. Through an interdisciplinary lens of hydropolitics and peace and conflict studies, this research used semi-structured interviews and interpretive phenomenological analysis (IPA) to investigate lived experience of sharing scarce water resources in Australia's Murray-Darling/Barka Basin and Yemen's Jibal as-Sarawat. Across divergent hydrological, cultural and political contexts, the study gained rich insight into how top decision-makers, mid-level community leaders and grassroots water sharers make sense of their relationships to water and emergent conflict in the face of water scarcity, as well as barriers to and opportunities for fair and peaceful water sharing. The study demonstrated that water scarcity conflict can wear down community resilience long before physiological needs arise, with devastating effects on mental health and social cohesion. Unpredictability, lack of information, social division and perceived injustice among basin stakeholders represent barriers to constructive water sharing outcomes. Opportunities to transform this conflict lie in expanding understandings of hydro-hegemony to incorporate the satisfaction of basic human water needs best understood as social in nature. However, this represents an ongoing process which is costly and replete with paradox. Despite water scarcity theory, policy and practice being dominated by positivist approaches, community resilience to the immense stresses of water scarcity can be found in acknowledging and holding emergent tensions between predictability and adaptability; simplicity and complexity; and personal and social responsibility.

Acknowledgements

I write this from the traditional lands of the Awabakal people, and pay my respects to Elders past and present. I am not of Aboriginal or Torres Strait Islander descent, and I make particular note of that here because I do not want to speak for those who I do not and cannot represent. I acknowledge that the society I know and operate in, including the academic system through which I pursue this thesis, is built upon the dispossession of Country and culture. As Tyson Yunkaporta (2019, p. 21) pointed out, the fact that this thesis is written in English 'inevitably places settler worldviews at the centre of every concept, obscuring true understanding.' In this light, I have surely used colonial language, concepts, and analysis in this thesis. It's insufficient, and I recognise that the waters I talk about and the Country it flows across were never ceded. Thank you for the generous spirit with which you shared your stories with me, and may I ask for your ongoing guidance when I get it wrong.

So too I pay a great deal of respect to the many Yemenis I have had the pleasure of engaging with over the last decade. I don't pretend to grasp the depths of your epic history, beautiful language and culture, or intricate politics. What I do know I have tried to represent faithfully here, but it comes with due acknowledgement that I see it through a very different lens than you do and thus I have a lot to learn. May these quotes, analysis and commentary serve to amplify your voices more than shade them with my own.

Many folks went above and beyond in supporting me to complete this thesis, for which massive thanks are needed (though not hierarchically so, as we'll get to in a few pages!)

To my legendary supervisory team in Dr Wendy Lambourne and Dr Eyal Mayroz. You've both shown so much faith in this little endeavour from the very beginning, and I'm so grateful for your guidance, encouragement, and support. You both really went above and beyond, and I'm so grateful for everything – thank you. And to the DPACS crew more broadly – what a stand-up bunch of excellent humans. It was a pleasure to spend these years with you, learn from you, and get to share a little in your amazing lives and work. Looking forward to more!

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Contents

Glossary of hydraulic and hydrologic terms

Aquifer   Underground, permeable rock or soil stratum that contains water.

Artesian   Describing an aquifer that is confined and pressurised between impermeable layers of rock. Being pressurised, artesian bores do not require pumping to extract water.

Bore water   Water extracted from bores/wells.

Coal seam gas   Methane gas extracted from underground coal strata.

Catchment   An area of land which, by its topography, collects rainfall.

Conveyance water   Flow in a river or other hydraulic network that facilitate the delivery of water.

Dam   A barrier constructed across flowing water such as a river, to store, deepen, and/or regulate water flows, forming a reservoir.

Downstream   Closer in proximity to a river's end, in the direction of water flow.

Gig   Colloquial abbreviation of 'gigalitre' (see quick conversions).

Groundwater   Water that flows or is stored naturally below ground. Also used to refer to water extracted from such sources, such as artesian or pumped bore water.

Headwaters   The start or upper reaches of a river catchment.

Hydraulics   The science of the mechanical properties of liquids, including the conveyance of water through pipes and open channels.

Hydrology   The science of water movement, distribution, and management on a planet.

Meg   Colloquial abbreviation of 'megalitre' (see quick conversions).

Rainwater   Water that falls as rain, including that which is caught and stored.

Riparian   Situated adjacent to the banks or a river or stream.

Surface water   Water that flows or sits above ground level, such as rivers, creeks, or ponds.

Tributary   A minor, relatively small river or catchment that feeds into an arterial river.

Upstream   Closer in proximity to a river's start, against the direction of water flow.

Valley   A sub-component of a basin; a catchment for a tributary of a larger river.

Water storage   Water held for later use, such as in reservoirs or tanks.

Weir   A barrier constructed across flowing water such as a river, to store, deepen, regulate and/or redirect upstream water. Effectively a small dam.

Glossary of acronyms and abbreviations

ABC	Australian Broadcasting Corporation
ACT	Australian Capital Territory
APA	American Psychological Association
AIATSIS	Australian Institute of Aboriginal and Torres Strait Islander Studies
ATSIDA	Aboriginal and Torres Strait Islander Data Archive
AUD	Australian Dollar (currency)
BAR	Basins at Risk (a project of the College of Earth, Ocean, and Atmospheric Sciences, Oregon State University)
BCE	Before Common Era
BHN	Basic Human Needs
CEOAS	College of Earth, Ocean, and Atmospheric Sciences, Oregon State University
COAG	Council of Australian Governments (domestic intergovernmental forum)
CIF	Conflict Intensity Frame
CPR	Common Pool Resource
EAR	Echelons of Rights (water conflict and justice analysis tool)
FAO	Food and Agriculture Organisation (United Nations agency)
GERAIS	Guidelines for Ethical Research in Australian Indigenous Studies
Hon.	The Honourable (title; salutation)
HREC	Human Research Ethics Committee (University of Sydney body)
ICESCR	International Covenant on Economic, Social and Cultural Rights
IHL	International Humanitarian Law
IPA	Interpretative Phenomenological Analysis
IR	International Relations
LWRG	London Water Research Group
MDBA	Murray-Darling Basin Authority
MDBP	Murray-Darling Basin Plan
MLDRIN	Murray-Lower Darling Rivers Indigenous Nations (confederation of sovereign First Nations)
Moh.	*Mohandas* (Arabic salutation, meaning 'Engineer')
MP	Member of Parliament (title)

NBAN	Northern Basin Aboriginal Nations (Australian civil society organisation; northern basin counterpart to MLDRIN)
NSW	New South Wales (Australian state)
NRAR	Natural Resources Access Regulator (NSW government body)
NWRA	National Water Resources Authority (Yemeni government body)
OCHA	United Nations Office for the Coordination of Humanitarian Affairs
PACS	Peace and Conflict Studies
QLD	Queensland (Australian state)
SA	South Australia (Australian state)
TC	Tragedy of the Commons
TWI	Transboundary water interaction
TWINS	Transboundary waters interaction nexus (water conflict analysis tool)
UN	United Nations
UNDP	United Nations Development Program
UNSC	United Nations Security Council
UNSG	United Nations Secretary General
UN Water	United Nations Water (coordinating body on water and sanitation)
USD	United States Dollar (currency)
VIC	Victoria (Australian state)
WEIS	Water Event Intensity Scale
YER	Yemeni Riyal (currency)

Quick conversions

Volumes of water

1 litre (L) = 0.264 US gallons (gal)

1 cubic metre (m^3) = 1 thousand (1000) litres

1 megalitre (ML) = 1 million (1,000,000) litres (colloquially 'meg'; 'megs' (*plural*))

1 gigalitre (GL) = 1 billion (1,000,000,000) litres (colloquially 'gig'; 'gigs' (*plural*))

Land area

1 hectare (ha) = 2.471 acres (ac)

1 square kilometre (km^2) = 247.105 acres (ac)

Currency

As at 15th[th] December 2021:

1 Australian Dollar (AUD) = 0.71 United States Dollar (USD)

1 Yemeni Rial (YER) = 0.004 United States Dollar (USD)

1 Australian Dollar (AUD) = 177.77 Yemeni Rial (YER)

(OANDA, 2021).

PART I: SETTING THE SCENE

"

Water connects people, but it also divides.

"

(Simons, 2020, p. 2)

1 Thesis overview and guide

1.1 Headwaters

Scottish economist Adam Smith, the father of free-market economics, said of attributing value to water: 'Nothing is more useful than water; but it will purchase scarce [hardly] anything; scarce anything can be had in exchange for it' (A. Smith, 1776/2015, p. 31). For Smith in rain-drenched Scotland, this makes sense: an overabundant supply and ready access to water ensured there was plenty of it to go around. Minimal output of 'toil and trouble acquiring it' meant that water held little value as a tradable commodity despite its immense value in utility ("Liquidity crisis," 2016; A. Smith, 1776/2015, p. 32).

Contrast this with a different argument put forward by representatives from 100 countries and 80 international, intergovernmental and non-governmental organisations who adopted the Dublin Statement on Water and Sustainable Development in 1992. The Dublin Statement declared as a core principle that 'Water has an economic value in all its competing uses' (The Dublin Statement on Water and Sustainable Development, 1992). Or consider the Echuca Declaration, as adopted by the First Nations of Australia's Murray-Darling/Barka Basin[1], which affirms 'that the people of each Indigenous Nation obtain and maintain their spiritual and cultural identity, life and livelihood from their lands and waters' (MLDRIN, 2009, p. 1). For the signatories of this agreement, water holds a degree of importance that goes beyond Smith's (1776/2015) economic value in exchange or utility.

The value of water, it is evident, varies significantly depending on a person or community's perception of circumstances.

Water is essential to sustain life, while at the same time serves countless other societal functions, from industry and production to culture and identity. Distinct from more static natural resources, its fluid passage (or lack thereof) across boundaries presents a unique sharing challenge. A highly

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[1] 'Barka' is the Barkindji name for the lower Darling River where it flows within Barkindji native title boundaries. This thesis adopts the naming convention 'Murray-Darling/Barka Basin' to reflect and respect the wishes of Barkindji Elders for dual naming of the river within these boundaries (Gooch, 2019). In keeping with First Nations protocol, the name 'Barka' is not imposed on other nations or traditional owner groups along the river. In 2021, the NSW Government adopted the dual naming of the Macquarie/Wambuul River, a tributary of the Darling/Barka, as it is known in Wiradjuri language (Gorman, 2021). Other First Nations names for rivers in the Basin are yet to be recorded in public registers or discourse.

variable resource across space, time, form, supply, and demand; water is stored, traded, shared, and revered. It can be a source of political power; it can be source of desperation.

According to the United Nations (2017a), approximately 663 million people worldwide do not have access to safe drinking water. It is a harrowing statistic, but it is also a coarse one, in that what constitutes sufficient access to water must consider many variables, including but not limited to quality, quantity, security, politics, sustainability, purpose, productivity, cultural significance, and even understandings of existence. Not merely an absolute natural phenomenon over which humanity has no control, 'water scarcity has both material and discursive elements which can be explained with reference to broader socio-political conditions' (Edwards, 2013, p. 1875; Linton & Budds, 2014; Medd & Chappells, 2007; Rijsberman, 2006). People and communities attach differing degrees of importance to such considerations, and particularly when water is scarce these values can prove challenging to reconcile. The way water is managed and distributed, be it naturally or by intervention, is often a highly sensitive matter and a volatile point of contention.

The behaviour of people facing water scarcity and the conflicts it provokes are not well understood. Despite having been largely discredited by research, the argument that water scarcity will inevitably lead to violence and even war has persisted in politics and policy, including at the highest levels of decision making (Wolf, 2004). The academic field of study known as hydropolitics (also hydro-politics) emerged in the latter half of the twentieth century, seeking to understand relational dynamics unique to cross-border sharing of a common water source. The field has chartered a course through 'water wars' theory, 'hydropolitics' and 'hydro-hegemony' as the study of riparian power relations, to the emergence of 'conflict' and 'cooperation' as its primary focus areas for investigation. However, with its roots firmly planted in *Realpolitik*, hydropolitics has struggled to reach beyond objective metrics, the control of the state, and the centrality of power. This represents a significant limitation, because while water can be objectively measured and distributed in litres and flowrates, it is at the same time intimately connected with the subjectivities of culture, meaning, and human values.

With water tightly intertwined with core aspects of people's day-to-day lives, its scarcity can be a pervasive, disruptive, and sometimes-all-consuming affair with profound impacts on individual and community wellbeing. Human behaviour in the face of water scarcity varies widely, ranging from constructive responses, as seen in the strengthening of relationships and community services, or galvanising of attention and advocacy (Hart et al., 2011; United Nations, 2017a); indifference and denial (Cassano & Benz, 2018; "Depraved Indifference Toward Flint," 2016); to socially and personally devastating manifestations, as observed in the prevalence of self-harm among drought-

stricken farmers (Bryant, 2018; Hanigan et al., 2012). Yet despite such variances, current approaches to hydropolitics are not well placed to address these subjectivities and personal experiences, arguably not offering effective analytical frameworks for doing so.

Alternatively, the academic field of peace and conflict studies (PACS) is concerned with analysing the dynamics of discordance, the causes and systems of violence and the means of promoting peaceful outcomes in situations of conflict. PACS draws on social psychological theories of human behaviour in its development of a human needs theory of conflict which can be applied to issues of water scarcity (Burton, 1990; Maslow, 1954). Accordingly, there is significant scope for additional insights to be yielded in theoretical and practical dealings with water scarcity through mutual influence between hydropolitics and PACS.

Some attempts have been made from within the field of hydropolitics to incorporate PACS approaches to addressing conflict. For example, hydropolitics has long referenced negotiation theory, particularly as developed by Fisher and Ury (1981/2011), in its analysis of water conflict management. Several prominent theories in PACS such as Maslow's (1943) hierarchy of needs and Burton's (1990) basic human needs theory position the physiological need for water and the social need for security, respectively, among the most fundamental of human motivators. More recently, scholarly efforts have been made to apply concepts of conflict transformation to water scarcity contexts, particularly (though not exclusively) by authors associated with the London Water Research Group (LWRG) (Mirumachi, 2015; J. Warner et al., 2017; Zeitoun et al., 2011, 2017; Zeitoun, Mirumachi, & Warner, 2020; Zeitoun, Mirumachi, Warner, et al., 2020; Zeitoun & Mirumachi, 2008) and Oregon State University's College of Earth, Ocean, and Atmospheric Sciences (CEOAS) (Delli Priscoli & Wolf, 2008; Wolf, 2010, 2012). However, in the absence of a thorough critique of its philosophical foundations, transboundary hydropolitics has struggled to move beyond its largely positivist bounds and is yet to broaden in scope beyond the analysis of power as its central theme. Despite acknowledging the prominence of subjective values and experiences embedded in water scarcity conflict, hydropolitical theory has so far failed to rigorously embrace interpretative epistemologies required for the application of these interest and needs-based theories of human motivation to explore water conflict dynamics (Barash & Webel, 2018a; Gray, 2013; J. Warner et al., 2017).

1.2 Research questions, responses, and significance

Exploring the application of PACS theories to hydropolitics, this study makes important contributions to the understanding of people's views surrounding water scarcity conflict. In particular, how they make sense of their experiences; the dilemmas they face; what circumstances or considerations drive them to respond to those dilemmas; and the options and pathways people take or want to take in navigating conflicts to try to achieve positive outcomes. The study does not aim to uncover a universal model of motivation or causality but is instead interested in learning from people who are themselves parties to water scarcity conflict, to build on, expand and ground hydropolitical theory in the data and evidence produced by lived experience.

From the aforementioned knowledge gaps, the following research question has emerged as the central focus of enquiry in this thesis:

> **How is conflict relating to water scarcity understood and responded to by people who experience it first-hand, and what are their perceived barriers to and opportunities for fair and peaceful water sharing arrangements?**

In responding to the question, this study makes its enquiry by focusing on the personal, first-hand experiences of those who face water scarcity conflict. Its main objective is to identify how everyday water users, influencers, and decision makers might engage with water scarcity conflict in ways that lead to more constructive, just, and peaceful outcomes.

Stemming from a question rather than testing theory, the study is primarily qualitative and inductive. Information sources for analysis focus on interview data, supported by a review of the scholarly literature, as well as the media and historical records for contextual richness. Applying Interpretative Phenomenological Analysis (IPA), the methodology places primary importance on how participants interpret their own circumstances and the reflections they share about their lived experience of water scarcity.

Amid countless examples of water scarcity conflict worldwide, the scope of the study is limited to two specific hydro-geographical contexts chosen on a combination of theoretical, methodological, and practical bases: Australia's Murray-Darling/Barka Basin; and the Sarawat Mountains region of Yemen (hereafter referred to by the Arabic *Jibal as-Sarawat*). Both contexts are intrastate in scale, contrasting with the predominantly international focus of the hydropolitics literature unpacked in Chapter 2. This offers an opportunity to explore the relevance of transboundary hydropolitics theory at multiple scales, and in contexts where boundaries are not limited to international borders.

In addition, the selection of water sharing contexts considered the Transboundary Waters Interaction Nexus (TWINS) (Mirumachi, 2015). Under this model, the Murray-Darling/Barka Basin presents with high-intensity conflict alongside high-intensity cooperation, while the Jibal as-Sarawat context shows high-intensity conflict with low-intensity cooperation. The clear distinction made between conflict and violence in Sections 2.4 and 2.5 influences the use of the TWINS model for research design, particularly in relation to its assumption of conflict-violence causality. The utility (including limitations) of the TWINS model for context selection is discussed in Chapters 2 and 3.

Communities in both settings face great difficulty reconciling the water scarcity conflicts they experience, while at the same time exhibit profound differences in hydro-geology, levels and mechanisms of governance, histories and social and economic processes. Methodologically, as detailed in Chapter 3, this study design facilitates comparison on points of similarity and difference between the water sharing contexts. Where similarities in experience of a common phenomenon emerge despite otherwise significant differences in context, such accounts yield significant insight by nature of their commonality. And on the contrary, where contentious issues arise despite contextual similarities, nodes of conflict are effectively identified. In practical terms, the two contexts represented good levels of researcher accessibility relating to existing networks, language, and familiarity.

Situating the emergent data in relation to existing knowledge, the study's findings are compared with relevant theory. The research is interdisciplinary by nature of the questions posed, and as such draws on a variety of academic fields. In addition to synthesising the findings between hydropolitics and PACS approaches, the study also draws on theories and insights from the disciplines of psychology, political science, international relations, and economics.

1.3   Where the river runs: a thesis map

The thesis is divided into three parts. Part I offers the background to the topic and problems, the rationale behind the research question, and the approaches taken to addressing it. It offers a contextual orientation to the water sharing contexts and participants who took part in the study. Part II then presents the data analysis. Finally, in Part III, the findings of the analysis presented in Part II are related back to existing literature, examining accords and divergences between theory and findings, their implications for our understanding of water scarcity conflict, and what this means for the future.

Opening Part I, the first chapter offers a brief orientation to the topic of water scarcity conflict, how it is currently understood and analysed, and some of the prevailing challenges. It articulates the research question central to the study and presents an overview of how this thesis responds and proceeds.

Chapter 2 unpacks in greater detail the theoretical background to contemporary understandings of water scarcity conflict. Key developments in the academic field of hydropolitics are summarised, including its strengths and limitations. Critique is offered on assumptions and reasoning that underpin contemporary hydropolitical frameworks, including why transboundary water interaction (TWI) in its current form is hamstrung in its analysis of water conflict. The chapter contrasts and bridges hydropolitical theories with several PACS theories which are useful for the study of water scarcity conflict. It identifies theoretical gaps between the two disciplines, and highlights intersecting points where both fields may benefit from a mutual, two-way engagement. The chapter concludes by further explaining what this analysis means for responding to the research question.

Chapter 3 provides an overview of the methodology and methods chosen for the design and implementation of the study to answer the research question. Breaking down the requirements for effectively addressing the research question, the chapter introduces the methodological framework used in the thesis, IPA, and makes the case for its selection. The two water sharing contexts explored in the thesis are introduced, as well as the participants interviewed for the research. The former serves to familiarise the reader with the geographical, hydrological, cultural, and political contexts, while the demographic information helps to situate the interviewees within their social sphere of community and influence. From there, the chapter details the methods used for data collection, and the process employed for the data analysis. The chapter also considers the limitations of the study.

Chapter 4 marks the beginning of Part II. The chapter presents and analyses data from interviews in which participants describe their relationships to water, from everyday interactions to where water fits into their world view. This data brings important context and richness to discussions of water scarcity conflict.

Chapter 5 then focuses on points of contention and difference identified by participants in the interviews regarding their own situations of water scarcity. This includes the types of conflicts that have emerged in such situations, what it is like for the interviewees to deal with these dilemmas, and the nature of their interactions with other people when responding to water scarcity conflicts.

Next, Chapter 6 unpacks the difficulties in managing water scarcity identified by participants based on their experiences. Participants discuss their perceptions of barriers to transformative outcomes, and their outlook on what comes or should come next.

Beginning Part III, Chapter 7 builds on the preceding chapters by situating the data analysis in relation to literature introduced in the first three chapters, as well as additional theory relating to the themes that emerged from the data analysis in Chapters 4-6. Areas in which relevant literature synthesises with participant lived experience are illuminated and unpacked, as are interdisciplinary insights from psychology, social work, and economics. This part of the analysis is approached from two angles: firstly, how current academic understandings, resultant policy and practice may be expanded or reframed to better reflect the community experience; and secondly, the emerging potential for more constructive navigation of water scarcity conflict, rooted in the collective ideas and perspectives of participants and synthesised with theoretical knowledge.

Finally, Chapter 8 summarises the findings of the study, offers conclusions and considers the implications for theory and practice in addressing water scarcity conflict.

2 Water scarcity conflict

2.1 Chapter introduction

This chapter explores the body of scholarly knowledge dealing with dynamics of water scarcity conflict. It offers an overview of key concepts and theories that have contributed to and shaped approaches to the topic, and in doing so illuminates both strengths and limitations of existing approaches. Briefly tracing a path through the development of water scarcity conflict discourse from its roots in classical realist international relations (IR) through to contemporary Transboundary Water Interaction (TWI), the chapter outlines significant contributions to this field as well as underlying assumptions, arguing that while substantial progress has been made, TWI remains constrained by positivist epistemological foundations. It is suggested that, as a result, recent attempts from within the field to break free of those constraints have struggled to gain traction.

The chapter identifies some of the limitations of hydropolitical theory, and proposes how PACS approaches may serve to address these limitations, expanding understandings of water scarcity conflict dynamics in theory and practice. Moving beyond the traditional security discourse and approaches to water conflict to interrogate issues of needs, identity, agency, and resilience, this chapter begins to identify the opportunities for conflict resolution and transformation that inform the research questions of this thesis.

2.2 On water scarcity

The term *water scarcity* has multiple definitions and measures. Falkenmark (1989, p. 116) developed the widely-used Water Scarcity Index (WSI), which measures the volume of fresh water present per capita in a given geographical space – usually a country – and applies thresholds of 'water stress', 'water scarcity' and 'beyond the water barrier' as quantitative indicators of increasing severity. However, while the WSI is widely used due to its simplicity, its focus is limited to the natural supply and physical presence of water. It does not reflect how accessible that water is, any variance in demand due to geographic, demographic, or production modality differences, nor the intervening influences of infrastructure on water availability (Linton, 2010). Rijsberman (2006) argues that if human impacts such as infrastructure development, water management and

institutional capacities are taken into account, much of the world's water scarcity 'has as much to do with the development of the demand as the availability of the supply' (Rijsberman, 2006, p. 5). In an effort to reflect the possibility that scarce water resources can also be managed, Ohlsson (2000, p. 213) built upon the WSI model by incorporating into it the United Nations Development Program's (UNDP) Human Development Index (HDI) as a 'readily available proxy for social adaptive capacity'. The resultant Social Water Stress/Scarcity Index (SWSI) offers a quantitative measure of water scarcity that acknowledges water scarcity as a matter of both supply and demand (Rijsberman, 2006, p. 6).

A disproportionate leaning toward either side of the supply or demand equation has significant implications for how water scarcity problems are addressed. Arguments centring on limited or decreasing water resources tend to focus on solutions that involve 'fixing' a lack of supply, such as engineering improved water sources. On the other hand, demand-side arguments focus on the social management of water scarcity, such as influencing the distribution of available water through regulatory or market-based interventions like licencing, water trading mechanisms, or water restrictions (Hussein, 2016; Mehta, 2005).

Of course, supply and demand perspectives on water scarcity are not mutually exclusive. UN Water acknowledges this, referring to scarcity in terms of limited 'availability due to physical shortage, or scarcity in access due to the failure of institutions to ensure a regular supply or due to a lack of adequate infrastructure' (United Nations, 2017b). Indeed, an uneven focus on one or the other can have significant implications. As Lankford (2013, p. 197) writes, 'bias towards supply management (e.g. building dams) or demand management (e.g. fixing leaks) is revealing … of how "scarcity response" narratives are constructed'. Moreover, viewing water supply and demand only in terms of material distribution obscures 'hydro-social' aspects of community water sharing and meaning (E. P. Anderson et al., 2019; Jackson & Head, 2020; Jackson & Moggridge, 2019; Linton & Budds, 2014; Linton, 2010; Norman, 2017; Strang, 2020). Among countless examples, media reports on water scarcity crises in Yemen and Australia demonstrate how presenting a particular water scarcity narrative as dominant over others has consequent implications for policy and practice (Hannan & Moir, 2020; Whitehead, 2015). Accordingly, acknowledging the distinctions between supply-side, demand-side, and trans-microeconomic thinking yields important insights into competing water security perspectives (Reinert, 2018; Seeley, 1992).

2.3   On water security

2.3.1   What is water security?

UN Water (2013, p. vi) defines water security 'as the capacity of a population to safeguard sustainable access to adequate quantities of acceptable quality water for sustaining livelihoods, human well-being, and socio-economic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability'. Like most articulations of the concept, this definition broadly captures what water security achieves, and hints at considerations required to achieve it.

The issue of 'safeguarding' draws attention to water security, or lack thereof, as a threat, and the consideration of protection against that threat. What is considered the source of this threat has crucial implications for water sharing arrangements. If water scarcity is viewed primarily as a problem of limited supply, the safeguarding of water security takes on an environmental or even narrower hydrological focus, with responses typically centring on shoring up the ability of the environment to maintain or increase adequate water supplies to the population. On the other hand, if demand-side issues are emphasised, safeguarding water security becomes a social question, with responses focused on who is involved and how to access, control and distribute water resources. This can take many forms and is heavily influenced by underlying views on how security is or should be attained. As such, an understanding of the theoretical influences that have significantly impacted views on water security is important, as it illuminates how and why different approaches are taken.

Academic discourse on water security has been dominated by theoretical analysis of transnational river basins, in which multiple states share a common water source that flows across their borders (J. Warner et al., 2017). Accordingly, basin-states have largely been taken to be the primary 'unit of analysis' in transboundary water sharing arrangements, 'responsible for and in control of the territorial space of the river' (p. 3). A growing body of literature does discuss water sharing at the subnational level, as will be outlined in Section 2.7.2. Yet, the bulk of academic theory on conflict over shared waters has its foundations in IR, particularly classical realism and liberalism (Mirumachi, 2015).

Early literature on transboundary water sharing was influenced by 'a morality of need, not of choice', including classical realist political thought regarding rational self-interest, the pursuit of power, the accumulation of resources, and security of and for the state (Kaplan, 2002, p. 82). When applied to the sharing of scarce waters, this classical realist lens suggests an innate human drive to

protect access to water for survival, pitching water-sharing actors against each other whereby one riparian community pursuing its water priorities may be seen as an irreconcilable or zero-sum security threat by another (Hanasz, 2013). However, thinking on transboundary water sharing from the late 1990s showed a significant shift beyond realist self-interest to incorporate concepts of cooperation (Ohlsson & Turton, 1999). Through a more liberalist lens, dominant water security thinking moved beyond the inevitable exertion of power over other entities to achieve security for the self, advocating instead for the ability of water-sharing actors to work together towards positive-sum outcomes (Boucher, 1998; J. Warner et al., 2017; Zeitoun & Mirumachi, 2008).

Analyses of transboundary waters built on these classical IR theories of realism and liberalism are both concerned with the achievement of order, stability, and security for riparians. However, they are both underpinned by assumptions of rational decision-making that stem from positivist epistemologies in which 'facts must be separated from values and beliefs to allow for objective investigation and explanation of empirical or observable phenomena' – an approach which this thesis rejects as inadequate for addressing the challenges of water scarcity conflict (Devetak et al., 2017, p. 527; Spindler, 2013).

2.3.2   Water and human security

It follows that water security literature informed by classical IR theory approaches has been mostly concerned with the security interests of states as mechanisms that offer their citizens protections, including secure water access. In an international context, write Buzan, Wæver, and de Wilde (1998, p. 21) 'security is about survival. It is when an issue is presented as posing an existential threat to a designated referent object' – traditionally the state. As such what constitutes a matter of security depends on the meaning of 'an existential threat', and beyond the international arena 'We are not dealing with a universal standard … on what threatens individual human life. The essential quality of existence will vary greatly across different sectors and levels of analysis; therefore, so will the nature of existential threats' (p. 21-22). Switching the referent object to the human being or community, for example, gives rise to the more granular concept of *human security* which illuminates the security concerns of individuals and communities at the sub-national and trans-national levels (UNDP, 1994).[2]

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[2] Also 'global security' which Booth (2007) uses to distinguish individual and social security from international security.

Warner and Zeitoun (2008, p. 807) offer a window into alternative framings of water security, stating that they 'find merit' in applying Booth (2007) and the expressly post-positivist Aberystwyth school to water security issues, which sees 'security as more than survival: it is the emancipation of subjected actors from oppression'. Buzan et al. (1998, p. 31) note that security commentators have since the 1960s argued that 'security can be approached both objectively (there is a real threat) and subjectively (there is a perceived threat)'. This is a crucial distinction, in that for a person or community to feel water-secure, it does not matter whether the threat is 'real' or not. Water security not only depends on an actor having enough water as per established metrics of quantity, quality, reliability, and affordability – it also hinges on whether they *perceive* that they have enough water (Wutich et al., 2017). This extends concepts of water security to *relational* dimensions, which are more difficult to measure and include socio-cultural dynamics, entitlements and human capabilities, and political institutions and processes. If water scarcity is perceived as a threat, it becomes a matter of security for the actor who views it as such.

2.3.3   Securitisation of water

The act of turning water resource sharing from a matter of everyday politics into an issue of security is called 'securitisation'. Indeed, the Copenhagen School argues that establishing a securitisation agenda does not necessarily require a show of force, but can be achieved simply by speaking about a political matter in terms of security or existential threat (Buzan et al., 1998). For example, Egyptian president Fattah el Sisi threatening military action against Ethiopia over the latter's construction of the Grand Renaissance Dam on the river Nile, without actual mobilisation of the Egyptian military (Abdelhadi, 2020; "Egypt's El-Sisi Warns 'All Options Open' after Dam Talks Fail," 2021). This is an important concept, because it claims that a successful securitisation agenda rests not only on the actions of the party making the threat, but likewise on how the message is received and interpreted by its audience (Buzan et al., 1998; Williams, 2003). Epistemologically, this represents a significant shift from the objective positivism of realism towards a more constructivist outlook, where circumstances are subject to interpretation and water security is at least in part socially constructed (Gray, 2013; Mirumachi, 2015; Schmidt, 2008).

Securitisation has had a profound influence on the study of water scarcity conflict. Scholars have identified that riparian power is not limited to physical force but can also take the form of 'soft' power, sparking a revolutionary shift in water conflict discourse that is further detailed in section 2.7 (Zeitoun et al., 2011). Where the Copenhagen School advocates for de-securitisation in order to avoid escalating unconstructive security-based disputes, other scholars have argued that

securitisation can ignite positive change, for example framing environmental securitisation in terms of solidarity or international cooperation (Mirumachi, 2013; Trombetta, 2010).

2.3.4   Responding to water insecurity

The flipside of the threat of water insecurity, then, is the matter of how people *respond* in the face of it. In contrast to the heavy emphasis on supply-side thinking in water scarcity research, Turton and Ohlsson (1999) argue that 'a more fruitful area of research is that which focusses on the ability (or inability) of a social entity to cope with the increasing demands caused by water scarcity' (p. 1). What Ohlsson (2000) and Turton and Ohlsson (1999) describe as 'adaptive capacity' to water scarcity is essentially what is known 'across the natural, social and psychological sciences' as *resilience* (Duffield, 2012, p. 480). With roots in ecology, heavy use in hazards and disaster research, application to the built environment, and more recently incorporated into peacebuilding, resilience thinking is closely interwoven with threats to water security on multiple levels (Adger, 2006; Béné et al., 2012; Clark & Ungar, 2021; Janssen & Ostrom, 2006). With such a diverse influence base, various definitions of resilience often include such themes as preparedness for, coping with, and recovery from adversity. 'Resilience', write Janssen and Ostrom (2006), 'determines the persistence of relationships within a system and is a measure of the ability of these systems to absorb changes of state variables, driving variables, and parameters, and still persist'.

By some theoretical definitions, resilience goes hand in hand with *vulnerability*. According to Adger (2006, p. 268), 'Vulnerability is the state of susceptibility to harm from exposure to stresses associated with environmental and social change, and from the absence of capacity to adapt' (Berkes et al., 2002; Carpenter et al., 2001; Folke, 2006). Where resilience tends to be presented in a positive light, 'Vulnerability by contrast is portrayed in negative terms as the susceptibility to be harmed' and thus should be avoided (Adger, 2006, p. 269). Multinational consulting firm Arup (2021), for example, states that applying resilience thinking to tackle future problems involves 'Rooting out vulnerabilities', the language of which strongly frames vulnerability as something to be eliminated (para. 3). Such a view casts vulnerability both as a threat to security *and* an inability to respond to it constructively.

Indeed, framings of water scarcity resilience and/or vulnerability that centre on coping imply – even if inadvertently – a degree of helplessness to affect change in the face of adversity. Even *adaptation*, while perhaps less passive than coping, risks placing the responsibility for capacity and accommodation on the person or community facing adversity, and in doing so deflect scrutiny from actors or systems that inflict or perpetuate that hardship. Such framings ignore or downplay

agency on the part of 'vulnerable' communities to challenge and struggle against oppressors or exploitative systems (Chandler & Reid, 2016).

Such framings of how people, communities and societies respond to water scarcity, give rise to concepts of water justice. Water justice, as argued by Sultana (2018, p. 487), 'is based on principles of fairness, equity, participation', and is built on to a conceptualisation of justice that is relational, situated, and context-sensitive rather than universalistic' (Boelens, 2015; Roth et al., 2014, p. 949). Stakeholders in a common water source – herein termed water sharers – thus share not only in the material H_2O, but also share in 'the fair distribution of benefits and burdens, including rights, obligations, desserts and needs' (Lauderdale, 1998, p. 9). As this thesis will unpack, understandings of 'fairness' can thus vary significantly between people, communities, and societies who attribute differing values to the water they share. When these values appear difficult to reconcile, differing understandings of fairness or justice can give rise to conflict.

2.4   On conflict

Concepts of 'conflict' are integral to discourse around transboundary water sharing. As Warner et al. (2017) summarise, politicians, journalists, and academics have been preoccupied with the interplay of water scarcity and conflict since the 1980s, when early warnings of impending 'water wars' gained prominence. Yet, as Wolf (1998, p. 3) notes, 'A close examination of the case studies cited as historic interstate water conflict suggest some looseness in classification'. Similarly, Rodriguez, Inturias and Robledo (2016, p. 2), writing on the broader topic of environmental justice, acknowledge that 'there is very little consensus on how socio-environmental conflicts are to be defined', and that 'meanings of the term vary according to the conceptual framings of conflict paradigm that guides each author, actor or institution in its approach to environmental conflicts'. Conflict – both in relation to water and more generally – is often an ambiguous term, and its multiple definitions are regularly conflated or even significantly divergent, creating confusion, if not holes, in both popular and scholarly understandings of conflict.

Stemming etymologically from the Latin *conflictus* meaning 'a contest', contemporary English definitions of conflict as a noun include two quite distinct concepts: on one hand, conflict can describe situations of physical violence, such as a 'fight, battle, [or] war' ("Conflict," 2019a; "Conflict," 2019b); while on the other, conflict does not imply the use of force at all, instead referring to the nature and dynamics of disagreement and tension: the 'incompatibility between two or more opinions, principles, or interests' ("Conflict," 2019a; "Conflict," 2019b). In a scholarly

setting, PACS definitions tend toward the latter etymological take, including perceived differences in interests, views, or goals (Deutsch, 1973), opposing preferences (Carnevale & Pruitt, 1992); a belief that different parties' aspirations cannot be simultaneously achieved (Rubin et al., 1994); and a process beginning when one party perceives that their concerns have been or are soon to be frustrated by another party (Sanson & Bretherton, 2001). Accordingly, PACS theories clearly distinguish between conflict and violence.

The looseness with which conflict is used to describe the dynamics of water scarcity holds significant implications for understanding it and, by extension, related policy and practice. Demonstrating this problem, Wolf's (1998, p. 4) historical review of reported international water conflicts found that 'The bulk of the articles … turn out to be about political tensions or stability rather than about warfare, or about water as a tool, target, or victim of armed conflict'. Often, helpful distinctions between conflict and violence are initially made, but lost through inconsistency. Water scarcity conflict scholarship that explicitly and consistently distinguishes between discordance and physical force is rare,[3] and prominent analyses of water sharing interactions continue to employ the term conflict without clear definition, allowing ambiguity in message and argument (Homer-Dixon, 1999; J. Warner et al., 2017; Wolf, 2007; Zeitoun, Mirumachi, & Warner, 2020).

Still, transboundary water scholars have on occasion offered a window into what a consistent understanding and presentation of conflict could offer. Some authors have distinguished between conflict and physical force by using a prefix to add greater clarity. For example, Zeitoun and Mirumachi (2008) and Zeitoun, Mirumachi and Warner (2011) helpfully employ the term 'violent conflict', while Wolf (1998) uses the term 'armed conflict', resembling the terminology of international humanitarian law (IHL) (ICRC, 2008). Adding the word *violent* or *armed* ahead of *conflict* serves to emphasise when the conflict in question carries with it physical force or the threat of physical force, while secondarily highlighting that conflict without such a prefix need not imply the use of violence. Others have drawn on the field of negotiation theory, and particularly the pioneering work of Fisher and Ury (1981/2011) in which 'conflicts', 'disputes' or 'tensions' are broken down into subcomponents of positions, interests and needs. (Frey, 1993; Grech-Madin et al., 2018; Islam & Susskind, 2018; Kosovac, 2016; Wolf, 2010, 2012; Zeitoun et al., 2011, 2017). As Rodriguez et. al (2016, p. 2) explain, such delineation frames conflict not as violent

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[3] Kosovac (2016), for example, offers a well-defined articulation of conflict in the discussion of water scarcity.

confrontation, but as 'competition for the satisfaction of interests and needs among diverse groups regarding the use of nature and its resources' (Rodríguez et al., 2016, p. 2).

Identifying the underlying components of conflict has profound implications for analysis of water scarcity. When conflict is considered without connotations of violence, it emerges as a dilemma with space for cooperative problem solving, freed from prior associations with fear and pain. By this paradigm, a progression from water scarcity to physical violence emerges as merely an option, rather than a foregone causal conclusion.

2.5 On violence

2.5.1 Violence as a destructive response to conflict

An understanding of conflict, including around water scarcity, as neither good nor bad does not imply that it is easy, comfortable or straightforward to handle. As Miller (1986) observed, many people struggle to deal with conflict, but conflict itself is not the problem – instead it is the way it is conducted that is the problem. Rather than reacting to conflict destructively with violence and aggression, Miller suggested people can instead 'wage good conflict' that is constructive (Miller, 1986, p. 132). Conflict or even anger without aggression in response, argue Hartling and Lindner, can mobilise energy for people to work for constructive change by 'separating the energy of anger from the behavioural response of aggression' (Hartling & Lindner, 2016, p. 386).

MacNair (2012) breaks down theories of the causes of violence into four overarching categories: disconnects, the power of the situation, personality, and the passions of war. Some, she writes, are controversial while others more accepted; some add understanding to complex problems while others are still developing; but 'none are expected to be the entire cause of violence without taking others into account' (2012, p. 1).

In hydropolitical scholarship, attempts to identify a causal relationship between water scarcity and violence, conflict, or cooperation are plentiful. However, if MacNair's assertion is applied, this is too narrow a view, since violence in the face of water scarcity may be traced to multiple, combined contributors. Indeed, alternative theories of violence point to multiple, combined contributors, closely tied to a need for security over time (Barash & Webel, 2018a).

As discussed earlier, water security discourse is largely built on a theoretical foundation which presents the maximisation of power as inherent human nature. However, MacNair (2012) frames power maximisation not as stemming from human nature, but from *belief*. This is a profound

distinction: when power maximisation is framed as human nature, it is easily justified. However, when it is instead presented as belief, response to conflict takes on an element of choice, or at least agency and the possibility for change. For this reason, power maximisation falls under the category of violence motivators of 'disconnects' (MacNair, 2012, p. 7).

Violence, argue Chenoweth and Lawrence (2010, p. 14), 'is a function of uncertainty and threat'.[4] It is thus a protective mechanism – albeit a destructive one. As Lederach (2010, p. 63) writes, 'in settings of violence the most immediate meaning of security emerges around physical safety vis-à-vis the presence of violent threat. People look for physical spaces and mechanisms that provide them with protection.'

2.5.2   Typologies of violence

Motivations aside, the term 'violence' remains extremely broad. As discussed in the previous section, 'violence', as frequently used in the media, and day-to-day conversation is often meant to employ the direct use of physical force. As such, it is often expected that violence is 'apparent through observable bodily injury and/or the infliction of pain' (Barash & Webel, 2018b, p. 7). In a broader sense, however, violence can be thought of as 'present when human beings are being influenced so that their actual somatic and mental realisations are below their potential realisations' (Galtung, 1969).

It follows, then, that delineating types of violence reveals the myriad of ways in which it can manifest in and divides communities, and by what mechanisms. Galtung (1996) discusses violence as a triangle, on which three distinct but interrelated types of violence – *direct violence*, *structural violence* and *cultural violence* – each form a point. Under this framing, direct violence comprises the common understanding of violence as physical force, as well as the exertion of force by verbal abuse or the psychological infliction of pain (Jeong, 1999).

Structural violence, on the other hand, refers to systemic oppression of potential, and is typically built in to the very structure of social, cultural, and economic institutions (Barash & Webel, 2018b, p. 7). It has the effect of the denial of rights; social, political, and sexual inequality; unfair distribution of resources and decision-making power; and the repression of personal fulfillment (Barash & Webel, 2018b; Jeong, 1999). Structural violence is thus 'a serious form of social

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[4] It is important to note that while 'a function' implies a relationship of some kind, this should not be assumed to imply a linear or positive correlation, nor the preclusion of other variables.

oppression' which is widespread, often unacknowledged, and 'works slowly to erode humanistic values and impoverish human lives' (Barash & Webel, 2018b).

Cultural violence, then, refers to aspects of culture that can be used to justify or legitimise other forms of violence – to make direct or structural violence seem right, 'or at least not wrong' (Galtung, 1996, p. 196). As such, cultural violence can present as those aspects of social interaction through 'religion and ideology, language and art, empirical science and formal science' that serve to normalise avoidable insults to life (p. 197).

There is a difference in how the three components of violence relate to time. Direct violence can be seen as an 'event'; structural violence a 'process' that can ebb and flow; while cultural violence transforms slowly with the culture that gives it rise (Galtung, 1996). Applied to water security, Galtung's triangle of violence offers an alternative, social framework for understanding water insecurity and its effects beyond material access to water.

2.5.3 Rationality and violence

As discussed in Section 2.3, there is often an embedded assumption in water security discourse that water sharers act as rational entities. So too, assumptions of pure rationality lie at the core of well-known resource maximisation and sharing paradigms that will be discussed in this thesis, such as the prisoner's dilemma, game theory, the tragedy of the commons (Kahneman, 2003; Thaler & Sunstein, 2008). Many framings of resource sharing, as with economics more broadly, assumes the central role of *homo economicus* – the rational thinker. Yet, as Thaler and Sunstein (p. 7) write,

> 'If you look at economics textbooks, you will learn that homo economicus can think like Albert Einstein, store as much memory as IBM's Big Blue, and exercise the willpower of Mahatma Gandhi. But the folks that we know are not like that. Real people have trouble with long division if they don't have a calculator, sometimes forget their spouse's birthday, and have a hangover on New Year's Day. They are not homo economicus; they are homo sapiens'

As with economics, scholarship on violence offers alternatives to its rational causation. According to Demmers (2017, p. 1), 'behind every analysis of violent conflict is a set of assumptions … about the interests, needs, instincts, structures or choices that explain why and how people resort to violence'. These are, she argues, 'usually very basic, and fundamentally subjective' (p. 1).

2.6 The myth of water wars

2.6.1 The water wars narrative

Political and academic circles are laden with conjecture about how societies react to water scarcity. From the 1980s, many public figures, journalists, and academic commentators on water scarcity advanced the argument that increased competition for finite water resources would result in situations of violence: so called *water-wars* (Allouche, 2011; Hanasz, 2013).

High-profile representatives of international organisations and government, including three successive UN Secretaries General (UNSG), have made bold claims about water scarcity as an impending source of violent conflict. In 1991, then Egyptian Deputy Prime Minister Boutros Boutros-Ghali (Burns, 1997) claimed that 'The next war will be over water, not politics'. His successors as UNSG issued similar warnings (Annan, 2001; Ban, 2007).

More concretely, the water wars narrative has reached beyond soundbite to inform international security debate and policy. This was demonstrated in 2018, when the Water, Peace and Security Initiative (WPSI) was presented to the UN Security Council (UNSC) to advise on the 'water-security nexus' and 'identify potential "hotspot areas" to prevent the next water-driven security crisis' (World Economic Forum, 2019; World Resources Institute, 2018). So too when then US Secretary of State Hillary Clinton stated in 2011 that 'water security for us is a matter of economic security, human security, and national security, because we see potential for increasing unrest, conflicts, and instability over water' (Clinton, 2011). In the same year, a United States Committee on Foreign Relations report stated of Afghan-Pakistani tensions in 2011: 'the impacts of water scarcity are fuelling dangerous tensions that will have repercussions for regional stability and U.S. foreign policy objectives' (United States Senate Committee on Foreign Relations, 2011). Countless public figures have recycled the favourite one-liner dubiously attributed to Mark Twain that 'whiskey is for drinking; water is for fighting over' (T. L. Anderson, 1983; Davis, Feinstein, Schwartzenegger in Doyle, 2011).

Such public discourse was for some time supported by academia. From the mid-1980s, scholars such as Naff and Matson (1984) and Starr and Stoll (1988) warned of impending wars to be sparked by dwindling supplies of fresh water. Westing (1986, p. 9) argued that where states share a common water resource, increasing scarcity 'leads to severe political tensions and even to war'. In the 1990s, Gleik (1993, p. 83) suggested that 'the focus of security analysts must now be *when* and *where* resource-related conflicts are most likely to arise, not *whether* environmental concerns can contribute to instability and conflict'. Indeed, a significant body of academic dealings with water

scarcity towards the end of the 20th century perpetuated this notion, claiming that wars over water were increasingly likely if not inevitable (Bulloch & Darwish, 1993; Frey, 1993; Homer-Dixon, 1994; Sherk et al., 1998; Shiva, 2002; Starr, 1991). The water wars aphorism gained traction during the 1980s alongside a significant neoliberal push towards water markets, positioning violent water conflict as a natural phenomenon beyond government control (Fazeli et al., 2021).

Yet despite the many pervasive cause-and-effect claims about water scarcity and war, the water wars narrative has not been built on substantive empirical evidence. On the contrary, quantitative evidence suggests that where interactions between nations have occurred over water issues, there are many more occasions where parties cooperate with each other rather than fight over water resources. A landmark study by Wolf (1998, p. 9) concluded that 'nations do not, and probably will not, go to war over water'. The study's database of recorded interactions between nations over water resources (excluding navigation) illustrated that between 1814 and 1994, only seven instances of armed conflict broke out – even then only as skirmishes and in stark contrast to the negotiation of approximately 300 treaties dealing with water management (Wolf, 1998).[5] Homer-Dixon (1999, p. 7), a prior advocate of water wars rhetoric, had by the late 1990s changed tack to stress that 'environmental scarcity by itself is neither a necessary nor sufficient cause' of violence, and claims that the water wars assertion was alarmist and unfounded gained increasing acceptance (Allan, 2002; Davis & Hirji, 2005).

With the water wars narrative effectively debunked, attention turned instead to the idea that water scarcity, either feared or actualised, is an indirect contributor to violence. Wolf's (1998) study that called the water wars narrative into question also argued that while scarce water may not itself lead to war, it certainly contributes to significant political instability. A central tenet of this argument is that water scarcity, particularly at a sub-national level, is an exacerbator of other tensions – even to the extent that 'geographic scale and intensity of conflict are inversely related' (Wolf, 1998, p. 5). A contemporary and often-referenced example of this argument is the war in Syria. Many scholars have pointed to drought in the leadup to the Syrian uprisings of 2011 as a significant contributor to national tensions which spilt over into what became a decade-long civil and proxy international war (Daoudy, 2020). Water scarcity in rural provinces, it was claimed, drove people toward the cities putting pressure on services and infrastructure, causing significant disenchantment among the population and inevitably sparking the revolutionary uprising. Similar arguments have been applied to violence in Darfur (Bromwich, 2018; de Waal, 2007; Zeitoun &

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[5] Defining which disputes were valid for this study, investigators took into account 'cases of international conflict where armed exchange was threatened or took place over water resources per se' (Wolf, 1998).

Mirumachi, 2008). But, like the water wars thesis, Daoudy (2020) argues that this deterministic narrative of climate-induced water scarcity as an exacerbator of tensions leading to violence does not hold up to empirical evidence.

2.6.2   Malthus and values

Much of the fear that underlies the water wars thesis, and reasoning as to why securitisation narratives take hold, developed out of Thomas Malthus' controversial but nonetheless heavily influential work, *An Essay on the Principle of Population*. In the late 18th Century, Malthus wrote of 'the constant tendency in all animated life to increase beyond the nourishment prepared for it' (Malthus, 1803, p. 2). If this unsustainable dynamic is left unchecked, increasing demand for resources would outpace the ability of the planet to supply those resources, triggering 'corrections' to the population by means of war, famine and death, until consumption and production capacity returned to a sustainable level. The disastrous point at which demand for resources exceeds production capacity is thus referred to as a Malthusian catastrophe.[6]

Looking at water scarcity through a Malthusian lens, both supply *and* demand for water may be viewed as simultaneous impending threats. On the supply-side, water resources are scarce, while at the same time increasing demand from growing or moving populations places extra strain on those resources. If Malthus' *Principle* holds true for water resources, it would be expected that the human population increase at a greater rate than water becomes available (including if supply stays static), pushing the population towards war, among similarly other grizzly 'corrections'.

As such, many writers label the water wars narrative as Malthusian or neo-Malthusian in nature, pitching water scarcity as a direct incentive for violence. So too the environmental collapse line suggests an indirect but nonetheless causal (or partially causal) incitation of violence. In that sense, some scholars have likened Malthusianism to Darwinian evolutionary thinking (Kosovac, 2016; Wilson, 2013). Indeed, Darwin (1887/2019, p. 58) references Malthus as foundational to his work. Yet there begs here a simple but significant question: why violence? Or more specifically, why do these narratives jump from the threats posed by need—real or perceived—to violence?

The *Principle of Population* of 1798 has largely come to typify pessimistic thinking on resource scarcity and is commonly rebutted by water scarcity scholarship. However, close attention to Malthus'

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[6] The Malthusian Catastrophe bears similarity to a warning of impending doom if demand for resources is allowed to outpace supply, issued by Machiavelli (1531/2009) some 200 years earlier.

essay reveals that a scarcity-violence *causality* is not made. Rather, Malthus *admonishes* that violence may be one possible outcome of scarcity. In the second edition of his essay, released five years later, Malthus expanded an argument that is much less emphasised in water conflict or broader resource scarcity literature. Contrary to the realist thought of Machiavelli before him, who argued that human nature places people in a constant state of conflict and drives resource accumulation, Malthus' second edition addendum argued that, in light of his earlier 'admonishments' of impending catastrophe, there exists a logical need to enact what he calls 'moral restraint' (Malthus, 1888, pp. 389–402). This aspect of his analysis is profound both in its own right as a significant paradigm shift away from inevitable violence; and because it is rarely acknowledged in resource scarcity literature.

Contemporary Malthusian and neo-Malthusian approaches to resource scarcity focus on his initial argument that if left unchecked, demand for resources will outstrip supply, plunging the population into poverty, disease, and violence. On its own, this first part of Malthus' argument bares similarity to Machiavellian realism, consistent with the idea that human compulsion in the face of scarcity inevitably leads to violence (Kaplan, 2002). However, this overlooks Malthus' ensuing argument that people also have the choice and agency to act based on their values to override 'the impulses of our natural passions' (Malthus, 1888, p. 391). As well as warning of the apparent perils of overstretched demand for resources, Malthus' thesis also advocates for the capacity of the population to enact self-control to avert catastrophe. In that respect, and contrary to much of its frequent citing in water conflict and resource scarcity literature, Malthusianism in a holistic sense sits in stark contrast to the deterministic water scarcity-to-violence progression of realist approaches.

Contrary to Malthus' own argument, water conflict scholarship often tends to ignore capacity for subjective value judgement among the population. Instead, the bulk of the literature focuses primarily on the 'positive checks' element of Malthus' essay, and as a result builds on an alleged causality argument that the author is not in fact making. A positivist reading of Malthus that focuses exclusively on his 'positive checks' argument is thus relegated to a binary outcome: catastrophe or nonsense. But Malthus' holistic argument was not positivist, since his argument for 'moral' preventative checks clearly incorporates the subjectivity of human values and agency.

It should be emphasised that the present thesis is neither concerned with nor advocates for Malthus' controversial, colonial, often cruel and overtly racist analysis and methods.[7] Rather, it is the Malthusian argument for personal and societal choice and agency in and of itself that is just as profound for water conflict scholarship as it is overlooked by it. The implication of this argument is that it calls into question not only the water wars narrative, but also embedded realist elements of the ensuing field of study: hydropolitics.

2.7 Transboundary hydropolitics

2.7.1 Hydro-hegemony

As the water wars thesis gave way to evidence to the contrary, the 1990s saw a paradigm shift away from fear of impending water wars towards optimistic hopes for cooperation between states over shared waters (J. Warner et al., 2017). As an issue so central to and with far-reaching implications for human security, the politics of water is addressed by multiple scholarly disciplines. Influential works from the disciplines of geography, anthropology, politics, law, economics, engineering, the natural sciences, and international development among others have situated the politics of water as a matter of political ecology from multiple standpoints (Allan, 2011; Boelens, 2015; Jackson & Moggridge, 2019; Linton & Budds, 2014; McCaffrey, 2020; Mirumachi, 2015; Ostrom, 1990; Swyngedouw, 2009; J. Warner et al., 2017; Wittfogel, 1957; Wolf, 2007; Zeitoun, Mirumachi, & Warner, 2020; Zeitoun & Warner, 2006).[8] Hydropolitics as the field of study has become known in scholarly circles, emerged as a trans-disciplinary specialist field analysing the ways people and groups relate to each other, hold power, and make decisions regarding the availability of water resources. First coined by Waterbury (1979), the nascence of hydropolitics explored the challenge of managing national self-interest amid a context of multinational coordination when states share a common water resource. Fast-forwarding two decades, Elhance (2000) defined hydropolitics as 'a systematic study of the nature and conduct of conflict and cooperation between states over transboundary water resources'. Water conflict came to be seen primarily as a 'crisis of skewed access to and control over a finite resource' (Mehta, 2005, p. x). Or, applying Lasswell's (1936)

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[7] Malthus' espoused 'virtues', checks, and advocated methods for population control are frequently rejected as cruel, including notable critiques by Friedrich Engels who called it 'Repulsive blasphemy against man and nature', or even by Dickens whose satirical portrayal of Scrooge in *A Christmas Carol* offers commentary on Malthusianism (Kaplan, 2002, p. 92). In defence of the people Malthus calls 'the lowest stage of human society', this thesis firmly rejects his undignified portrayal of humanity.

[8] This list of citations is by no means exhaustive, but rather serves to demonstrate the breadth of scholarly disciplines that have an interest in and intersect with the field of hydropolitics.

definition of politics to shared water resources: 'who gets what, when, where and why?' (Zeitoun & Cascao, 2010, p. 28).

The first two decades of the 21st century saw significant development in understandings of power as it relates to water sharing, particularly from the London Water Research Group (LWRG, 2021; J. Warner et al., 2017). Zeitoun and Warner (2006) and Cascão and Zeitoun (2010) pioneered the concept of hydro-hegemony: the presence and dynamics of power asymmetries when and where water flows are shared across boundaries – typically but not limited to state borders. They attest that hydro-hegemony presents across four forms: geographic, material, bargaining, and ideational power (Zeitoun & Cascao, 2010, pp. 31–32). Such forms of power, the London Group argues, play out through two key dynamics: conflict and cooperation over shared water resources (Zeitoun & Mirumachi, 2008; Zeitoun & Warner, 2006).

As will be discussed in further detail, since they bear heavily on this thesis, conflict and cooperation were initially viewed as dichotomous, sitting at opposite ends of a 'conflict intensity' spectrum. However, drawing on the power analysis of Lukes (2005), Zeitoun and Mirumachi (2008) identified that conflict and cooperation over scarce water are not mutually exclusive, but should instead be recognised as distinct but coexistent elements of water sharing dynamics. This delineation of conflict and cooperation served to highlight that neither variable is inherently positive nor negative. Assumptions that all forms of conflict are bad and all forms of cooperation are good were refuted (Zeitoun & Mirumachi, 2008). Hydro-hegemonic structures and strategies including those where 'soft power' is employed under the cloak of cooperation were illuminated, as in the example of water sharing treaties that formalise and lock in systemic inequalities between conflicting actors. Likewise, concepts of conflict as a potential catalyst for positive outcomes, such as galvanising change, were brought to the fore (Zeitoun et al., 2011; Zeitoun & Mirumachi, 2008).

Critiques of hydro-hegemonic frameworks have been levelled primarily around three focus areas. Firstly, state-centricity; secondly, assumptions of negativity; and thirdly, hydro-hegemony itself as a hegemonic concept (J. Warner et al., 2017). Selby (2007) argues that state-centricity renders the hydro-hegemonic frameworks of the London Group theoretically realist. He argued that in focusing on the international level, hydro-hegemonic analysis ignores national and transnational water politics to its detriment and called for a broadening of scope. Warner (2017) et al. contend that the ensuing decade of scholarship has seen hydro-hegemony move beyond realist state-centricity, incorporating into its discourse counter-arguments such as Atkins' (2014), who labels neoliberalism itself as an enabler of hydro-hegemonies; and Davidson-Harden and Naidoo's (2007) discussion of counter-hegemonic approaches to water justice.

Various angles of critical theory have offered critique of hydro-hegemonic discourse. For example, Kosovac (2021) and Earle and Bazilli (2013) argue that hydro-hegemonic norms, such as the 'hydraulic mission' to maximise state development of water resources for economic, social, and physical security (which Warner (2004b) labels 'Hobbesian'), represent and perpetuate an unbalanced research, policy, and practice agenda dominated by men.[9] Detraz (2009), also from a feminist perspective, argued that characterisation of conflict as being solely between riparian states and over environmental security matters ignores the gendered aspects of water allocation at local levels. The early 21st century has seen increased focus on Indigenous rights which critique the material distribution focus of hydro-hegemony (Bakker et al., 2018; Boelens, 2015; Curley, 2019; Jackson, 2018; Ruru, 2009). Hydropolitics within states and on gender and class-based water rights issues has been studied by Cleaver and Elson (1995), Zwarteveen (1997) Kosovac (2021), and Crow and Sultana (2002). So too neo-Marxist critique has influenced the London Group, but by their own acknowledgement its incorporation has been theoretically 'rather loose' (J. Warner et al., 2017).

When situated among a wide body of transdisciplinary critical literature, the dominance of positivism in the study of hydro-hegemony appears less certain. Closely related to the earlier discussion on conflict definitions in Section 2.4, further questioning of the epistemological foundations of hydro-hegemony and the effect of these on ensuing theory and practice presents an opportunity to expand understandings of transboundary hydropolitics. The field of hydro-hegemony may have moved on from its realist roots in some respects to embrace a far more liberalist view of cooperation, but still both political theories are firmly positivist in their foundations, offering little space for consideration of subjectivities and the perspectives of people facing water conflict. Warner et al. (2017, p. 9) do propose that 'an alternative option would be to de-centre hydro-hegemony' from water conflict analysis, though it would not go away. However, this thesis contends that rather than hydro-hegemony being dislodged from centre stage, the field of hydropolitics would instead be better served by a further unpacking of its assumptions.

2.7.2   Intra-state hydropolitics

Despite the persistent dominance of state-centricity in hydro-hegemonic discourse and the 'rather insular' development of alternative perspectives, the field of transboundary hydropolitics has increasingly recognised the potential benefits of expansion beyond its classical IR roots

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[9] This critique, it is duly acknowledged, includes this very thesis – written by a man following his own research interest.

(Mirumachi, 2015, p. 28). Zeitoun et al. (2020, p. 45) for instance suggest that 'The transformation of an inequitable transboundary water arrangement requires blue-sky thinking, beyond narrow national interests or outdated notions of borders'.

Approaches to expand the study of hydro-hegemony beyond state-centricity have largely taken one of two angles. The first of these, as cited in Section 2.7.1, is through critique of hydro-hegemonic norms which question the role and use of power in water sharing arrangements, and/or their centrality to water conflict analysis. In doing so, these critiques offer a window into the role of identity in group formation irrespective of overt international borders. Earle and Bazilli (2013, p. 103), for instance, identify the importance of group identity in water conflict, warning that while 'the primary actors in TWM [transboundary water management] processes have been states represented by technical, economic and political elites .... Left out are the local communities relying on the resource directly: the water users; the poor; women; and other important groups.'

A second approach has been to explore how understandings of power asymmetry previously applied to international riparian interactions may or may not be adapted and applied at different scales in water basins. Allouche (2011, p. 55), for example, argues that 'Access and control over water, political power, and social and gender relations are the major drivers causing water crises, especially at the local level.' Selby (2007, p. 2) posits that hydro-hegemony 'occurs at a multiplicity of levels, not just the international', and that 'national and trans-national as well as international water conflicts should all fall within the orbit of hydro-hegemonic analysis'. Zwarteveen and Boelens (2014) propose levels of hydro-hegemony defined not by geographical borders, but as mutually interactive 'Echelons of Rights' (EAR) comprising the material distribution of water; the rules, norms and laws that determine such distribution; the authority to formulate and enforce water rights; and 'the discourses used to articulate water problems and solutions'. The EAR model thus offers a hydropolitical framework that can but does not necessarily centre the state, and can be used at different or multiple scales. However, built on a Foucauldian understanding of power, the EAR focuses on power as dominance and does not explore alternative forms of power to the extent of the TWI frameworks based on Lukes (2005) (Zeitoun et al., 2011, 2017).

While a thorough unpacking of the application of power analysis at multiple geo-political levels is beyond the scope of this study, a published debate between Furlong (2006) and Warner and Zeitoun (2008) offers considerable insight into the applicability and limits of state-centricity to transboundary water arrangements.

For the purpose of this study, it is important to recognise that international hydro-hegemony theory, along with the related tenets of threat and security, are not assumed to be blindly applicable

to water scarcity conflicts at multiple geo-political scales without adaptation. Moore (2018, p. 19), for instance, points out that

> At the international level, the absence of a single, overarching sovereign authority means that countries can at least in principle exploit asymmetries in political, economic, and military power to control shared waterways.

At subnational jurisdictional and community levels, approaches to dealing with water security disputes rely far more on 'legislative and judicial manoeuvres' (p. 8). Addressing conflict in basins 'shared by multiple subnational political jurisdictions, including states, provinces, prefectures and governorates' can be even more pervasive than at the international level, 'for while many rivers are shared between countries, nearly all are shared between multiple subnational units'. As such, 'many waterways remain mired in protracted, acrimonious disputes between lower-level jurisdictions' (p. 2).

Arguing that 'the study of water politics must move beyond the determinism embodied in traditional hydropolitical theory', Moore (2018, p. 5) posits that rather than simply a factor of upstream-downstream hydro-geographic position, 'The most relevant geographies are sectional rather than riparian' and are 'shaped by a complex constellation of subnational political actors, all with their own conception of their interests in a shared river basin.' 'Ideational factors like sectional identity', he suggests,

> are just as important as institutional ones. Water is highly emotive; it reflects and refracts tensions between ethnic, religious, and other social groups that share it. Where institutions reinforce sectional divisions between social groups, whether over race, language, or ethnicity, shared water resources can both reflect and magnify intergroup conflicts and disputes (p. 2).

This thesis builds on Moore's ideas which are closely aligned with the social psychology theories underpinning PACS approaches to the role of identity and conflict more generally. 'Very often', writes Demmers (2017, p. 24), 'social identities such as ethnicity, religion, clan or nation are seen as the primary fault line between groups in conflict'. 'Identity, broadly defined, is the answer to the question "Who or what are you?"' (Demmers, 2017, p. 21). It is 'a person's unique sense of self, that is, being utterly unlike anyone or anything else', while that sense of self can at the same time be at least in part related to their membership of a social category or group (Demmers, 2017; Verkuyten, 2018). Social identity, then, can be thought of as 'that part of an individual's self-concept which derives from his knowledge of his membership in a social group (or groups)

together with the value and emotional significance attached to that membership' (Billing & Tajfel, 1973, p. 63) (Tajfel 1981: 63). Respectively, these concepts can be thought of as *individual identity* and *social identity*. As pointed out by Erikson (1966, p. 149), identity is both individual and 'the core of communal culture'. Individualist or social identities are seen to play out with respect to the roles of social rules and individual agency and choice (Demmers, 2017, p. 18). Thus, the manner in which individuals relate with their wider communities, how communities band together within a broader society, and how non-geographical identifiers such as ethnicity, culture, or political affiliation can unify or divide water sharers are of primary importance as to whether scarce waters are shared cooperatively.

2.7.3   Conflict and cooperation: from continuum to coexistence

In Zeitoun and Warner's (2006) original framework of hydro-hegemony, the authors published the 'Conflict Intensity Frame' (CIF), which combined earlier models of so called 'conflict intensity'. The first of these, Yoffe and Larson's (2001) Water Event Intensity Scale (WEIS), developed as part of the CEOAS Basins at Risk (BAR) project, presents a numerical single-axis continuum which ranges between voluntary national unification and formal declaration of war as opposite extremes. The second, NATO's (1999) Stages of Conflict Development, places 'durable peace' and 'war' at opposing ends of the spectrum. The CIF is shown in Figure 2.1.
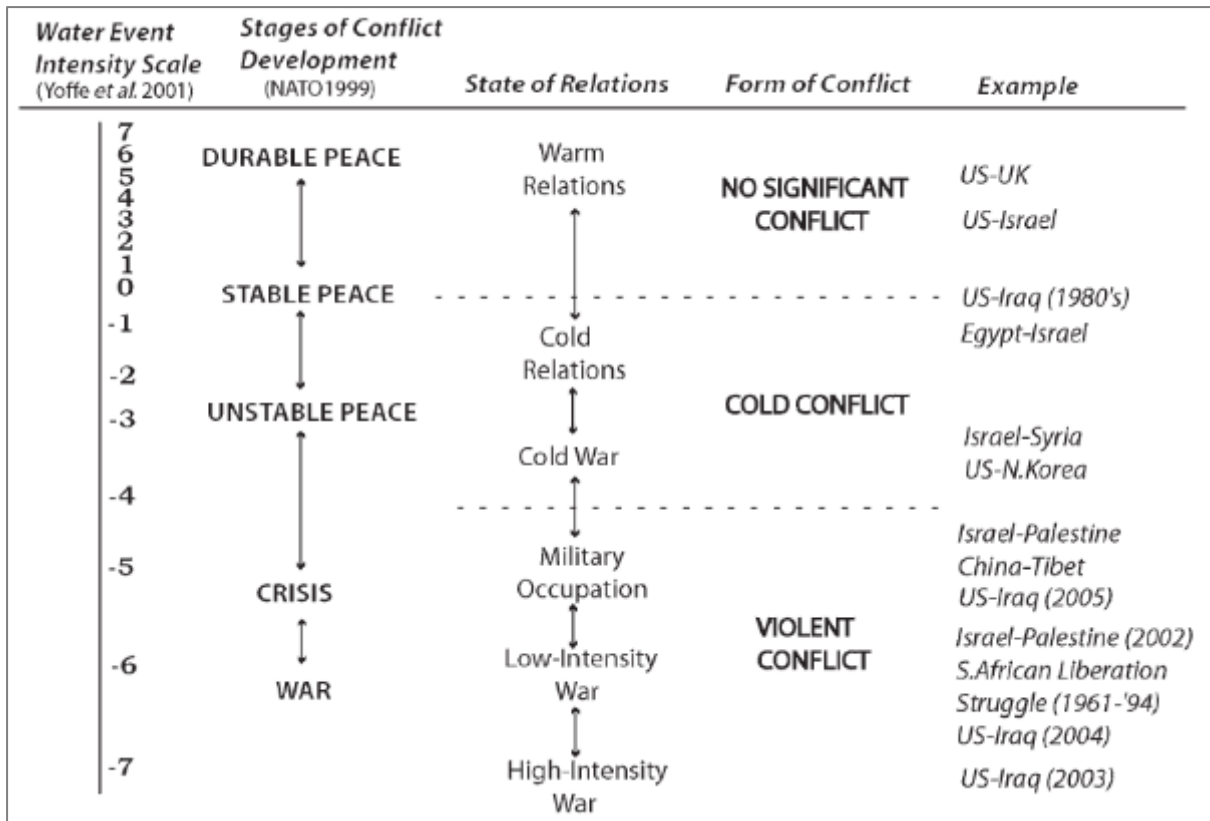
Figure 2.1: Conflict Intensity Scale (Zeitoun & Warner, 2006, p. 441)

There are some significant differences between the scales. For instance, the WEIS was designed to measure individual 'events', while the CIF gauges the status of relations over a longer time period. Notably, however, and holding significant implications for ensuing understandings of water scarcity conflict which will be revisited later in this thesis, both scales claim to measure conflict in terms of violence. The WEIS situates treaties between states in opposition to violent acts of war, while the CIF scale equates 'durable peace' with 'warm relations' and an absence of 'significant conflict' (Yoffe & Larson, 2001; Zeitoun & Warner, 2006).

Zeitoun and Mirumachi (2008, p. 6), as discussed earlier, observed that 'Continua make it difficult to represent the variations of relations over time and through changed political contexts. … Even more importantly, the unidimensional analysis may tend to obscure the multiple political dimensions of interaction.' This observation represented a significant paradigm shift in the field of hydropolitics. From that point on, the London School and with it the majority of water conflict literature moved to consistently distinguish between conflict and cooperation as coexistent variables. As part of that delineation process, conflict and cooperation each required individual conceptualisation.

The Transboundary Waters Interaction Nexus

Building on the hydropolitical concepts of coexistent conflict and cooperation, Mirumachi (2015) developed the Transboundary Waters Interaction Nexus (TWINS). The TWINS plots 'conflict intensity', on the vertical axis against 'cooperation intensity' on the horizontal axis, as illustrated in Figure 2.2.
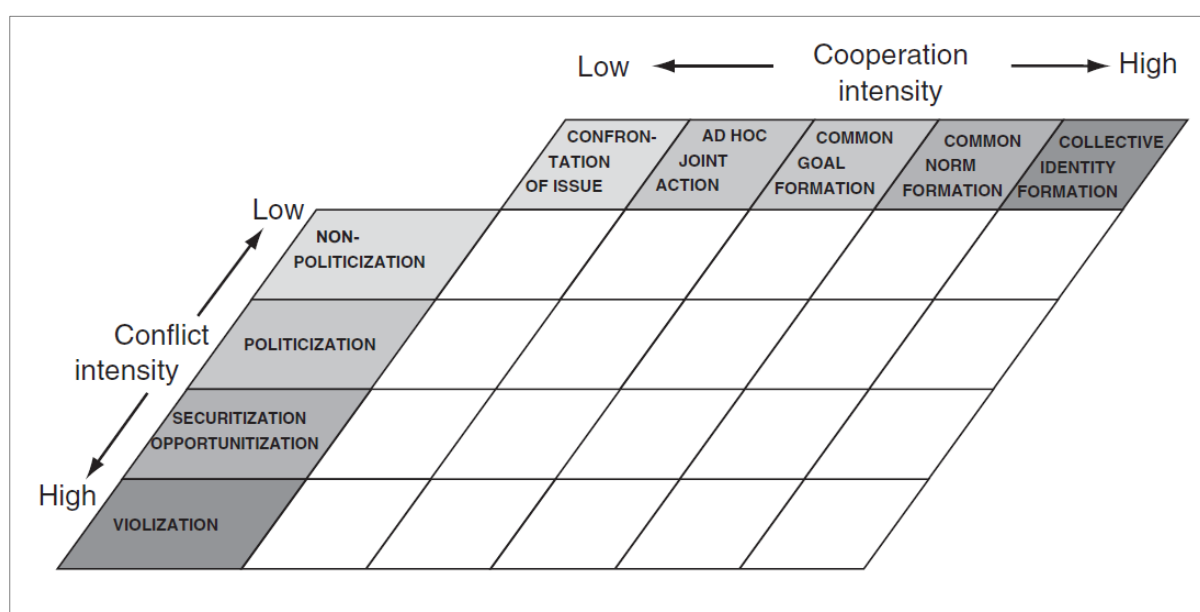
Figure 2.2: Transboundary Waters Interaction Nexus (TWINS) (Mirumachi, 2015, p. 41)

The TWINS model serves as an analytical tool for examining the development and progress of transboundary water interactions, including over time, since changes can be mapped across the nexus as they develop in context (Mirumachi, 2015). As Bernauer (2002, p. 2) pointed out at the turn of the twenty-first century, hydropolitical literature over shared waters conflict and cooperation is 'almost entirely descriptive', and the TWINS model is no exception. This is not a flaw per se, but as a prominent model of transboundary waters analysis it is notable that the TWINS model does not offer pathways forward beyond analysis of past and present interaction dynamics.

Where the TWINS model does run into problematic territory, though, is in its presentation of 'conflict intensity'. Mirumachi, (2015, p. 19) who developed the TWINS model, recognises and advocates for multiple epistemological understandings of conflict and cooperation. She posits that the TWINS model extends beyond realist and neoliberal institutionalist hydropolitics, 'finding the constructivist perspective more useful' in its representation of relationship between agencies and structures (Mirumachi, 2015, p. 42). So too, the author helpfully argues that 'using absolute water quantity as a factor to explain conflict is problematic, and that it is rather the *perceived importance* of water that is worth analysing' [emphasis added]. As can be seen in Figure 2.2, the 'cooperation intensity' axis employs metrics that describe closeness of relationship and willingness to find and embrace commonalities between parties. Though this does not in itself constitute a constructivist approach, an increase in 'cooperation intensity' beyond the will to cooperate is then presented as the formation of value-based norms and social identities which *are* constructivist concepts on account of their subjectivity (Mirumachi, 2015, p. 48).

However, while it can be reasonably argued that the 'cooperation intensity' axis of the TWINS is constructivist, the argument is more problematic when applied to the 'conflict intensity' axis. Here, Mirumachi argues that 'Acute conflict over water is relatively easy to identify and define: by observing the existence of armed warfare. Less overt forms of conflict such as diplomatic tension and negotiation disputes rely on analysis that is contextually derived' (Mirumachi, 2015, pp. 28–29). To gauge 'conflict intensity', the TWINS model explicitly adopts a scale that ranges from 'non-politicisation' to 'violisation', as developed for transboundary waters by Warner (2004b, 2004a) (Mirumachi, 2015, p. 41). However, unpacking the theory that underpins this framework reveals an epistemological clash that calls the conflict intensity scale into question.

The conflict intensity scale

Zeitoun and Mirumachi (2008, p. 12) point out that 'The conflictual (y) scale in the TWINS matrix draws upon security theory of the Copenhagen Schools, which Warner (2004b) applied to the interaction over water-related issues.' Yet Warner's '5 stages of conflict' scale that is used to measure conflict intensity is problematic on several fronts, both in its construction and its use in the TWINS model.

Firstly, the Copenhagen School, recalling section 2.3.3, frames neither conflict intensity nor violence. Rather, it frames securitisation, which is a different concept: a speech act that pitches an otherwise everyday political matter in terms of security, explicitly distinct from physical violence.

Secondly, Warner's depiction of the scale was not directly based on the Copenhagen School securitisation approach of Buzan et al. (1998). Rather, it was based on a proposal by Neumann (1998, p. 10) to add 'a category of "violisation" to the Copenhagen concept of "securitisation"'. Neumann's stated aim was to depict a point at which rhetoric about war materialises with physical violence. He states:

> 'In order to link the work of the Copenhagen School to the outbreak of war, I suggest that we differentiate the concept of securitisation so that securitisation is reserved for speech acts which perform the tasks which Buzan, Wæver and others have defined it as performing, and then add a new category for the cases where large-scale violence is actually in evidence' (Neumann, 1998, p. 13).

Critically, Neumann's (1998) extra category is a purely descriptive tool that serves to distinguish between talk and action, but makes no suggestion that violence is a progressive escalation of conflict. Moreover, neither Neumann (1998) nor Buzan et al. (1998) place their categorisations on an escalating scale. It is in Warner's (2004b) adaptation of Neumann (1998) that the categorisation of securitisation and violisation is transformed from *states* to *stages*—from categories to measures. Warner (2004b, p. 8) makes this development explicit, stating 'The five states (or stages) of conflict outlined here can be an analytical tool. To help understand the transition of politicisation to 'violisation', Warner (2004b, p. 8) 'proposes to see politics and war as different nodes on a *continuum* of conflict.' Yet, the author offers no reasoning for the proposed transition, offering only speculative suggestions 'Because of the preoccupation with 'water wars" at the time (J. Warner, 2004b, p. 8).

Warner's (2004b) conceptualisation of violised water conflict is based on three perspectives, the first of which is so-called Malthusian. He states: 'The most famous narrative of how conflict becomes violent is the Malthusian 'water wars' thesis, claiming scarcity will lead to competition, a scramble for resources resulting in violent conflict.' (J. Warner, 2004b, p. 9). Problematically however, as was detailed in Section 2.6.2, this was not what Malthus argued. Rather, Malthus *warned* of population checks that *may* present as violence, but made no causal link between scarcity and violence above other potential checks of famine and misery, and advocated for moral restraint to avoid such catastrophe. Thus, Warner's (2004b, p. 9) first 'Malthusian' perspective of violisation is based on a misrepresentation of that theory.

His second perspective, Cornucopia, offers no causal explanation of violence at all, but is rather presented as an example of why violence *cannot* be explained, since scarcity leads purportedly to

adaptation. Reflecting on this perspective, the author states that 'The search as to what it is that may relate scarcity and violence is still on.' (J. Warner, 2004b, p. 9).

The third theory offered is that of violence, as originally developed by PACS scholar Johan Galtung (1969). Warner (2004b, p. 10) accurately presents Galtung's framing of structural violence as distinct from direct violence, referring to the former as 'any constraint on human potential due to economic and political structures' – an important concept that will be revisited in this thesis. However, while this insight holds significant potential, the 'violised' level of Warner's scale at the same time states that 'violisation = the process whereby an already securitised issue such as identity becomes a *casus belli* over which blood must run' (J. Warner, 2004b, p. 9). This is clearly not referring to structural violence, since Galtung (1969) specifically distinguishes it from direct violence, and a situation in which 'blood must run' certainly refers to the latter, not the former. While Warner's (2004b) paper presents an interesting exploration of possibilities, it is also explicitly speculative, makes no causal links between securitisation and violence, and on these bases is a problematic platform on which to build the TWINS model and associated theory. The result is that the conflict intensity scale used in the TWINS conflates the three concepts of conflict, securitisation, and violisation.

In philosophical terms, violisation as a measure of conflict intensity adheres to a firmly realist (and thus positivist) school of thought. Securitisation on the other hand, as Buzan et al. (1998) argue, is overtly constructivist, holding human relationship and the social construction of security as a central tenet. Thus, it is not theoretically sound to present violisation as an escalation of securitisation, as the two concepts are built on fundamentally different epistemologies. Conflict can be presented as either positivist or constructivist, though the two presentations hold very different meanings. Through the constructivist lens, conflict is not a metric: it is a social phenomenon, interpreted subjectively by those who participate in it.

In practical terms, if it is taken that violence is negative, as it is in PACS, the use of violisation as the maximum measure of conflict intensity puts it at odds with the TWI assertion that conflict is not necessarily negative. It also denies that people have agency and choice as to how they react when water scarcity is seen as a threat.

2.7.4   Sharing the commons

A body of literature that is broader than but certainly related to TWI is thus the study of cooperative sharing of common pool resources (CPR). In 1968, Garret Hardin (1968) published

his famous work 'The Tragedy of the Commons' (TC). The tragedy, he wrote, reflects an incentive for individual resource sharers to act in their own interest brought about by rational interaction with the wider group, and in doing so put that very resource in jeopardy.

> Each man is locked into a system that compels him to increase his herd in a world without limit – in a world that is limited. Ruin is the destination toward which all men rush, each pursuing his own best interest in a society that believes in the freedom of the commons. Freedom in a commons brings ruin to all' (Hardin, 1968, p. 1244).

In this sense, Hardin arguably presents more of a so-called 'Malthusian' discourse than Malthus himself (see Section 2.6.2), since the TC does not advocate for intervention. Ensuing growth in cooperation theory was less pessimistic, such as development in game theory as presented by Axelrod (R. Axelrod & Dion, 1988; R. M. Axelrod & Dawkins, 2006) and Kreps and Wilson (1982). Nonetheless, a great deal of scholarship on resource sharing uncritically accepting the TC as given (Nebel & Wright, 1998). Specific to the development of TWI, Mirumachi (2015) discusses game theory[10] and the prisoner's dilemma[11] as having made headway into understanding cooperation, and as such serve to demonstrate why rational resource-sharing individuals may choose not to cooperate for collective benefit.

However, Hardin's TC theory has been criticised by those who argue that it overlooks the capacity of a social group to organise and develop institutions to manage the commons. Elinor Ostrom (1990) identified that these idealised models only hold true when resource sharers remain viewed as prisoners. In a Nobel Prize-winning counter-argument to the TC, Ostrom argues that in practice, those who share a common resource have agency to choose a preferred course of sharing behaviour.

> What makes these models so interesting and so powerful is that they capture important aspects of many different problems that occur in diverse settings in all parts of the world. What makes these models so dangerous – when they are used metaphorically as the foundation for policy – is that constraints that are assumed to be fixed for the purpose of the analysis are taken on faith as being fixed in

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[10] According to Myerson (1997, p. 1), 'Game theory can be defined as the study of mathematical models of conflict and cooperation between intelligent rational decision-makers'.

[11] The prisoner's dilemma is a standardised presentation of game theory, demonstrating why two completely rational individuals might not cooperate, even if it appears in their interest to do so. For a detailed explanation of the dilemma, see Campbell (1985, p. 4).

empirical settings, unless external authorities change them. The prisoners in the famous dilemma cannot change the constraints imposed on them by the district attorney; they are in jail. Not all users of natural resources are similarly incapable of changing their constraints (Ostrom, 1990)

Far from being the realm of *homo economicus*, sharing the commons is not a wholly rational experience. Instead, resource sharers make choices about how they interact that are informed by emotional loading, with the often-limited information available to them, and amid unpredictable circumstances (Ostrom, 1990; Thaler & Sunstein, 2008). To that effect, Ostrom identified eight principles common to long-enduring common pool resource (CPR).[12] Her prolific work in this area also identified water sharing institutions – the norms, rules, practices, ethics and organisational relations that govern how water is shared (Ostrom, 1990, 1994b, 1994a, 2000, 2010, 1992). Ostrom's principles have since been adapted and expanded for specific resources and contexts, including Schmeier's (2013) adaptation for the governance of international watercourses. Specific to addressing the 'institutional needs of individual basin communities' Wolf (2007, pp. 259–260) suggests a list of five principles to assist 'riparian states in the development of cooperative management networks'. Hydropolitical theorists have drawn on Ostrom's CPR principles, particularly in analysis of transboundary water cooperation (Allouche, 2011; Delli Priscoli & Wolf, 2008; Mirumachi, 2015; A. R. Turton, 2001; Zeitoun & Mirumachi, 2008). Beyond this, however, as Bakker (2007) points out, Ostrom's work links to concepts that transcend state borders, such as water commodification and the human right to water. Indeed, concepts of shared commons further speak to themes of justice, resilience, and agency, which this thesis will expand on in Chapter 7.

2.8   Water rights and needs

2.8.1   Water and human rights

Two common ways that people, communities, and states attempt to assure or defend sustainable access to water is by asserting human rights and basic needs. The two concepts are distinct, but are often interwoven in that a need describes the conditions required to function and/or thrive,

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[12] Ostrom's (1990, p. 90) CPR design principles are, in summary: 1) clearly defined boundaries; 2) congruence between appropriation and provision rules and local conditions; 3) collective choice arrangements; 4) monitoring; 5) graduated sanctions; 6) conflict resolution mechanisms; 7) minimal recognition of rights to organise; and for CPRs that are parts of larger systems, 8) nested enterprises.

while a right is a recognition of entitlement to have a need fulfilled (Gasper, 2005). When it comes to water this link is particularly important, because while in the general sense 'not all needs correspond to rights, and not all rights correspond to needs', water rights narratives are often constructed on the basis of water needs in legal, organisational, and social invocations, as will be discussed in this thesis (p. 1).

In 2010, the UN General Assembly (UNGA, 2010) and UN Human Rights Council (UNHRC, 2010) adopted resolutions on the human right to water and sanitation. These resolutions are not binding under international law in and of themselves, but they do lend the human right to water significant political weight. (Lepard, 2010; United Nations, 2021; Winkler, 2019).

Significantly, the UNGA resolution acknowledges 'the importance of equitable access to safe and clean drinking water and sanitation as an integral component of the realisation of all human rights' (UNGA, 2010, p. 2). Thus, the human right to water is established as an essential foundation that underpins all other human rights. In addition, the UNHRC resolution states that

> the human right to safe drinking water and sanitation is derived from the right to
> an adequate standard of living and inextricably related to the right to the highest
> attainable standard of physical and mental health, as well as the right to life and
> human dignity.

On that basis, the human right to water is considered an implicit component of the human right to an adequate standard of living, which *is* guaranteed by the legally binding International Covenant on Economic, Social and Cultural Rights (ICESCR) (McCaffrey, 2020; Winkler, 2019).

These resolutions focus primarily on the rights of individuals, and the obligations of the state to provide for them. But other instruments of international law, such as the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) focus on collective water rights (United Nations Declaration on the Rights of Indigenous Peoples, 2007). Moreover, the human right to water also impacts how states engage internationally. The Watercourses Convention of 1997 states that 'resolution of conflicts among different uses of an international watercourse should be resolved in a way that gives 'special regard … to the requirements of vital human needs' (Bulto, 2011, p. 24; United Nations, 1997). The provisions of the convention state that 'In determining "vital human need", special attention is to be paid to providing sufficient water to sustain human life, including both drinking water and water required for production of food in order to prevent starvation' (United Nations, 1997). This provision 'is consistent with the human right to water', and 'the requirement for catering for such vital needs should be informed by the

human right to water' (Bulto, 2011, pp. 23–24; McCaffrey, 2020, p. 422). But it raises the question: what is 'sufficient' to 'sustain' human life?

Galtung (1994) argues that traditional human rights approaches are more suited to survival needs than other needs that are impaired by problematic structures. He posits that needs 'direct us to look for causal factors', while rights imply duties by specific actors (Galtung, 1994, p. 69). This is demonstrated in the minimum standards for humanitarian assistance. In a crisis setting, the established minimum allowable quantity of water for drinking and domestic hygiene is 15L/person/day (Sphere Association, 2018). However, the same humanitarian minimum standards recognise that 'In the acute phase of a drought, 7.5 litres per person per day may be appropriate for a short time. Or, in an urban middle-income context, 50 litres per person per day may be the minimum acceptable amount to maintain health and dignity' (Sphere Association, 2018, p. 107). Yet it is expected by the ICESCR that what constitutes an absolute minimum varies at least geographically, and parties are required take progressive steps to achieve well beyond their 'core obligations' (McCaffrey, 2020; United Nations, 1997).

Clapham (2015, p. 13) explains that modern rights theorists tend to justify the existence and importance of rights due to 'some overriding *value*, such as freedom, autonomy, or equality' [emphasis added]. Political arrangements, he suggests, 'are useful for protecting human rights, not because every community must be about protecting God-given rights, but rather because human rights seem to prove a useful way to protect other values, such as dignity' (Clapham, 2015, pp. 13–14).

The human right to water is thus, at the very least, a tool to protect the value of preservation of life. But when human needs extend beyond survival towards improved function and indeed thriving, the associated human right to water becomes significantly more subjective.

2.8.2   Water needs

Allan (2002, p. 3) writes that when scientists define what constitutes 'sufficient' water, they are typically referring to a locally sourced *volume* required to satisfy 'the total water needs' of a population. Avruch and Mitchell (2013) point out that a key reason physiological needs are often given ready attention is because they are measurable, and their consequences predictable. For many positivist-leaning social and behavioural scientists, non-physiological needs appear idiosyncratic, 'and their validity and testability highly uncertain' (Avruch & Mitchell, 2013, p. 6). Purely biological needs like thirst, hunger and shelter have quantifiable satisfiers in litres, kilojoules and square

metres and the impact of these is easily determined. A deficit of love or belonging, on the other hand, is much more difficult to measure and operationalise (Avruch & Mitchell, 2013, p. 6).

Yet from the days of Aristotle, human needs have been recognised in some form as both physiological and non-physiological. Aristotle contrasted 'natural needs' (also translated as 'desires'), which are intrinsic and universal; with 'acquired desires', which a person takes on via their particular societal, cultural, and political environments (Avruch & Mitchell, 2013; Pakaluk, 2005). More than two millennia later, concepts of basic human needs that distinguish between the physiological and non-physiological remain central to theories of behaviour and motivation. Langer (1943), for example, distinguished between 'physical', 'social', and 'egoistic' needs; while Maslow's (1954) famous hierarchy of needs, usually presented as a pyramid (although not by Maslow himself) as shown in Figure 2.3, lists in order of priority: physiological needs; safety; love and belonging; esteem; and self-actualisation.
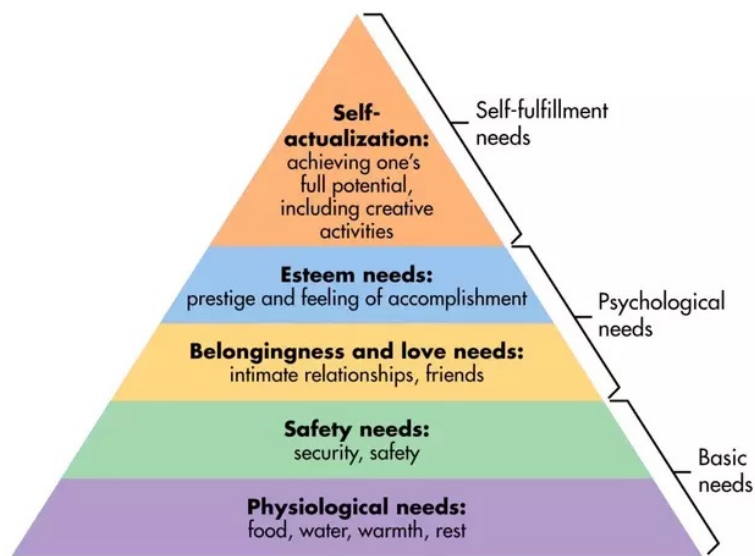
Figure 2.3: Maslow's hierarchy of needs, conceived as a pyramid (in McLeod, 2020)

Maslow's hierarchy 'remains a touchstone for most human needs theorists' (Avruch & Mitchell, 2013, p. 6), although as will be discussed further, these theorists have criticised Maslow's needs model on the basis of its hierarchical progression. Where Maslow (1954, p. 36) proposed five needs groups, in which 'physiological needs are the most prepotent of all needs', Sites (1973) put forward

eight categories, 'all of which require fulfilment and, therefore, none of which is necessarily more important than others' (Burton, 1979).[13]

One of the most influential proponents of human needs theory was former Australian diplomat and PACS theorist John Burton, who makes important distinctions between needs, interests, and values. He states that 'human motivations include some that are required for the development of the human species, some that are culturally specific, and some that are of a transitory nature' (Burton, 1990, p. 36). 'Needs', he claims, 'are universal and integral to the human being' (Burton, 1990, p. 36). 'Values', which under this framework are acquired and may gradually alter over a long period of time, are the 'ideas, habits, customs and beliefs that are characteristic of particular social communities' and inform separate cultures and identity groups (Burton, 1990, p. 37). Lastly, 'interests' refer to 'the occupational, social, political and economic aspirations of the individual, and of identity groups' (Burton, 1990, p. 38). According to Burton (1990, p. 40), interests are negotiable, but values and needs are non-negotiable.

Burton (1984, p. 147) refined Sites' list down to a theory of four basic human needs (BHN): identity, participation, recognition, and security—all of 'which are an ontological part of the human development process'. This represents a significant shift from the needs thinking of Maslow, in that the BHN presented by Burton are social needs, not physical needs. As social needs rather than physical ones, Burton's categories of needs are not subject to finite supply or absolute scarcity, and as a result open significant space for positive-sum, 'win-win' outcomes. Thus, and with a heavy focus on problem solving in conflict resolution, Burton postulated that conflict is not so much about resources such as territory or sustenance, but about deeper needs that underly them. However, he maintained the assumption that BHN are conditioned biologically, and that these needs will be 'pursued by all means available' (Burton, 1990, p. 36).

Galtung (1990), along with Sites and Burton, critiques Maslow in refuting that BHN are hierarchical in nature. Firstly, he argued that people have agency in prioritising how their needs are addressed:

> People are known to be willing to give up their lives for freedom and/or identity,
> so physical survival is not unconditionally the most basic need. But they are also
> willing to give up freedom and/or identity in order to obtain security and/or

---

[13] Sites' (1973, Ch. 2) list of eight needs were 1) consistency and response; 2) stimulation; 3) security; 4) recognition; 5) distributive justice; 6) rationality and the appearance of rationality; 7) meaning; and 8) control.

welfare—indicating the futility in trying to establish any universal hierarchy (Galtung, 1990, p. 317).

This argument has profound implications for water sharing approaches that place physiological requirements as foremost among human needs. Secondly, and building on the prior observation, Galtung (1990, p. 323) argued that Maslow's hierarchy is heavily Western-centric in its material focus.

> Because of the material bias of our societies, implying that material problems are the problems held to be resolvable within these societies, other problems are either defined away or given up—and that consensus for action is built around material "facts" not non-material "values." But in a different culture, with greater emphasis on non-material dimensions, this may all turn out very differently.

There is, he claims, 'a difference between tension relief and human development' and that needs can develop 'precisely because they are biosocial in character' (Galtung, 1990, p. 329). Lee (1965, p. 72) goes further, suggesting that 'it is value, not a series of needs, which is at the basis of human behaviour'. But Galtung (1990, p. 331) retorts that this argument overlooks 'the important distinction between values in general and values so basic that the tension resulting from non-fulfilment becomes destructive. Needs are in this latter category, and it is not a fixed category.' This is consistent with Burton (1990) who asserts that while values may alter, 'even in the best of circumstances this is a long process. It requires a sense of security, which in turn depends on an absence of discrimination, and on opportunities for development' (1990, p. 37). But as Galtung (1990, p. 331) then poses: 'the question is—Which values should become needs? Or under Burton's (1990) framing: if values are non-negotiable and thus have the same properties as needs, which values are non-negotiable?

The distinction between interests, which are negotiable, and values, which are non-negotiable, has the effect of illuminating underlying causes of conflict and impacts actors' abilities 'to negotiate from fixed positions of relative power' (Burton, 1990, p. 40). Accordingly, it is not a welcome delineation 'to those who are in a majority or powerful position. It is a distinction, however, that must be made if there is to be an understanding of conflicts, and the formulation of policies calculated to avoid or resolve them' (Burton, 1990, p. 40). The emergence of needs, values, and interests serves to transition focus from away from 'elite interests in institutions of government, in property and in control, to the human needs of the peoples who comprise societies' (Burton, 1990, pp. 40–41).

2.8.3 Water negotiation

The field of hydropolitics has significant familiarity with win-win approaches to water sharing, seen particularly in its shift from the zero-sum water wars paradigm towards the potential of cooperative interactions. This has primarily come in the form of negotiation theory—particularly the pioneering work of Fisher and Ury (1981/2011) who present a further variation on needs theory. This approach bears some resemblance to BHN, and with the shared aim of identifying a pathway to a satisfactory outcome more than a developing a theory of motivation, similarly speaks to the matter of conflict dynamics. Presenting the concepts of *positions* and *interests*, the authors describe positions as people's often-divergent perspectives as to how a problem should be addressed. They argue that, while differing positions are frequently seen as conflictual, it is instead conflicting interests that are the basic problem in negotiation: the 'needs, desires, concerns and fears' that underpin positions (R. Fisher & Ury, 1981/2011, p. 42).[14] Presenting their own list of proposed basic human needs, the authors suggest

> The most powerful interests are basic human needs. In searching for the basic interests behind a declared position, look particularly for those bedrock concerns which motivate all people. If you can take care of such basic needs, you increase the chance both of reaching agreement and, if an agreement is reached, of the other side's keeping to it. Basic human needs include:
>
> · Security
> · Economic well-being
> · A sense of belonging
> · Recognition
> · Control over one's life
>
> As fundamental as they are, basic human needs are easy to overlook (2011, p. 50).

From the perspective of negotiation, conflict is presented as problematic; as standing in the way of a positive outcome. As a result, negotiation theory advocates the use of objective criteria when possible to avoid a 'clash of wills' (R. Fisher & Ury, 2011). Wolf (2007) applies this approach in a discussion of negotiations over international transboundary water allocations, arguing that a

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[14] Fisher and Ury define interests differently to Burton. Where Fisher and Ury use 'interests' as a term to encapsulate needs amongst other motivators that underlie 'positions', Burton's 'interests' are closer in nature to 'positions' as defined by Fisher and Ury.

statement of water rights is adversarial and zero-sum, in that it forms a fixed position and can hinder negotiations by leaving no room for bargaining. Instead, he argues, negotiations achieve better outcomes when they follow a pattern that progresses from rights to needs and, eventually, interests.

Indeed much hydropolitical scholarship directly references and builds on negotiation theory (Daoudy, 2020; Delli Priscoli & Wolf, 2008; Wolf, 2000, 2010; Zeitoun et al., 2011, 2017; Zeitoun, Mirumachi, & Warner, 2020). It is thus no surprise that the field leans heavily on positivist metrics—not only are they more easily determined; they are also seen to make negotiating easier. Discussing the principle of 'equal and equitable use' as per the 1997 Watercourses Convention, Zeitoun, Mirumachi and Warner (2020, p. 124) advocate seven factors to use 'as the basis for negotiations, or as the *least subjective* measure of what is 'fair." [emphasis added].

It follows that if water conflict approaches are built on negotiation theory, their purpose is to reach an endpoint which maximises individual gains (R. Fisher & Ury, 2011; Rodríguez et al., 2016). This is a form of 'conflict resolution', in that the cessation of conflict—which is generally seen as negative and to be avoided—is a desired outcome. However, while such an approach may be effective for short-term transactions, its effectiveness for dealing with protracted conflict over time is questionable. In this distinction there is an interesting parallel with earlier hydropolitical examples of the potential for water treaties to cease immediate tensions, yet at the same time lock in power imbalance. In such instances, the conflict has not been resolved because the underlying needs have not been met and attempts to fulfil them persist (Sanson & Bretherton, 2001).

2.8.4 Epistemology problems: power and rights or interests and needs

Here emerges the epistemological problem, in that approaches to conflict based on power and rights, and those based on interests and needs, draw on different views of knowledge.

> Power and rights-based approaches are objective. Power-based approaches depend
> on being able to collect information, analyse the sources of power and estimate the
> probable consequences of strategies in a particular context. Effective rights-based
> approaches necessitate the collection and weighing of evidence in relation to a set
> of rules and making judgements which take precedent and community expectations
> into account' (Sanson & Bretherton, 2001, p. 207).

On the other hand, interest-based approaches contain an element of subjectivity, and consider knowledge as being created or constructed.

The idea that knowledge has a subjective element does not mean that reality is denied, but rather that conclusions about the nature of reality are seen as tentative working hypotheses open to revision in the light of new information. Good conflict resolution practitioners recognise that knowledge is partial, so different perceptions may be equally valid' (Sanson & Bretherton, 2001, pp. 207–208)

Addressing this paradox, the field of peace and conflict studies offers the alternative approach of conflict *transformation* (Lederach, 2003). Through this lens, conflict is seen as constantly in flux, and should be addressed as an ongoing process. If a conflict does not need to be 'resolved', space emerges for addressing factors that go beyond the 'least subjective measures'.

2.9   Conflict resolution and conflict transformation

Rodríguez et al. (2016) argue that environmental conflicts typically have complex roots, seen in their important political, historical, social, physical, and cultural aspects, alongside profound power asymmetries and institutional failures. The ability of 'conventional, facilitated conflict resolution methods' to deal with such situations, they argue, is limited as a result (2016, p. 6). Speaking specifically to the challenges of variability over time, Zeitoun et al. (2020, p. 17) advocate for a shift from water conflict *management* to conflict *transformation*, and in doing draw attention to 'the constantly changing nature of conflicts'. They emphasise that this is particularly pertinent considering water's environmental, economic and political variability. However, the authors then explicitly state that they 'do not delve any more deeply into the theory of and debates around conflict transformation and peacebuilding (about splitting hairs with conflict resolution, for example)' (2020, p. 17). In doing so, the authors reference Botes' (2003) presentation of arguments as to whether differences between conflict resolution and conflict transformation represents mere semantics or a crucial shift in theory. They conclude noting that Lederach's (2005) focus on listening to people most affected by peace decisions and logistics is sufficient if new water conflict 'arrangements are to be legitimate and sustainable' (2020, p. 17). This study, however, draws further on Lederach's theories and the potential for a conflict transformation approach, as well as on Zeitoun et al.'s (2020) significant yet epistemologically constrained progress in acknowledging its contribution.

Lederach (2005, p. 49) argues, contrary to Zeitoun et al. (2020), that conflict resolution and conflict transformation are profoundly different, and at times 'operate in the exact opposite ways'. Conflict resolution, he argues, is conceptualised as creating a pathway through problems so that people may

'reach the light at the end of their tunnel' (Lederach, 2005, p. 44). It is characterised by the notion of reaching a solution, and an agreement to that effect 'creates the expectation that the conflict has ended' (Lederach, 2005, p. 44). Conflict transformation, on the other hand, is an *ongoing* social and relational platform. It 'is one of the fundamental building blocks for supporting constructive change over time', and requires 'a long-term view that focuses as much on the people in the setting of conflict building durable and flexible processes as it does on specific solutions' (Lederach, 2005, p. 47). Indeed, he devotes a whole book to these differences (Lederach, 2003).

Lederach (1995) makes explicit that conflict transformation is by its nature constructionist which, like constructivism, holds people's interpreted understandings of their experiences such as situations, events, and interactions, as central. [15]

> A constructionist view suggests that people act on the basis of the meaning things have for them. Meaning is created through shared and accumulated knowledge. People from different cultural settings have developed many ways of creating and expressing as well as interpreting and handling conflict. … Understanding conflict and developing appropriate models for handling it will necessarily be rooted in, and must respect and draw from, the cultural knowledge of people (Lederach, 1995, p. 10)

Conflict, he argues, is a natural, common experience present in all relationships and cultures. Conflict is socially constructed, 'accomplished through and rooted in people's perceptions, interpretations, expressions and intentions, each of which cycles back to their common-sense knowledge' and emerging through interactions in which people are active participants (Lederach, 1995, p. 9).

Rooted in the quality of relationships, conflict transformation incorporates both *process*—the communications and interactions between people; and *structure*—the ways in which social, political, economic and cultural relationships are pieced together (Lederach, 1997). Where conflict resolution is about reaching a definitive point at which the visible symptoms of conflict are reduced, conflict transformation is a long-term process that extends beyond agreements and considers the ongoing, dynamic, relational aspects of social conflict that lie at the root or epicentre

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[15] Constructionism, from the field of sociology, refers to 'theories that emphasise the socially constructed nature of social life' (Oxford Reference, 2021). Constructivism, from the field of psychology, refers to the cognitive structures that shape knowledge of the world through interactions a subject and its environment. This can include a person and their social interactions, but also incorporates interactions beyond the social sphere. Thus, the two concepts can be seen as epistemologically similar and closely related.

of what generates the fighting (Lederach, 2005, 2003). This is not splitting hairs—rather, conflict resolution and conflict transformation are profoundly different concepts, pursued through different though potentially overlapping processes.

This holds significant implications for contemporary models of water conflict analysis. The nascent approach to conflict transformation of Zeitoun et al. (2020, p. 59) explicitly states that it is 'underpinned' by negotiation theory. This is problematic, since conflict resolution based on negotiation theory seeks an endpoint, while conflict transformation necessitates a continual process of attention to relationships that underpin conflict and its transformation.

Assefa (1999) differentiates between conflict resolution and conflict transformation in terms of the level of mutual participation in search for a solution. His 'Spectrum of Conflict Handling Mechanisms' is presented in Figure 2.4.
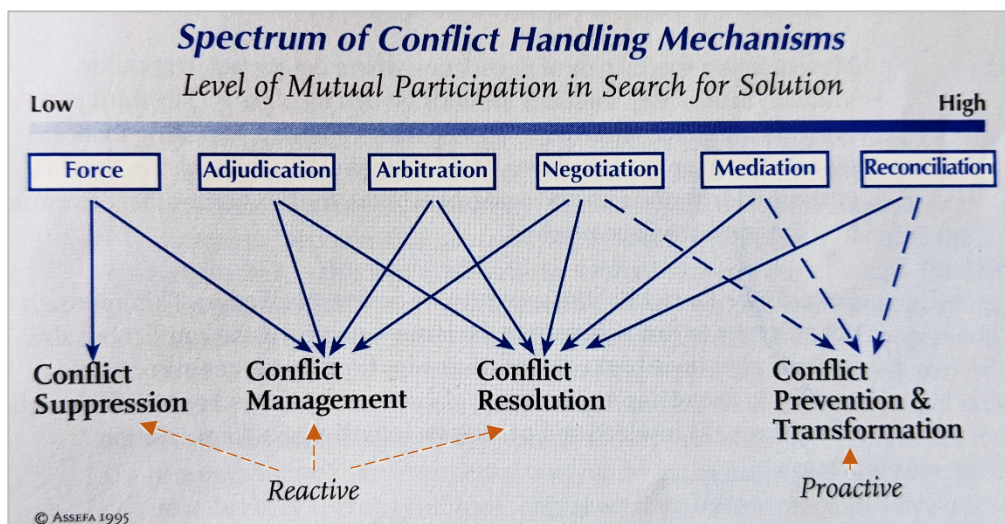
Figure 2.4: Spectrum of Conflict Handling Mechanisms (Assefa, 1999, p. 37)

At first glance, the spectrum in Figure 2.4 bears some resemblance to those continua used in the development of the hydropolitical conflict and cooperation as described in section 2.7.2, with 'force' at one end and 'reconciliation' on the other.[16] So too, 'Level of mutual participation in search for a solution' sounds somewhat similar to the 'cooperation intensity' axis of the TWINS model. However, closer inspection reveals a fundamental difference: the continuum in Assefas's framing describes force, reconciliation, and other mechanisms in-between as *responses* to conflict,

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[16] This comparison is not intended to imply that 'reconciliation' is equated to 'durable peace' or 'warm relations' as seen in the Conflict Intensity Frame.

rather than elements of conflict itself. Through this lens, conflict resolution and conflict transformation approaches are not necessarily contradictory but are instead distinct processes that underpin the different mechanisms for handling conflict. Importantly for policy and practice, conflict resolution is reactive, while conflict transformation is a proactive response to handling conflict.

Assefa's (1999) framework offers a delineation of and conceptual bridge between many of the concepts discussed in this chapter. It establishes conflict as a social phenomenon, rather than as violence; it situates violence, negotiation, and reconciliation (among others) as potential responses to conflict; and delineates between conflict resolution and conflict transformation as distinct though not mutually exclusive mechanisms through which conflict may be addressed, depending on the objective. It is also consistent with BHN theory, which illuminates the issues which these response mechanisms address.

2.10 Chapter conclusions

There is both a push and a willingness within the field of hydropolitics for managers and facilitators involved in transboundary water sharing arrangements and dispute resolution processes to move away from the realist paradigm of relative gains, rational self-interest, and compulsive motivation in human nature. Yet, presentations of conflict in hydropolitical literature maintain a heavily realist leaning. In its continued use of the 'conflict intensity scale', TWI maintains the assumption that resource scarcity will progress to violence as people's survival needs are threatened, despite recognition that the water wars thesis is unfounded. A rigorous move beyond the realist water wars thesis requires the breaking down of such assumptions, representing the first key gap to inform this thesis' central research question.

However, the high level of attention given in TWI literature to cooperation dynamics shows that the field of hydropolitics has significantly shifted to incorporate liberalist perspectives as well as realist. Thus, it is not enough to call realism in hydropolitics into question, and the problem calls for a deeper level of analysis. Both realism and liberalism are built on positivist epistemology, implying that 'the way we interpret the world has little influence on matters of cause and effect' and that there is 'a "real" landscape of features like geography, resources and relative power, to which we respond fairly directly' (Parsons, 2018, p. 75). But an interrogation of negotiation theory and BHN approaches to water conflict has revealed both the limitations of objectivity as a lens and the importance of incorporating subjective values in hydropolitics. Offering an alternative to

positivism, 'A constructivist argument claims that people do one thing and not another due to certain 'social constructs': ideas, beliefs, norms, identities or some other interpretive filter through which people perceive the world' (Parsons, 2018, p. 75). While the idea is not yet rigorously incorporated into the field of hydropolitics, recent scholarship advocates 'the merit of exploring alternatives, be they narratives, knowledge(s), opinions or solutions' (Zeitoun, Mirumachi, & Warner, 2020, p. 155). Thus, theoretical broadening to include subjective personal perspective emerges as a second building block of the research question.

A further aspect relates to the prospect of transforming water conflicts through ongoing process rather than aiming for conflict resolution with an endpoint. In recent years, scholars in the field of hydropolitics have begun to entertain notions of conflict transformation as an alternative or at least expanded approach to sharing scarce waters. However, conflict transformation is theoretically and practically a significantly different approach to addressing conflict than the resolution-focus of hydropolitics. This too informs the research question, demanding a focus on relationships and perspective-telling. Expanding 'transboundary' to include the possibility of interpretative boundaries as well as sensory ones, the research question must hear from parties to water conflict as to what they see as boundaries, and how they wish to transform them.

The following chapter describes how the research methods employed in this study provide a means to answering the research question including the aspects identified above.

3 Research process

3.1 Chapter introduction

This chapter provides an overview of the research process, including an introduction to methodology chosen, the methods used to carry out the research, and the contexts and participants selected.

Sections 3.2 and 3.3 discuss the demands of the research question and outline key characteristics of the methodology chosen to meet those demands: Interpretative Phenomenological Analysis (IPA). This includes an overview of the theoretical background, inductiveness, the hermeneutic nature of enquiry, idiographics and ensuant opportunity for comparison, and purposive sampling.

Section 3.4 then starts by outlining the two water sharing contexts chosen and the justification for their choice. It offers a brief initiation to the hydrological context in both regions, as well as relevant demographic and cultural considerations. It gives a broad overview of the dominant water supply and demand characteristics seen in each context, along with a brief familiarisation with the governance structures in place for managing that water. Following this orientation to the case contexts, the participant selection method is explained and the participants who took part in the study are introduced with relevant demographic information. The use of semi-structured interviews for data collection is then outlined, as is the process of coding the interviews into themes using IPA. A process of reflexivity is then discussed, as are the other validity strategies employed to ensure academic rigour.

Section 3.5 then concludes the chapter with a discussion of the ethical considerations and limitations of the study.

3.2 Demands of the research question

The methodology for this research project was chosen and refined to meet criteria that effectively addressed the research question. There were four specific criteria that informed this choice.

Firstly, considering that the research question enquires as to individuals' perspectives on and experiences of water scarcity conflict, it was fundamental to the validity of the study that the research approach was built on an epistemology that embraces subjective views as valid data.

Secondly, the methodology chosen for the study needed to be inductive in nature. As identified in the review of literature in Chapter 2, the dominance of positivism in hydropolitical literature presented a clear opportunity to 'ask the people' – to interrogate existing theory taking into account the perspectives of those who face water scarcity first hand and learning from their experience. Inductive inquiry, arising from a question rather than aiming to test existing theory, focuses first on the collection of data before an ensuing search for patterns and relationships in that data (Gray, 2013). Conducive to a bottom-up approach, inductive research methodologies are apt for 'understanding dynamics, robustness, emergence, resilience, [and] focus on individual behaviour' in such a way that takes into account context and contingency (Dudovskiy, 2021).

Thirdly, in seeking to understand how people perceive water scarcity conflict in the experiential moment rather than in hindsight, it was also important that participants' perspectives could be captured in present tense. This did not prohibit personal reflection on the past or hopes for the future, but instead served to capture acute emotional responses in the midst of conflict when its pressures and influences were most pertinent, recognising that their impact may change or dissipate over time.

Lastly, since this is a study of conflict in and between communities, the chosen methodology required the participation of more than one individual. Moreover, it was beneficial that the chosen methodology function not only to identify where multiple people held *similar* views on a matter, but also to illuminate areas of *difference* between these participants' perspectives.

The following section discusses in detail why and how interpretative phenomenological analysis (IPA) effectively addresses these criteria, making it an appropriate and effective choice of methodology for this study.

3.3 Interpretative phenomenological analysis

3.3.1 Theoretical background to IPA

The chosen methodology, IPA, is a subtype of the broader methodological field of phenomenology – an approach to research that focuses on the importance of knowledge gained through lived experience. By drawing out and analysing participants' perspectives on and understandings of a particular situation, phenomenological methodologies serve to explore complex social and political phenomena that are not easily understood by reducing them to numbers or statistics (J. A. Smith et al., 2009). Instead of relying on theory to analyse and predict,

phenomenology puts the highest value on listening to and understanding the primary accounts of people experiencing the phenomenon first-hand.

Phenomenology has its roots in the writings of German mathematician Edmund Husserl who, not being content with 'mere words', wrote of the epistemological importance of self-evidence for adding rich, grounded meaning to pure logic, theory, and equivocations. 'Meanings inspired only by remote, confused, inauthentic intuitions—if by any intuitions at all—are not enough: we must go back to the "things themselves"' (Husserl, 2012, p. 168). To address this, phenomenology seeks to 'identify phenomena through how they are perceived by the actors in a situation', and the subjectivity of participant's perspectives forms the epistemological basis for this approach to research (Creswell, 2007; Lester, 1999, p. 1). Through inductive gathering of qualitative data, phenomenological methodologies are effective at representing information and knowledge 'from the perspective of the research participant(s)', and are thus 'powerful for understanding subjective experience, gaining insights into people's motivations and actions, and cutting through the clutter of taken-for-granted assumptions and conventional wisdom' (Gill, 2014; Lester, 1999, p. 1). Or as Brown (2015b, p. xiii) concisely puts it: 'the most useful knowledge about human behaviour is based on people's lived experience'.

Stemming from Husserilian phenomenology are multiple subtypes with nuanced but important differences. Where Husserl sought primarily to *describe* the overall essence of an experience, his student Heidegger strove to *understand* experiences and how to articulate them (Gill, 2014; van Manen, 2016; Wilding & Whiteford, 2005). This angle was further developed into IPA by J.A. Smith, who sought 'to explore in detail how people make sense of their personal and social world' (Gill, 2014, p. 122).

Epistemologically, IPA 'recognizes that different people perceive the world in very different ways, dependent on their personalities, prior life experiences and motivations. It attempts to explore/understand/make sense of the subjective meanings of events/experiences/states of the individual participants themselves' (J. A. Smith & Osborn, 2008a, p. 229). Importantly, IPA does not exclude an outside world which functions independently to the person perceiving it, and quantifiable observations can and should still be acknowledged as a useful source of knowledge. In that sense, IPA rests firmly on a constructivist epistemology. It does not reject an external reality, but focuses on the participant's *interaction* with and *perception* of this outside independent world to illuminate how people construct meaning and assign value (J. A. Smith & Osborn, 2008b). 'Hence, multiple contradictory but equally valid accounts of the world can exist' (Gray, 2013, p. 20). An 'examination of how people make sense of their life experiences', IPA is a highly effective

tool for understanding what happens when 'lived experience takes on a particular significance for people' (J. A. Smith et al., 2009, p. 1).

IPA is increasingly used as an effective methodology in the discipline of peace and conflict studies. With its roots in qualitative psychology, it has shown to be especially useful for exploring issues relating to how people perceive of, process and react to conflict. For example, conflict between people with different levels of influence in society is studied by Musa and Ferguson (2013); Burgess et al. (2007) explore gaps between conflict resolution and conflict transformation; while Nwabuzor (2017) examines lived experience of conflict through the lens of two different theoretical frameworks.

3.3.2 Inductiveness

The research question at the heart of this study points towards inductive enquiry. Informed by theory, the question primarily seeks to address and build on theoretical openings, rather than test a specific theory or hypothesis. It is open-ended, directionally flexible, and is designed to draw out previously unknown themes and issues that participants see as relevant. IPA is an effective methodology for this purpose, as it is highly inductive by design. As Smith (J. A. Smith, 2004, p. 43) writes, 'IPA researchers do not attempt to verify or negate specific hypotheses established on the basis of the extant literature; rather they construct broader research questions which lead to the collection of expansive data.' To that aim, all participant data included in this study was collected using semi-structured interviews—'the exemplary method' for this purpose as detailed in section 3.4.3 (J. A. Smith & Osborn, 2008b, p. 57).

At the same time, to claim that IPA is a *purely* inductive approach would be both disingenuous and contrary to its by-design iterative and reflexive process. The IPA process employed for this study starts by identifying patterns that emerge from the experiential statements of the participants. As is typical of inductive methodology, these emergent patterns were then analysed against existing theory to find points of convergence and divergence between existing theories and the ideas emerging from the data. Repeated iterations were then guided by where the data spoke to particularly pertinent points of interest in theory. With this approach, it could be argued that there is a deductive element to the process. However, as the data was never generated for the purpose of testing a theory or hypothesis, the IPA employed for this study is considered a series of inductive iterations.

3.3.3   Hermeneutics

Hermeneutics, the theory of interpretation, is a core theoretical underpinning of IPA. Indeed, IPA is *double hermeneutic*, which is to say that the phenomenon in question is interpreted twice before it is reported. The first is the participant's interpretation, whereby a person reflects on and makes sense of relationships between themselves, others, and the world around them. Secondly, the researcher then interprets the account given by the participant, so that it can be analysed and reported. 'Although the primary concern of IPA is the lived experience of the participant and the meaning which the participant makes of that lived experience, the end result is always an account of how the analyst thinks the participant is thinking' (J. A. Smith et al., 2009, p. 80).

At first glance, the double hermeneutic nature of IPA can seem fraught with a loss of accuracy. However, as Heidegger (2010) and Smith et al. (2009) argue: our access to all data is at some point through interpretation – certainly if coming from a constructivist epistemology – and recognising these layers of interpretation helps the researcher to approach the data in a way that ensures maximum reliability. This is done through a process of *reflexivity*, which seeks to acknowledge the researcher's own predispositions, and in doing so illuminate inevitable researcher bias which may influence the data analysis (Creswell, 2007). This is not to be confused with the *bracketing* approach seen in other sub-types of phenomenology, which seeks to *separate* or even *remove* researcher bias from participants' perspectives. Instead, the purpose and usefulness of reflexivity is to *incorporate* researcher interpretation of data, recognising with transparency that their own personal experience *does* and *will* affect the interpretative process (J. A. Smith et al., 2009). In that sense, reflexivity is an important validity strategy for a hermeneutical study, as detailed in section 3.4.5.

A further hermeneutic aspect of understanding motivation is the matter of timing. Specifically, the ability to capture a participant's perspective in the very moment of that person's experience can offer a window into needs and motivation that is rich with the intents, pressures, and other such drivers that exist in the present but may blur after the event. Most research data collected in a post-war period is sequential and process orientated – by nature a historical study (Zartman, 2005). While perceptions can of course be recalled, investigating them after their occurrence risks losing the immediacy of people's concerns; the intensity of the experience; or the acuteness of a person's fear, distress or longing. But as Gillward (1990, p. 122) states, 'empirical needs research focused on the present enjoys the advantage that the conditions governing needs satisfaction are known and that the subjects under study are physically present'. This is essentially a matter of source accuracy, in that a lack of historical distance between author (the participant) and reader (the interpreter) serves to capture the on-going process of making sense of one's surroundings, averting

the potential distortions of hindsight, memory, or dominant historical narratives both favourable and unfavourable (Amos, 2016; Hunt, 2010; J. A. Smith, 2007).

3.3.4 Idiographics and comparison

Where other subtypes of phenomenology, particularly Husserlian subtypes, seek to draw out commonalities among a group of people, IPA's idiographic focus lends itself to also analysing points of difference. This is an important aspect of the methodology, emphasising why IPA cannot and should not be used to make universal or even general claims about society. Instead, it serves to highlight how the perspectives of *selected* individuals harmonise or clash with others', without applying or extrapolating trends to the broader population. While IPA does not *prohibit* general claims such as those made through a supporting quantitative study, this cannot be pursued through IPA itself. Rather than analysing statistically representative samples, IPA facilitates the detailed examination of the perceptions and understandings of individuals or small groups (J. A. Smith & Osbourne, 2008).

Because IPA is idiographic, it begins with a detailed examination of an individual's perspective on a given phenomenon, before moving on to see how it compares to others', be it in their similarities or how they differ. In that sense, IPA has comparison embedded within its process, and its focus on the individual is a characteristic that separates IPA from most other forms of phenomenology (Gill, 2014; J. A. Smith, 2004). Comparison of similarity and dissimilarity between participants' perspectives in IPA is called *convergence* and *divergence*, and both offer useful insights though for different reasons.

Convergence—that is, when people express similar views towards a shared phenomenon—is particularly interesting when the social context of those people is quite different. The logic behind this approach is that if commonalities in cause or process are identified despite the differences in context, such results provide strong arguments for theory building (Höglund, 2011; Przeworski & Teune, 1970). Divergence on the other hand—that is, when people express differing perspectives towards a shared phenomenon—is of interest primarily when two or more people have a great deal else in common despite the divergence in their perspectives. This serves to spotlight issues in contention.

3.3.5 Purposive sampling

An IPA study reflects neither a random nor statistically representative population sample, and makes no such pretence (J. A. Smith & Osborn, 2008a, p. 231). As is often the case with qualitative methodologies, IPA does not aim to generalise findings across a section of society, but is instead useful for understanding 'complexity, depth, variation, or context surrounding a phenomenon' (Gentles et al., 2015, p. 1782). It follows that the guiding principle for participant sampling in this study was subjective information-richness, rather than causality or generalisability.

However, non-statistically representative sampling represents a common point of critique of IPA, particularly for theorists more familiar with quantitative research. Typically, such critique centres on the ability to minimise bias in the collected data as validity is pursued through less tangible or statistically measurable means than in a quantitative study (Harter, 2008). Yet, both the random participant sampling and large sample sizes typical of quantitative research contrarily risks *reducing* data validity when subjective information-richness is the guiding objective. When exploring the subjective views of participants, Hycner (1985, p. 294) argues that 'Randomness, or participants unable to articulate the experience, might, in fact, keep the researcher from fully investigating the phenomenon in the depthful manner necessary. The critical issue here is that the phenomenon dictates the method (not vice-versa), including even the selection and type of participants'. Thus, a strong emphasis on validity is needed in IPA, which is in part achieved through purposive sampling, whereby a stated sampling logic gives structure and consistency to the selection of participants. The strategies employed to that effect in this study are detailed in section 3.4.5.

A key aspect of purposive sampling in IPA is the homogeneity of participants. As Gill (2014, p. 128) writes, 'Phenomenological studies utilize homogenous and purposive samples. They recruit participants who can offer a meaningful perspective of the phenomenon of interest and who share a certain lived experience.' However, on the surface the focus on homogeneity can seem at odds with IPA's pillar of idiography, and without close attention to sampling design a tension of logic can arise between recruiting participants on the basis of their commonalities and divergence in their perspectives. On this issue, J.A. Smith et al. (2009, p. 49) make clear that

> Purposive homogeneous sampling is not seen as treating the members of the sample as an identikit. Quite making the [sample] groups as uniform as possible according to obvious social factors or other theoretical factors relevant to the study, one can then examine in detail psychological variability within the group by analysing the pattern of convergence and divergence which arises.

This distinction between social and psychological factors again speaks to the epistemological foundations of the study. By using IPA, a study explicitly acknowledges a constructivist epistemology, in which the data collected 'can tell us something about people's involvement in and orientation towards the world, and/or about how they make sense of this' (J. A. Smith et al., 2009, p. 47). This is important, because it determines how comparisons between people's perspectives can be made and which of those comparisons are valid.

A further consideration of purposive sampling is the targeted sample size—a matter which should take into account the objectives, resources and constraints of the particular study. As Gill (2014, p. 128) writes,

> 'Although phenomenological approaches typically employ small sample sizes, this is not always the case; for example, Benner and colleagues' (Tanner et al., 1993) use of interpretive teams facilitated the study of hundreds of participants. Nonetheless, generalizations are usually limited to the specific groups researchers are studying, and all forms of phenomenology emphasize rich qualitative accounts over the quantity of data (Sanders, 1982)'

Thus, the size of a purposive sample needs to take strike a balance between homogeneity of experience, diversity of perspectives, and the depth of analysis. To that end, Polkinghorne (1989) suggests a sample sizes for phenomenological research of between 5-25 participants, while J.A. Smith et al. (2009, p. 51) recommend up to 10 interviews for undergraduate research but avoid prescribing a target PhD scale of research due to wider time and scope variance. Instead, they emphasise quality over quantity, urging that the number of interviews be enough to develop points of similarity and difference, but 'not so many that one [the researcher] is in danger of being overwhelmed by the amount of data generated'. Thus, the workable breadth of an IPA study is not strictly limited by theory but is instead determined by its application to a specific research question and context.

3.4   Methods: IPA in action

3.4.1   A tale of two scarcities: water sharing context selection

As introduced in Chapter 1, this thesis examines perspectives on conflict regarding water scarcity in two hydro-geographical contexts: Australia's Murray-Darling/Barka Basin and Yemen's *Jibal as-*

Sarawat (Sarawat Mountains).[17] The two contexts are vastly different in many ways, particularly around culture, language, and governance. Yet with parts of each catchment experiencing very low average yearly rainfall – in some instances less that 250mm – extreme supply-side water scarcity is a shared phenomenon (Bureau of Meteorology, 2019; World Bank, 2019).

Both contexts offered a level of familiarity, networks, and acceptable level of community access to undertake semi-structured interviews. Having been brought up in the mid-Murray-Darling/Barka Basin, I as the researcher had a personal connection with and appreciation for the hydro-geographical, cultural and political context of the basin. While not as deep, my having lived and worked in Jibal as-Sarawat in 2013-14 and again in 2017 meant that I had sufficient networks within the Yemeni water sector and broader community to carry out the research.

The selection of these water sharing contexts builds on the critical hydropolitics literature presented in Chapter 2 by de-centring state-centric control of water basins as the primary unit of analysis. Doing so does not disregard the relevance or importance of cross-border water conflict dynamics, but moves beyond a positivist framing of 'transboundary' to incorporate greater subjectivity in how water conflicts are analysed and addressed. Water resources in both the Murray-Darling/Barka Basin and Jibal as-Sarawat flow across boundaries between geo-political divisions, and while noting the points of differentiation from international basin dynamics discussed in Section 2.7.2, both settings offer scope for analysis of cross-border water sharing dynamics. However, a crucial element of the research design is that geo-political borders are not assumed to be the primary 'boundary' in transboundary hydropolitics, but are instead viewed as one possible form of societal division among others that emerge from lived experience.

The key categorical framework which was applied for identifying the two water sharing contexts is Mirumachi's (2015) TWINS nexus. Despite the critique of the TWINS offered in Chapter 2, the model nonetheless presents a pertinent differential for context selection when applied with acknowledgement of its limitations.

As highlighted in Section 2.7, TWINS is currently considered a prominent tool for the analysis of transboundary water interaction (TWI). It is used to highlight the extent to which parties to a conflict cooperate in relation to conflict intensity, and can be further used to map the progression of that intensity over time. Breaking the TWINS model down into quadrants reveals four categories of TWI: High conflict, low cooperation; high conflict, high cooperation; low conflict,

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[17] The two water sharing settings selected are referred to as *contexts*, as distinct from *cases*, to avoid confusion with case study methodology. This relates to IPA's emphasis on the validity of lived experience, as detailed in Section 3.3.

low cooperation; low conflict, high cooperation. For the purposes of this study, the lower half of Figure 2.2 is of less interest than the top half. That is to say, the study is interested in water sharing contexts in which 'conflict intensity' is (or was, if the conflict has subsided) considered high, yet levels of 'cooperation intensity' on the horizontal axis diverge. According to Gerring (2008), this divergence allows the researcher to generate an inductive hypothesis through dissimilar comparison (Gerring, 2008; Seawright & Gerring, 2008). However, in keeping with the critiques of the TWINS model in Section 2.7, its use to categorise the water sharing contexts is limited to the presence and intensity of conflict. This study does not conceive of physical violence as an escalation of conflict, as the TWINS model does. Instead, this study makes a clear distinction between conflict and violence as described in Sections 2.5-2.6. This creates space to both analyse water conflict dynamics without the assumption that they will inevitably escalate into violence; and to explore violence – including structural, cultural, and physical components – as a possible contributor to water conflict, not simply an outcome.

The Murray-Darling/Barka Basin, Australia

Australia's Murray-Darling/Barka Basin is an immense river system situated in the country's south-east. Its 77,000km of rivers drain a total land area of 1,061,469 km²—a catchment approximately the size of France and Spain together, and roughly one seventh of the Australian continental landmass (Pigram, 2007, p. 159). The basin incorporates parts of the states of Queensland, New South Wales (NSW), Victoria, and South Australia (SA), as well as the Australian Capital Territory (ACT). Water generally flows westward as surface water (rivers) and groundwater (underground aquifers), from the Great Dividing Range on Australia's eastern seaboard to the Murray Mouth near the city of Adelaide in South Australia.

The European names given to the basin's rivers and tributaries reflect the history of white colonisation, with many including the Murray itself named after white colonial-era public figures. However, Aboriginal People of the forty sovereign First Nations along the rivers tell of its much longer history, including stories of the Rainbow Serpent which lives in the waterholes of the Barka (Lower Darling), or the creation of the Murray as Ngurundjeri pursued Ponde, the river cod (Simons, 2020). The basin is shown in Figure 3.1, including key localities mentioned in the study.

Figure 3.1: Murray-Darling/Barka Basin (adapted from (MDBA, 2021a))

Residents of the major cities Canberra and Adelaide are among a population of more than 3 million people who draw their drinking water supplies from the basin (MDBA, 2021c).

The Murray-Darling/Barka is considered Australia's primary food bowl, with 40% of Australian agricultural production capacity located within the catchment, contributing approximately AUD 24 billion annually to Australia's economy (MDBA, 2021d). The basin accounts for almost two thirds (62%) of Australia's water used for irrigation, half of which in 2019 was used for irrigating cotton, followed by grazing pastures and fruit and nut crops (Australian Bureau of Statistics, 2019b).

The basin is subject to the Murray-Darling Basin Plan (MDBP) – a water sharing agreement jointly signed in 2012 by the Federal Government and the five riparian state and territory governments –

reflective of Australia's broader constitutional division of governance responsibilities. The MDBP, or *the Plan* as it is commonly referred to, is federal legislation that has the self-described aim of bringing 'the Basin back to a healthier and sustainable level, while continuing to support farming and other industries for the benefit of the Australian community' (Water Act 2007 (Cth) No 137 (Austl.), n.d.). The Plan's overarching scope offers central guidance for multiple facets of water management, including prioritisation, consumptive limits, infrastructure development, water trading markets, water quality, and monitoring (MDBA, 2021b). However, it is the basin state jurisdictions themselves that are responsible for delivering water resource plans (WRP), infrastructure projects, market mechanisms, and compliance.

WRPs are set out at a local catchment level, outlining 'how each region aims to achieve community, environmental, economic and cultural outcomes and ensure that state water management rules meet the Basin Plan objectives' (MDBA, 2022b). While the overarching Plan is legislated, the 33 WRPs throughout the basin are individually prepared by State governments and accredited by the federal Murray-Darling Basin Authority (MDBA). Thus, the WRPs are variable – subject to adjustment over time to reflect new information changing conditions.

Water *entitlements* (also *licences*) in the basin are 'a permanent right to take up to a certain amount of water from the river system'. Water *allocations*, which are managed by State government departments, refer to a percentage of entitlements that can be accessed in a given year, and can change according to rainfall and storage conditions (MDBA, 2022a). Both entitlements and allocations are tradable under individual State market regulations.[18]

Conflict in the Murray-Darling/Barka Basin is widely presented as hydro-geographical dissonance between basin states; disagreement over mechanisms and targets for sustainable extraction; competition between industries; urban-rural division; or tension between consumptive use and non-consumptive use including cultural flows, environmental sustainability and tourism. The 'Plan burning' incidents of 2010, in which copies of the MDBP were set alight by disgruntled water sharers in NSW, are frequently cited in popular media as a window into the emotionally charged issue of water access in the basin ("Angry Crowd Burns Copy of Murray-Darling Report," 2010; "Irrigation Farmers Demand MDBA Freeze 'devastating' Basin Plan," 2016; Davies, 2022). However, such presentations of water scarcity conflict are arguably over-simplified, with histories of water colonialism, water injustices, cultural flows, and both settler and Indigenous approaches to water management all informing contemporary management of water in the basin (Guest, 2017;

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[18] Entitlements are traded permanently, while allocations are traded temporarily across seasons.

Hartwig et al., 2020; Jackson, 2017; Lavau, 2013; O'Bryan, 2019; Simons, 2020; Weir, 2009). Marshall (2017, p. 99), for instance, writes that 'The central conflict in water policy for Aboriginal water use results from the fact that Aboriginal rights or interests are categorised into economic or non-economic interests'. And as Downey and Clune (2020) discuss, approaches to management of the Murray-Darling/Barka mirror the complex hydraulics, histories, and cultures of the system itself.

Of the 163 countries ranked by the Global Peace Index (GPI) in 2021, Australia was listed as the world's 16th most 'peaceful' (Institute for Economics and Peace, 2021). This comes, however, on the back of two and a half centuries of violence against First Nations peoples, particularly in the British invasion of Australia and continuing in the form of both direct and structural violence. Indicators of such conflict include a lack of treaty and land rights; lack of recognition of Aboriginal and Torres Strait Islander people in the Australian Constitution; disproportionate rates of incarceration and deaths in custody; and poorer health and education outcomes fuelled by persistent racism (Cunneen, 2020; Grant, 2019, 2022; Whyman et al., 2021).

Jibal as-Sarawat, Yemen

Yemen's *Jibal as-Sarawat*, or Sarawat Mountains region, is as dramatic in landscape as it is in history. The relatively fertile mountain region is home to the majority of Yemen's population, and stretches the entire west coast of Yemen roughly parallel to the Red Sea from the Gulf of Aden in the south, to and beyond the country's northern border with Saudi Arabia. From the ridgeline, where altitudes in some places exceed 3000m above sea level, the mountains fall away dramatically towards the Red Sea coastline over a short (less than 100km) distance. The region is shown in Figure 3.2, with locations mentioned in the study identified.
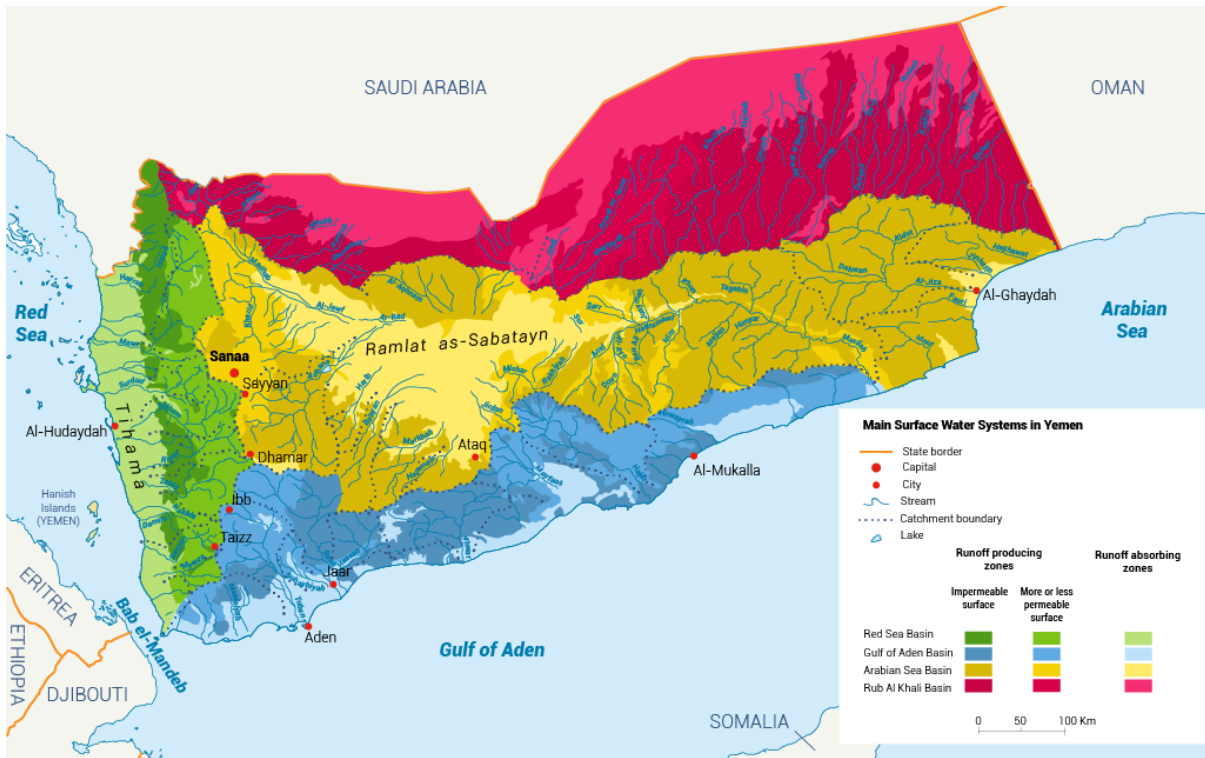
Figure 3.2: Yemen rainfall catchments (adapted from Fanack Water, 2021) [Note: borders as depicted do not imply political endorsement]

Several major Yemeni cities are situated high in the Sarawat, including Sana'a, the country's largest with an estimated population of 3.52 million people (UN OCHA, 2019). The city's rainfall drains eastward to the Arabian Sea, while that of Yemen's second largest municipality, Ta'iz, falls within the west-draining Red Sea catchment. The major city of Ibb straddles the watershed boundary between the Red Sea catchment and that which drains south to the Gulf of Aden.

Yemen's desert soil is predominantly very sandy, and as a result the country has almost no rivers that consistently flow above ground. Instead, most rainfall seeps through the pervious sandy surface where it collects and flows through vast underground aquifers. In the absence of surface water, approximately 70% of the country's water supplies for domestic, agricultural and industrial use is extracted from below the ground using wells or boreholes (World Bank, 2018). Since the 1970s, increased accessibility to mechanical pumping alongside expanded oil drilling has meant that water is mechanically extracted in much higher quantities and from far greater depths than ever before. Until the 1970s, the water table in Sana'a Governorate was only 30m below the ground surface. However, unregulated groundwater extraction from bores now hundreds of meters deep has contributed to continued drop in the water table without replenishment at an estimated rate of approximately 6m per year (UN OCHA, 2012; Ward, 2014; World Bank, 2014). Unchecked

extraction of groundwater resources is frequently cited among Yemen's most prominent water challenges (Al-Hamdi, 2021; Haidera et al., 2011; Herzberg, 2019; Taher, 2016).

Of all water resources consumed in Yemen, agriculture accounts for approximately 93% (Ward, 2014; World Bank, 2018). Around a third of this is used for irrigated cultivation of the qat plant, the leaves of which are chewed socially and are valued for their mild stimulant effect. A lucrative cash-crop due to high demand and fast growth, the production of qat accounts for approximately 38% of irrigated land area in Yemen (McCracken, 2012; World Bank, 2014).

Water resources in Yemen are regulated under national law No. 33/2002 amended by No. 41/2006 which stipulate responsibilities for the provision of services; the regulatory framework for water extraction licencing; and water conservation (Law No. 33 / 2002 (on Water) (Yem.), 2002; Law No. 41 / 2006 Amending Law No. 33 / 2002 (on Water) (Yem.), 2006). While the Ministry of Water and Environment presides over policy, public water services are operated by provincial-level water boards, with separate utilities operating urban and rural infrastructure. At the local level, particularly in rural settings, water user committees oversee village water extraction and distribution, often sourced from private wells. However, the State's limited ability to enforce water regulation is frequently cited as problematic for effective water governance (Glass, 2010; Herzberg, 2019; Odhiambo, 2017; Taher, 2016; Weiss, 2015). Al-Mowafak (2021) writes that water (and land) in Yemen 'are closely associated with identity', and that tensions over water use emerge 'between tribes, between large landowners and small farmers, between urban and rural communities, and between domestic and agricultural uses'. Rapid population growth and increasing urbanisation strain resources and infrastructure and contribute to competition for scarce water (Glass, 2010; Haidera et al., 2011; Odhiambo, 2017; Taher, 2016).

Much of Yemen is highly disputed territory. The majority of the Jibal as-Sarawat region is located in what was formerly North Yemen, with the former Republic of Yemen to the south. Though the former states are now unified, secessionist movements that have ebbed and flowed in strength and prominence over several decades are intimately interwoven with national politics not simply bound by geography (Fawcett, 2016). Furthermore, a deeply embedded tribal culture heavily influences social and political allegiances among the population (Phillips, 2011). In September 2014, the political and armed movement Ansar Allah, popularly known as 'the Houthis', overthrew the UN-recognised Central Government in Sana'a (Day, 2020). While this battle for control of territory and governance is commonly oversimplified as a sectarian conflict, the Houthis came to power riding a wave of popular discontent against the Central Government when a sudden reduction in fuel subsidies requested by the International Monetary Fund sent massive economic

shocks through the country in 2014. Still, allegiances with regional allies that fall broadly along Sunni-Shia sectarian lines has led many to view the war raging in Yemen since 2015 as a proxy battle for regional hegemony between Saudi Arabia and Iran, respectively, along with regional their allies (Day, 2020; Fawcett, 2016; Phillips, 2011).

As a result of the internal grappling for military and political power, Yemen at the time of the interviews for this study unofficially operated under a multi-government system. In the early stages of the study, the Central Government as recognised by the UN was operating in exile from Cairo, later moving to the southern Yemeni city of Aden. Through both periods, the Houthi movement operated mirror ministries in Sana'a. For some portfolios, including the Ministry of Water and Environment, the dual government structures were straddled by a single minister with the support of both the Central and Houthi administrations. In 2021, Yemen was listed 162nd of 163 countries measured by the GPI (Institute for Economics and Peace, 2021).

It should be noted that the Jibal as-Sarawat region is not itself a single water basin, but rather incorporates the headwaters of four different catchments. Technically, most participant accounts in this study refer to the Red Sea Basin. However, Jibal as-Sarawat is herein referred to as a 'basin context' to maintain participant anonymity and account for hydro-geographical ambiguity in participant descriptions.

3.4.2   Participant recruitment

Participants were recruited according to the principles of purposive sampling discussed in section 3.3.5. In this study, the sampling 'purpose' is guided by the research question which, recalling Chapter 1, enquires as to the lived experience of people facing water scarcity conflict and how it might be transformed.

Idiographic in its enquiry into the perspectives of individuals, the research question called for a participant selection framework that was not built on the state-centric narrative 'of power and conflict rooted in Thucydides, Hobbes and Machiavelli', on which hydropolitics is heavily based (Avruch, 2013, p. 40). Pointing to the dilemma of analysing conflict-divided societies around the world, Lederach (1997, p. xvi) introduces a modest thesis: 'that the nature and characteristics of contemporary conflict suggest the need for a set of concepts and approaches that go beyond traditional statist diplomacy'. Instead, a non-state-centric consideration of conflict reveals a picture of power that 'may be far more diffuse and fractionated', presenting in differing forms within the population (Lederach, 1997). When power is no longer seen solely as the domain of states and

their leaders, hydropolitical actors, from the top levels of societal influence to the grassroots, can be seen to 'interact on different "chessboards" in horizontal, vertical and diagonal interactions' (Hanasz, 2013). Lederach (1997, p. 39) captures the diffusion of power and roles played by people in divided societies in his 'conflict-affected population pyramid', depicted in Figure 3.3.
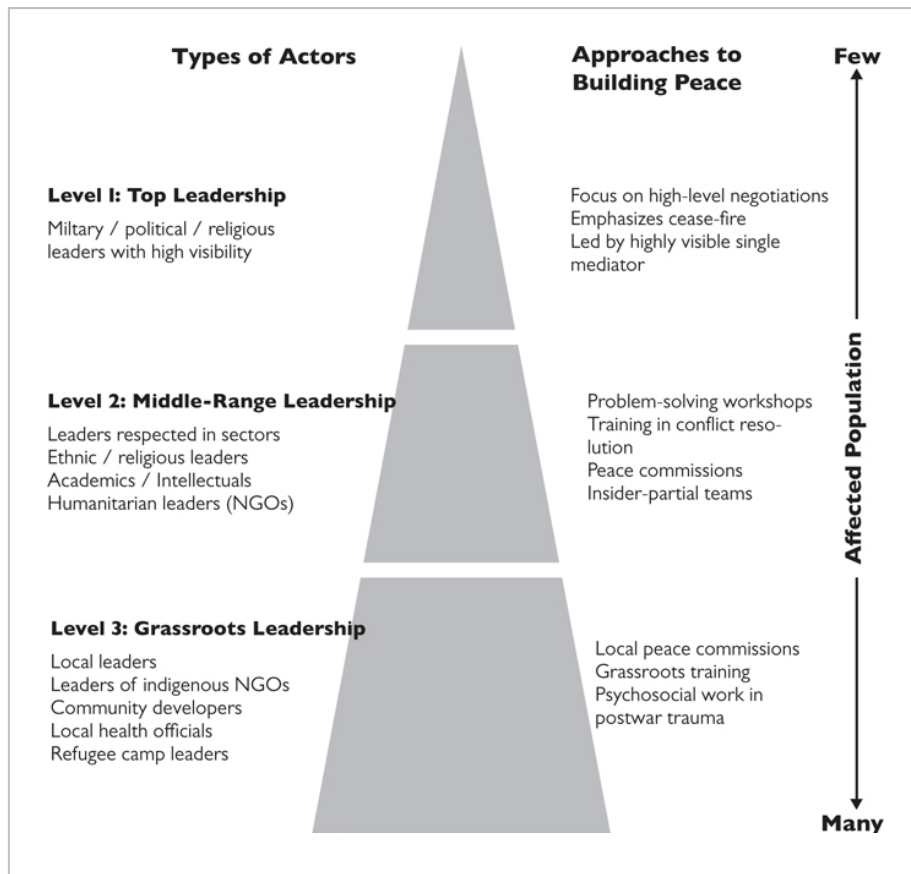
Figure 3.3: Conflict-affected population pyramid (Lederach, 1997, p. 39)

Lederach's pyramid offered an effective framework for the design of purposive sample that met the needs of this study. Participants were selected to mirror the pyramid's simplified distribution of conflict actors in a community, which offered both an effective purposive structure as well as the flexibility of sample size and scope needed for the research of active conflict. This choice of framework was also well suited to IPA, with a target sample size of between 15-20 people per context being both large enough to capture a broad range of perspectives, while small enough to engage in a suitable depth of analysis.

The apex of the pyramid represents top decision makers and influencers—usually key political and military leaders in an intrastate conflict—but also the smallest group in number: often only a handful of actors. People in this group also have high public visibility, are under enormous pressure from both adversaries and their constituencies, and are often 'locked into positions' in conflict

situations, which can ham(R. Fisher & Ury, 2011; Lederach, 1997, p. 40)ry, 2011; Lederach, 1997, p. 40).

In recruitment for the high-influence group for this study, the range of potential participants was limited to the small number of people occupying positions of high office with policy decision-making or implementation responsibilities. For example, there is typically a single minister responsible for water in a given jurisdiction, or one head of a relevant government department. In such cases, specific participants were invited to interview based on their role. In accordance with approval from the Human Research Ethics Committee (HREC) (see section 3.4.7), participants in this category were invited by email to participate, knowing that their personalised invitation was due to their leadership role in addressing water scarcity.

The middle layer of Lederach's pyramid represents people in middle-range leadership, though not necessarily connected to top level authority positions. Such roles might include highly respected community figures or occupants of sector or industrial leadership positions; individuals prominent in large institutions or networks; identity-based leaders, such as people well known among ethnic or regional groups; or prestige, such as those widely recognised for authorship or achievement. Middle-level actors are far more numerous than top-level leaders, well networked and connected to influential people across the conflict.

A greater variety and choice of potential participants was available for purposive sampling in the mid-level influence group. Often, these participants were leaders of a given influential organisation or community, of which there may be only one person. However, the breadth of appropriate organisations at the mid-level was far greater than for the high-level influence group. Participants in this category were invited by email, LinkedIn, and via intermediary contacts using a generalised letter of invitation approved by the HREC.

The pyramid's base then reflects grassroots leadership among the masses. Proportionally, this category represents by far the greatest number of people and is characterised by those who know intimately the everyday conditions that the majority of the population live through. The grassroots are often a microcosm of the bigger picture, with identity lines splitting local communities. Unlike those at the top of the pyramid, the grassroots witness first-hand the harshest daily challenges of conflict (Lederach, 1997).

The grassroots level offered the broadest scope of potential participants. In this category, anyone could participate so long as they were impacted by water scarcity conflict in their day-to-day lives. Effort was made to recruit a range of participants that offered diversity in their relationship to

water scarcity. For this purpose, participants were recruited largely based on researcher access more than their societal role or level of influence. Grassroots participants were recruited through a mixture of emails, phone calls, and word-of-mouth, though in each instance provided with the HREC-approved letter of invitation at first possibility.

A total of 17 participants from Australia's Murray-Darling/Barka Basin were interviewed for the study, including 5 high-level group, 6 mid-range and 6 grassroots participants. Where participants requested anonymity they have been de-identified and listed under a pseudonym with potentially identifying demographic information generalised. The table provides basic demographic data for each participant along with a code associated with their water sharing context and social influence category that is used to identify them in the data analysis: H-Aus, M-Aus and G-Aus.

Table 3.1: List of study participants - Murray-Darling/Barka Basin, Australia

Name	Role	Location	Gender	Age
High-level influence (H-Aus.)				
Mr Ruben Kelly *	Director of government department	Adelaide, SA	M	45-55
Senator Sarah Hanson-Young	Federal senator for South Australia	Adelaide, SA	F	35-45
Mr Phillip Glyde	CEO, Murray-Darling Basin Authority	Canberra, ACT	M	55-65
Mr James Murphey *	Director of government department	NSW	M	45-55
Mr Roy Butler MP	State member for Barwon	Broken Hill, NSW	M	45-55
Mid-range influence (M-Aus.)				
Cr Craig Davies	Mayor, Narromine Shire Council	Narromine, NSW	M	55-65
Mr Rene Woods	Chair, Murray Lower-Darling Indigenous Nations	Hay, NSW	M	35-45
Hon. Kim McLaughlan MP *	Former prominent minister; industry leader	Adelaide, SA	M	55-65
Mr Mark Hall *	Industry leader	Adelaide, SA	M	45-55
Mr Linton Besser	Reporter, ABC '4 Corners'	Sydney, NSW	M	
Hon. Karlene Maywald MP	Former SA water minister; Chair, ICEWaRM	Adelaide, SA	F	55-65
Grassroots influence (G-Aus.)				
Mr Glen Whittaker	Irrigator	Warren, NSW	M	
Mr Robert Collins	Irrigator	Hillston, NSW	M	55-65
Mr Theo Conti *	Dairy farmer	Jervois, SA	M	45-55
Mr Archer Taylor *	Activist	Canberra, ACT	M	45-55
Mr Clancy Lee *	Small business owner	Murray Bridge, SA	M	45-55
Cr Karlene Irving	Councillor; teacher; lands council researcher	Warren, NSW	F	45-55
* Pseudonym Male/Female ratio: 14/3 [19]				

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[19] See Section 3.4.7 for discussion on the limitations of the research in relation to gender imbalance and professional representation, and Section 8.6 regarding opportunities for further research alternative approaches.

A total of 18 participants from Yemen's Jibal as-Sarawat were interviewed for the study, including 3 high-level, 6 mid-level and 9 grassroots participants. Where participants requested anonymity they have been de-identifiedand listed under a pseudonym with potentially identifying demographic information generalised. The table provides basic demographic data for each participant along with a code associated with their basin context and social influence category that is used to identify them in the data analysis: H-Yem, M-Yem and G-Yem.

Table 3.2: List of study participants - Sarawat Mountains, Yemen

Name	Role	Location	Gender	Age
High-level influence (H-Yem.)				
Moh. Saleem Nader *	Government minister	Cairo	M	45-55
Mr Abdullah Al Saif *	Director of government department	Ibb	M	35-45
Ms Tawakkol Karman	Journalist; politician; Nobel Peace Prize Laureate 2012	Sana'a	F	35-45
Mid-range influence (M-Yem.)				
Mr Khaled Abadi *	Government advisor	Ta'iz	M	-
Mr Saad Al Najar *	News reporter, state media	Ta'iz	M	-
Moh. Haitham Hadid *	Water sector leader with prominent international organisation	Sana'a	M	25-35
Mr Omar Ghanem *	Reporter; social influencer	Ta'iz	M	18-25
Mr Rami Al Hassan *	Government advisor	Ibb	M	35-45
Ms Noor Fakhoury *	Chairperson, Yemeni water NGO	Cairo	F	35-45
Grassroots influence (G-Yem.)				
Mr Sami Bashar *	Water utilities worker	Tai'z	M	25-35
Moh. Rafiq Al Shadi *	Former infrastructure engineer	Ta'iz	M	-
Ms Lina Alawadi *	Housekeeper	Ta'iz	F	-
Mr Farid Malik *	Water truck driver	Ta'iz	M	25-35
Mr Raja Ahmed *	Drinking water station owner	Ta'iz	M	-
Mr Eli Assaf *	Youth activist	Ibb	M	25-35
Moh. Hosam Rashid *	Humanitarian aid worker	Sana'a	M	-
Mr Sultan Faysal *	Restaurant owner & student	Ta'iz	M	18-25
Mr Mazen Farraj *	Farmer	Ta'iz	M	25-35
* Pseudonym Male/Female ratio: 15/3 [19]				

As with any simplified model, the use of Lederach's conflict actors pyramid comes with related limitations, and its confines as a model carry over into the research design built on it. As Hamad (n.d., p. 23) rightly critiques, the two-dimensionality of the conflict actors pyramid fails to acknowledge that 'individuals always fulfill multiple functions in their social systems. … One is never only a top leader or only a grassroots actor.' This is reflected in the research design, whereby a participant selected for a representative leadership role may also have deeply rooted connections

and carry out a significant function in their local community. A single categorisation is likewise problematic in describing roles that change over time, and while the focus on present-tense data in this study counters that limitation, it nonetheless warrants close attention. These multiple dimensions that exist in reality but are not reflected in the simplified model can significantly affect people's degrees of freedom or encumbrance in terms of action, voice and association in situations of conflict (Lederach, 1997, pp. 41–42).

3.4.3   Data collection: semi-structured interviews

IPA typically employs semi-structured interviews as the preferred mechanism of data collection. Considering the need to record rich, personal perspectives of water scarcity experience from participants, this method of data collection was ideal for the requirements of this study. As J.A. Smith et al. (2009, p. 58) discuss,

> One-to-one interviews are easily managed, allowing a rapport to be developed and giving participants the space to think, speak and be heard. They are therefore well-suited to in-depth and personal discussion.

Also offering the opportunity for interpretation of body language and to an extent participant context, semi-structured interviews thus reflect a relationship between researcher and participant that is both 'it is empathic and questioning' (J. A. Smith et al., 2009, p. 37). The semi-structured interview is thus an attempt 'to understand, both in the sense of 'trying to see what it is like for someone' and in the sense of 'analysing, illuminating, and making sense of something' (p. 37).

In conducting the interviews, consideration was given to physical and cultural proximity. From a theoretical perspective, Creswell (2007, p. 18) highlights the epistemological importance in qualitative study of the researcher getting 'as close as possible to the participants being studied'. Close physical proximity of the researcher, he argues, enriches the narrative conveyed by participants, adding depth of understanding to first-hand information and allowing greater insight into the environment in which participants live and work. Moreover, and from a personal perspective, close researcher proximity shows respect for participants, and can facilitate greater comfort and relatability for interviewees who in some cases may already find a research project difficult to relate to.

Most interviews conducted in Australia were completed face-to-face in a location of the participant's choosing—usually at their place of work or home. Travel restrictions associated with

the COVID-19 pandemic in 2020 made this impossible for the final five interviews, which were instead conducted over online teleconferencing.

For Yemeni participants, a range of mediums was used to conduct the interviews. Travel to Yemen was prohibited by the HREC on account of Yemen being designated 'do not travel' status by the Australian Government due to the prevailing situation of armed conflict and consequent high risk security situation. However, in an effort to lessen the physical and cultural distance between researcher and participant, most interviews were conducted from neighbouring countries in the Middle East, rather than from Australia. Mediums used for this purpose included online teleconferencing, phone calls, and voice messages via WhatsApp, Imo, or Signal.

Interviews lasted for approximately one hour, with participants presented with the approved list of standard questions in advance (as listed in Appendix B with annotations on the reasons for their inclusion). All participants were provided with a participant information statement and were asked to indicate their consent to the interview by signing a consent form (see Appendix B). Yemeni participants were offered these documents in both Arabic and English and were given the option of being interviewed in either language. Four interviews with Yemenis were conducted in English, while the remainder were conducted in Arabic with the use of an interpreter. All interviews with Australian participants were conducted in English.

As required by the HREC, participants were given the option to consent to audio recording of their interview. While most interviews were recorded for later transcription, three participants – one from Australia and two from Yemen – preferred to write their answers. Participants were also given the option of anonymity and confidentiality of their interview responses: just less than half of the Australian participants (7 out of 17) chose this option, while perhaps not unsurprisingly, almost all of the Yemeni participants (17 out of 18) opted for anonymity in their interview responses.

3.4.4   Coding, clustering, and comparison

A process of data coding the interview responses was carried out, broadly guided by the procedure outlined by Creswell (2007), which is itself a simplified modification of the Stevick-Colaizzi-Keen method as described by Moustakas (1994). The coding process also incorporated that put forward by Smith (2009), who focuses on the nuances of IPA as distinct from other subtypes of phenomenology.

First, each recorded interview was transcribed. In the case of interviews conducted in Arabic, the interviews were first transcribed in Arabic before being translated by human effort into English. Ambiguities encountered in the translation process were flagged for closer scrutiny, and where necessary and possible, re-checked with the participant.

Recorded interviews were then played back with transcriptions at hand, facilitating 'close, line-by-line analysis of the experiential claims, concerns, and understandings of each participant' (J. A. Smith et al., 2009, p. 79). For every interview, each discussion point was listed and timestamped by hand, with recurrent themes receiving multiple timestamps. This allowed for the identification of themes that emerged from the perspectives of an individual participant, and patterns between these themes were mapped across their interview. An example of a coded interview from this study is given in Appendix C.

Once all interviews had been coded, the emergent themes were then grouped into clusters of similarity. These clusters reflected super-ordinate or 'parent' topics under which the many sub-ordinate themes fell. The emergent themes, grouped into clusters, were then organised in a table, yielding a holistic data structure (Creswell, 2007; J. A. Smith et al., 2009). An example of this table is shown in Appendix D.

The process of clustering emergent themes was repeated for each social influence level in Lederach's conflict-affected population pyramid for both the Australian and Yemeni contexts. Thus, a total of six distinct data categories was produced, as illustrated in Figure 3.4.
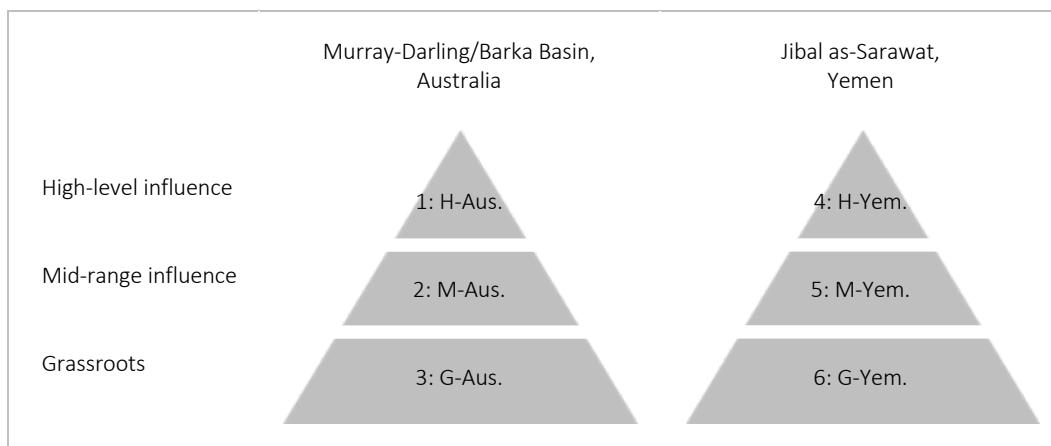
Figure 3.4: Data categories

Using these delineated categories, the perspectives of participants were able to be compared across communities and contexts, as a basis for the data analysis presented in Chapters 4-6.

In comparing participant perspectives, emphasis was placed on convergence and divergence, commonality and nuance (J. A. Smith et al., 2009). Considering the research question alongside the theoretical differences of convergent and divergent comparison outlined in section 3.3.4, particular focus was placed on patterns that showed:

- Divergence within an otherwise similar group, which was particularly useful for illuminating areas of disagreement and conflict within a community despite the shared characteristics that led them to be grouped together;

- Convergence across different influence categories within a common country context, highlighting perspectives that transcend level of social influence;

- Convergence between influence categories across different country-contexts, identifying perspectives which are shared despite significant differences between country-contexts.

Comparisons were not actively interrogated across categories that differed in both influence level and country-context, since this would have introduced too many variables to make valid comparisons.

3.4.5   Reflexivity

As the discussion of hermeneutics in section 3.3.3 introduced, reflexivity refers to the 'explicit consideration of specific ways in which it is likely that the study was influenced by the researcher' (Yardley, 2008, p. 250). It is a process to proactively account for researcher subjectivity, in which the researcher's 'epistemological, ontological and theoretical assumptions as well as other personal, interpersonal, emotional, institutional and pragmatic influences' are acknowledged and addressed, rather than a 'positivistic model of the absent or neutral researcher' (Mauthner & Doucet, 2003, pp. 414–415).

Where some qualitative methodologies suggest a process of 'bracketing', in which the researcher aims to remove themselves from the research, IPA instead seeks to acknowledge that researcher interpretation is an inherent part of the analysis. It is thus important to reflect on and acknowledge researcher assumptions and areas of predisposition, not to remove these effects from the research but rather to reduce bias by making explicit the ways in which researcher subjectivity will inevitably influence the analysis. For this purpose, I will reflect in the first person.

Early in the research process, before I had settled on IPA as the chosen methodology, I made a novice attempt at 'bracketing', which was later developed for reflexivity purposes. One excerpt included a reflection on my close personal affiliation with life in the Murray-Darling/Barka:

I grew up in the small cotton farming and sheep grazing town of Warren, on the Macquarie River in rural NSW. I am not from a farming family, as my parents were both public servants and thus not directly reliant on the river for income. I was heavily exposed to life in a water-dependent community over my childhood years, though this was largely by immersion rather than direct economic dependence. Warren is located on Wiradjuri Country, and I consider myself very fortunate to have grown up alongside many friends from Aboriginal backgrounds. No doubt these experiences influenced my perceptions of water scarcity, though they are so engrained that I'm sure I don't even recognise the full extent.

I kept records of personal reflections, both written and spoken, throughout the interview process. One such reflection centred on my own upbringing in the mid-Murray-Darling/Barka, as I returned to my hometown for research after years away:

It's so strange coming to Warren after not having been back in a long time. My sense of scale has completely changed. The town is so much smaller than I used to think of it. This is a bad [rainfall] year so I'm sure it's better after some rain, but it's so quiet – there's just nothing happening! The town is more dependent on the river than I think I realised even when I lived here.

Indeed, I made many such comments over the course of the research, often reflecting on my 'moving between worlds', as much of my adult life experience has been geographically, educationally, vocationally, and culturally dispersed. Despite my own feelings of affiliation with the Murray-Darling/Barka context I grew up in, at the same time it almost seems foreign. This was summarised in an email from a contact at the Warren Rotary Club, after telling him about an upcoming presentation of my study results at the 2021 World Water Week conference:

It's a "strange" world? You move in a circle which is quite alien to Warren. World Water Week – I wouldn't think there would be a person here who would even consider such an event occurring.

So too I reflected on my relatively sheltered experience of water scarcity while working for the International Committee of the Red Cross (ICRC) in Yemen:

The security situation means that, even though I live here, I don't have to deal with the situation outside the same way others do. We (mostly) have electricity and water. Which is a strange thing, because I know from my work how challenging it can be to access those things, while then coming home and not really having to deal with them – at least to the same level.

In both contexts, I worry that I am too much of an outsider. In the Australian context, my concern is that I have moved too far away from my roots to relate, and that I may have forgotten the realities of life there or projected my since-learnt understandings of the world onto that environment inappropriately. Or conversely in the Yemen context, that despite my having lived

there for a significant time, my understanding of the context is too sheltered and claims of understanding are disingenuous. This feeling of spreading myself too thin extended to vocation:

> *It's interesting to think back on my crossover between engineering and arts. I think back on the one so-called 'philosophy' subject that was compulsory in my engineering degree, and how it really just highlights the extent to which engineers are not trained in social impact, despite having a massive influence on water outcomes and public policy more generally.*

Certainly, in both instances there is some validity to my concerns. However, a comment made by my one of my early supervisors at the University of East Anglia reminded me that, while my understanding of either context may not be as deep as I might like, my exposure to both nonetheless brings significant benefit:

> *Don't underestimate how valuable your on-the-ground experience will be to your academic studies. It's rare to have both.*

With that in mind, I continue the analysis building on what I do know of both contexts and a willingness for my own understandings to be challenged and expanded.

Beyond the specifics of the contexts, I also recognise that I bring to the research values, philosophies and life experiences that are relevant to the topic at hand. When I write about my value system, it is clear to me that I come from a standpoint that advocates nonviolence. It is clear that this is built upon my upbringing in a faith-centred family, and has developed from what was in my youth a more mainstream Christianity into a far more socially and liberation-orientated understanding of this part of my heritage. This includes but is not limited to placing personal importance on restorative justice, reconciliation, and a strong though not always well-directed desire to rebuild damaged relationships, as well as an uncomfortable relationship with anger, hate, and violence. It is abundantly clear to me that I do not wish to impose my beliefs on anyone else, and I am open to and enjoy learning and expanding my world view with new perspectives, recognising that I have already developed and changed so much in this space – I am likely to develop and change a whole lot more.

I do not pretend to be neutral in my politics or opinions, but my decade working for a strictly neutral organisation in contexts of armed conflict and human crises has taught me much about what it means to *deal with* conflict situations neutrally. Then, I have also put energy into social cause advocacy which was anything but neutral. Suffice to say, I have come to learn that 'neutrality' is itself a political position and, like other political positions, is chosen to achieve a particular outcome. This undoubtedly reflects my personal understandings of agency, and a learnt

understanding of values, including how pain and work are required to live a value-led life – something that I had previously thought was more inherent or personality driven.

These reflections are offered for the purpose of giving greater context to the interpretive analysis that follows in Chapters 4 to 6. As such, this reflexivity is incorporated into the study alongside the following further validity strategies.

3.4.6   Validity strategies

A focus on enhancing the validity of the research was essential to demonstrate its value beyond simply reporting on interviews. This study employed published criteria and accepted standards for quality assurance in qualitative research—particularly those put forward by Yardley (2000, 2008) and further adapted by J.A. Smith et al. (2009), as well as Yin (1989) and Silverman (2009). Broadly, the validity criteria used herein are built around Yardley's (2000, pp. 180–183) four key principles for assessing the quality of qualitative research: sensitivity to context; commitment and rigour; transparency and coherence; and impact and importance. While the latter is addressed throughout the research design, specific strategies used to enhance the validity of the data collection, analysis and presentation are outlined below.

Contextual sensitivity

J.A. Smith et al. (2009) recommends the use of gatekeepers to guide the researcher on sensitivity towards unfamiliar contexts. In addition to helping a researcher navigate cultural, linguistic, and social barriers, a gatekeeper can help with the recruitment of purposive samples in an IPA study. Such participants who hold or share a particular lived experience can be difficult to access, and a gatekeeper who brings networks, rapport, and local knowledge 'may well be central to the very viability of an IPA project from the outset' (J. A. Smith et al., 2009, p. 180).

Such centrality was true of this study, particularly for the Yemen component, which would not have been possible without gatekeeper figures. Over the course of this study, three Yemeni gatekeepers were employed at various times to help navigate the challenges faced in organising and conducting interviews in Yemen, particularly as it faced war. Two were former colleagues of mine from the cities of Sana'a and Ta'iz, one of whom was particularly well networked in the Yemeni water sector. At the time of the interviews, neither person still worked in the roles in which I had originally met them, and thus presented no conflict of interest between the research space and humanitarian assistance. Both women, they were able to facilitate interviews with female participants who would have been otherwise inaccessible to a male researcher, and I was able to

draw on their extensive networks as well as their deep knowledge of the context. The third gatekeeper was an acquaintance of mine from earlier academic circles who was well-connected in the Yemeni government structures, including the water and environmental departments. He was able to introduce me to participants occupying both Central and Houthi governmental positions, as well as brief me on the complexities of Yemeni politics and governance structures.

Beyond the interview process, sensitivity to context also extended to the analysis of data. In this study, effort was made to enrich the recorded data by presenting background and commentary to participants and their quotes, rather than using excerpts devoid of context. Quotes are presented verbatim, with contextual editing placed in parentheses to distinguish it from verbatim narrative. Additional explanation of the environment in which quotes were recorded is also offered to situate the participants' perspectives in their original context. Moreover, I have erred on the side of presenting longer quotes where doing so functions to contextualise the perspective without becoming superfluous.

Contains coarse language

It is in the same vein of verbatim quoting for validity that the data presented in this study is not censored for offensive content. Interviews conducted about and amidst conflict are often highly emotional exchanges, and several participants used language in their interviews that may be considered offensive to the reader. In the interest of conveying the data as accurately as possible, it was decided that participants' perspectives should wherever possible be conveyed in their own words, capturing the uncompromised context and sentiment that gives fuller, richer meaning to their words. As Alda and Brown (2020) state on understanding people's experiences and views on life:

> You have to understand that how they see the world is as true and real as how you see the world. It's not like 'wow, their view of the world is broken' – no – their view of the world is different. Part of empathy is not shoving other people's stories in front of your lens. Listen to what that story meant to them. If you tell me a story … [and I dismiss it], I'm not hearing what it meant to you.

I hereby offer a warning to the reader of potentially affronting content in verbatim quotations and ask that it is read in the spirit of presenting data accurately, rather than as offensive flippancy. The same is true of remarks that may rightly be considered sexist or racist. May the data not serve to perpetuate discrimination, but instead illuminate the need to address it.

Grammatical tense and aspect in quoting interviews

The richness of qualitative IPA data is increased by close attention to nuance in language, as a person can convey a lot of information about their perspectives in subtle ways, including tone and non-verbal communication. Likewise, close attention to tense and aspect in a participant's choice of language can offer significant insight into their experience (J. A. Smith, 2004, pp. 44–45).[20]

As demanded by the research question, a notable factor in the choice of IPA as a methodology was its usefulness in describing what participants are thinking and feeling *in the midst* of conflict, rather than only with the benefit of hindsight. Yet, as a thesis is of course written *after* the data is collected, this poses a linguistic challenge: how to put forward present tense data that was collected in the past. To overcome this, mixed tense is used in the presentation of data, with the benefits of data richness deemed to outweigh the need for grammatical purism. Thus, I request the reader to approach the data presented herein in the knowledge that its form was specifically chosen to best convey the participants' experiences.

Coherence and presentation of data

The formatting and styles used for data presentation in this study were chosen for the intentional purpose of increasing coherency. Smith, Jarman and Osborne (1999, p. 227) emphasise that 'Good qualitative work clearly distinguishes between what the respondent said and the analyst's interpretation or account of it.' American Psychological Association (APA) style guidelines suggest that quotations, including those of research participants, should be presented in quotation marks within the text when less than 40 words in length; or in an indented block quotation when greater than 40 words (American Psychological Association, 2020). However, considering the large quantity of both participants and quotations, I took the approach of presenting all participant quotations of a sentence or more in an indented block quotation. This departure from APA style

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[20] In his discussion of levels of IPA analysis, Smith (2004, pp. 44–45) presents a fine example of a woman, Linda, discussing her experience of chronic back pain in relation to her sisters:

> *I just think I'm the fittest because there are three girls and I'm the middle one and I thought well I'm the fittest and I used to work like a horse and I thought I was the strongest and then all of a sudden it's just been cut down and I can't do half of what I used to do.*

Reporting this piece of data in the grammatically comfortable past tense would succeed in gaining important insights into the woman's self-identity and her values around hard work: Linda felt she was the fittest, and felt she worked like a horse. However, Smith argues there is a deeper level of analysis possible. By quoting verbatim, the researcher illuminates even deeper meaning in Linda's words. She begins in the simple present form: 'I just *think I'm* the fittest'; moves to simple and perfect past: 'I *thought*', 'I *used to*', 'I *was*'; then to present perfect: '*it's just been cut down*'; and back to simple present: 'I *can't do*'. Her use of tense and aspect convey a degree of inner conflict as she grapples with the loss and change.

norms is an intentional effort to emphasise the distinction between participant perspectives and researcher interpretation, strengthening reflexivity by being clear what is my own interpretation.

Rigorous use of quotes

For a subordinate theme to be included in the analysis of results presented herein, at least two quotes from a homogenous category of participants (as defined in section 0) were required to have been observed in participant interviews. This minimum provided both a basis for what to include, as well as a framework for addressing 'deviant quoting'. That is, where an emergent theme has been included on an established basis, a footing on which that theme can be contrasted with alternative, divergent perspective is also provided. Having a framework for handling both emergent themes and deviant quoting in the analysis adds depth, as well as necessary critique, to the analysis by avoiding cherry-picking and demonstrating inconsistency in perspectives (Creswell, 2007; Silverman, 2009; Yardley, 2008). It could be argued that, according to the pyramid-like sample distribution across influence categories, the higher number of participants in the grassroots categories are more likely to produce related quotes. However, this is countered by the fact that participants from the lower influence categories come from a broader spectrum of society, and have far fewer constraints on the positions they take on a given conflict matter (R. Fisher & Ury, 2011; Lederach, 1997).

A further challenge of using IPA was the need to balance the dominance of quotes from participants who were verbose in their responses and as a result provided plenty of data, with participants who were more reserved in their perspectives and thus offered less narrative. By nature of the IPA coding process, participants who spoke about a wider range of topics generated more potential emergent themes. Thus, even-handedness and attention to perspective weighting was a necessary component of the analysis. This challenge includes a significant structural component, in that the prominence of voice in interviews is affected by pre-existing social inequalities, such as race, gender and educational disparity among others. Rather than intervening in the IPA process to counter-weight under-represented voices, which may have furthered the problem of misrepresenting existing power balances, the frequency and possible dominance of louder – or rather, more vocal – voices in the study was tabulated to give an indication of their weighting. This tabulation is given in Appendix E and serves to make visible any dominance by or weighting afforded to particular participants (Silverman, 2009). Whether imbalance is the result of existing social structures, or inequalities born of or perpetuated by the research design, presenting these in tabulated form is a simple way of spotlighting areas of power disparity that the reader may choose to take into account.

Participant feedback

Participants were given the option of reviewing transcripts and extracted quotes to ensure the accuracy. Three Australian participants and one Yemeni participant took up this opportunity, each approving the written record of their interview for inclusion in the study.

Auditability

Arguably one of the most significant strategies to ensure transparency of the study is the ability, potential or real, of another researcher to back-interrogate the research process. This entails filing all data in a way that would allow an independent investigator to retrace the chain of evidence, from the end results backwards through the clustering and coding processes, through the transcriptions and interviews, to construction of the research question and even the research proposal (Yin, 1989). Likewise, J.A. Smith et al. (2009, p. 183) assert that this is a 'powerful way of thinking about validity in qualitative research'. For that purpose, this study was designed to be auditable, with clustering, coding, transcripts, participant recruitment, annotated interview schedule, ethics approval, research question development, and the original project proposal all designed to be backwards-interrogable.[21]

3.4.7 Ethical considerations and limitations

The research design included significant ethical considerations and underwent a formal process of approval by the University of Sydney Human Research Ethics Committee (HREC).[22] The ethical review process made explicit the ways in which the research would assure participant welfare, cultural sensitivity, and researcher safety.

As someone of white European descent, I was conscious that my identity could ethically compromise study components that entailed my interviewing of First Nations People in Australia. At the time of my ethics application to the HREC, the University of Sydney did not have a First Nations advisory body to consult on ethical research design. In lieu of this, I drew upon my ethics submission from an earlier project with the Jumbunna Indigenous House of Learning at the University of Technology, Sydney. This earlier process had illuminated the significant colonial legacy that I may carry to research with First Nations People in Australia simply by the nature of

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[21] Data filed for this purpose remains anonymised in accordance with participants' wishes and remains subject to the University of Sydney guidelines for storage of electronic data as approved by the HREC.
[22] Letter of approval from the HREC is included in Appendix A.

my ethnicity. It was important to me that my research not be exploitative in the extraction of information, given the power imbalance embedded in the colonial history of European settlement of Australia. In an effort to limit the problematic effects of this, I also sought the advice of three First Nations academics and attended training with the Aboriginal and Torres Strait Islander Data Archive (ATSIDA). The research was designed with the assistance of Australian Institute of Aboriginal and Torres Strait Islander Studies (AIATSIS) and its Guidelines for Ethical Research in Australian Indigenous Studies (GERAIS).

In Yemen, many of my contacts in the water industry had previously been made through my prior work there in a humanitarian assistance capacity. This was identified as a potential conflict of interest, with a risk of being perceived as information extraction in return for assistance transaction. To counter this, I did not conduct any interviews while being simultaneously employed in a humanitarian assistance capacity. In instances where a contact or interviewee may have known me in that capacity, the separation of research and assistance was made explicit. Research conducted from Jordan was in accordance with the research requirements of the Prime Minister's Council of Jordan.

All collected data was treated as re-identifiable under the University of Sydney's guidelines for data collection. This meant that, unless participants had expressly given consent for being identified in research output, names were replaced with codes and pseudonyms in recordings and transcripts to protect individuals' privacy and confidentiality. As some participants were selected due to their position of social influence, data was re-identifiable only to the primary researcher to facilitate the accurate analysis of emergent themes relative to others' categories, as described in section 0. All recorded data was digitised, password-protected and stored as per the University of Sydney guidelines for data storage. Participants each gave written or recorded verbal consent and were given the option of withdrawing from the interview at any time with no adverse consequences. The Participant Information Statement and Consent Form are found in Appendix A.

To make the most of IPA, it is important to recognise its limits. Acknowledgment of what cannot be achieved from the research process both strengthens the validity of the study and illuminates opportunities for further research.

As discussed, the sampling regime of IPA is such that, while it does not prohibit generalities, the outcomes of this study should not be universally applied to situations of water scarcity conflict. In this study, where further statistically representative studies or information saturation approaches may be beneficial, this is flagged, rather than stretching data analysis beyond the theoretical capabilities of the methodology into unfounded assumptions.

A significant limitation of the study is found in the gender ratio of participants. As mentioned in the previous section, the purposive sampling approach means that, particularly in the high-level influence category, participants available for selection may reflect existing demographical biases. In both basin contexts, this played out especially prominently in a bias towards men as high-level decision makers. In the Murray-Darling/Barka Basin, for example, two of the five state Ministers for Water at the time of enquiry were women, but both declined to be interviewed. In Jibal as-Sarawat, all incumbent ministers in water-related portfolios were men. Likewise, societal norms meant that societal leadership positions more broadly were dominated by men. As such, there are strong arguments for and against efforts to ensure equal or otherwise-proportional representation in participant sampling. On one hand, a sample that closely represents societal gender, age, racial and geo-political demographics may serve to offer voice to those underrepresented in water scarcity decision-making. On the other, it could be argued that to gain an understanding of the conflict dynamics playing out in practice, it is important to capture societal structures as they play out in practice. Therefore, while some demographical information on participants is provided and statistics on quoting are provided in Appendix E, an approach that gives greater voice to underrepresented demographics may offer further insight into the dynamics of water scarcity conflict.

3.5 Chapter Conclusions

This chapter has discussed the methodology and methods used to interrogate and answer the research question. Interpretative phenomenological analysis (IPA) was identified as an appropriate choice of methodology, as it facilitated the inductive, hermeneutic enquiry that the research question demanded. The idiographic nature of IPA also presented as an effective means of studying conflict, since its embedded comparative analysis was seen to be effective for highlighting differences between participants experiencing a common phenomenon such as water scarcity. So too, purposive sampling was identified as an effective approach to identifying participants experiencing conflict, since it is especially effective for identification of difference, rather than for making general claims about a population.

As per the TWINS model of analysis, Murray-Darling/Barka Basin and Jibal as-Sarawat present with contrasting levels of 'cooperation intensity', despite both showing high levels of 'conflict intensity'. On this basis, the two contexts represent an opportunity for dissimilar comparison of highly water-scarce basins that exhibit significantly different social dynamics in response.

Practically, networks and contacts of the researcher made for good levels of accessibility in both contexts, despite significant levels of violence in Yemen at the time of enquiry.

In keeping with the established norms of implementing an IPA study, 35 participants were interviewed across the two basin contexts. Purposive sampling was carried out with reference to Lederach's peacebuilding pyramid, which categorises conflict-fractured societies into three levels of societal influence. In this way, comparison between participants facilitated the identification of points of difference not only between basins, but also between levels of influence vertical divisions within water-sharing societies.

Participants were recruited to take part in semi-structured interviews, that would provide enough similarity in topic nature for comparison while allowing space for individual, contextual interpretation of the questions. Interviews were conducted either face-to-face or by online messaging services, with the option to converse in local language through a translator where necessary and in accordance with ethics approval requirements. Interviews were coded and analysed in accordance with established IPA process of clustering emergent data, firstly into subordinate themes and then into overarching superordinate categories. Validity strategies included reflexivity, contextual sensitivity, rigorous quoting, participant feedback opportunities, and auditability. Finally, the chapter discussed the ethical considerations taken into account, as well as limitations of the study.

Having discussed the foundations of the study, this chapter thus concludes Part I of this thesis. Subsequently, Part II will present the interview data that emerged from the IPA process.

"

Most people have little or nothing to say if you ask them to explain their objectives or philosophy on life, but they brighten at the opportunity to tell personal stories, which then reveal their values.

"

(Shiller, 2020, p. 15)

4 Relationships with water: participant orientation

4.1 Chapter introduction

This chapter presents participants' perspectives on their relationships with water. The views expressed serve to situate participants in relation to the water-scarce context they were experiencing at the time of interview, though the reflections put forth are informed by lifetimes of accumulated experience.

Much of the data presented in this chapter emerged from the first two interview questions, in which participants were first asked to share some of their personal background, and then to reflect on their relationship with water (see Appendix A). These questions established how the participant saw themself fitting and interacting within their water-scarce circumstances, and in doing so identified self-viewed roles, connections, values, and needs as they relate to the prevailing environment. Such orientation gives background and context to their later depictions of conflict, offering a greater ability to 'see beyond the presenting problems towards the deeper patterns of relationship' that contribute to contention (Lederach, 2003, pp. 10–11).

The headings and sub-headings in this chapter are structured to mirror the emerging themes and clusters that the IPA coding process produced. Firstly, section 4.2 delineates conceptualisations of water's essentiality for life, which was raised in some form by all participants. Under this theme, differences emerged between participants as to how they understood critical human water needs, with varied degrees of value placed on physiological, production, and ontological water needs.

Secondly, section 4.3 establishes various ways in which water forms part of participants' self and observed identities. Occupational obligations, social interactions and groupings identified with conflicting needs, and sustainability as ongoing existence emerged as aspects of water scarcity that informed individual and social identities.

Thirdly, the impact of water scarcity on livelihoods and wellbeing is discussed in section 4.4. Here, participants raised difficulties with the impact of water scarcity on employment and broader economic conditions; stress and fatigue from protracted water scarcity; the difficulties of dealing with uncertainty and change; and the impact of these on psycho-social health and individual and community wellbeing.

Conclusions of the chapter are then presented in section 4.5.

4.2   'Water is life': the essentiality of water

Across every participant category in both the Australian and Yemeni contexts, there was acknowledgement among participants that water is in some way essential for life. As well as 'essential', other terms commonly used to convey a similar sentiment included 'critical', 'vital', 'fundamental', 'basis', and 'source'. [23]

Yet despite this common acknowledgement, comparison of participant views revealed that exactly what is meant by critical or viewed as essential water was rarely made explicit and is subject to interpretation. Deeper analysis of the 'water is life' mantra (or comparable sentiments) and its meaning to different participants revealed significant divergence in perspective.

4.2.1   The subjectivity of critical human needs

A concept of water being a satisfier of critical human need in some form or forms was demonstrated by every participant in the study, presenting across all influence categories in both country contexts.

An imperative to satisfy the needs, a lack of clear definition in the term, and the reason for that ambiguity were overarchingly illustrated by Hon. Karlene Maywald MP. A former Minister of Water Security for the South Australian (SA) Government, Ms Maywald (M-Aus.) now chairs multiple influential boards and water policy advisory groups both in Australia and internationally. She discussed the focus that recent severe drought brought to the issue of critical human water needs—a matter not addressed by earlier water sharing agreements in the Murray-Darling:

Ex. 4.1   *For the first time since the Murray Darling Agreement was struck in 1917, we had insufficient water to supply any needs basically. And we had to suspend the Murray Darling Agreement and negotiate between the three states for the sharing of every available gigalitre of water. And for the first time since 1917, we were required to consider critical human needs as the first priority. Prior to [the Millennium Drought] the Murray-Darling Agreement was silent on the matter of critical human needs – it was a water sharing agreement for irrigation, and in the early days navigation purposes. So it didn't even reference critical human needs as a requirement.*

Here, the term 'first priority' to describe critical human needs is significant. In using this term to describe critical human needs, Ms Maywald highlights that there is a preference, in some form, for

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[23] Noting that many Yemeni participants spoke in Arabic, in which case such terms have been translated as per the process outlined in Chapter 3 (Section 3.4).

the order in which needs are attended to. The "Murray-Darling Basin Agreement" to which she refers forms Part 12 Schedule 1 of the Australian Water Act (Water Act 2007 (Cth) No 137 (Austl.)). In section 86A(1), this legislation refers to

> the fact that the Commonwealth and the Basin States have agreed:
>
> (a) that critical human water needs are the highest priority water use for communities who are dependent on Basin water resources; and
>
> (b) in particular that, to give effect to this priority in the River Murray System, conveyance water will receive first priority from the water available in the system.

This legislation is written to reflect the hydrological context of the Murray-Darling/Barka Basin, in which a base level of flow in the river system is hydraulically required for water to pass downstream.[24] Incorporating temporal and spatial considerations into the satisfaction of water needs, the Act makes clear that, in practice, *highest priority* and *first priority* are not the same thing.

While Ms Maywald did not identify in her interview exactly what "critical human needs" are, her references to legislation offer insight here, too. The Act in section 86A(2) specifies that, in the eyes of the law,

> Critical human water needs are the needs for a minimum amount of water, that can only reasonably be provided from Basin water resources, required to meet:
>
> (a) core human consumption requirements in urban and rural areas; and
>
> (b) those non-human consumption requirements that a failure to meet would cause prohibitively high social, economic or national security costs.

Thus, Australian law goes some way towards defining critical human water needs, specifying that they are *consumptive* needs, and specifically states that this extends beyond human physiological uses (Water Act 2007 (Cth) No 137 (Austl.)). The definition bears some similarity to the Watercourses Convention's 'water for drinking water and water required for production of food in order to prevent starvation' (see section 2.7.4) (United Nations, 1997). However, what constitutes 'prohibitively high social, economic or national security costs' in the Act is left undefined leaving significant room for interpretation (Water Act 2007 (Cth) No 137 (Austl.)).

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[24] 'Conveyance water' is defined by Section 86A (4) of the Act as 'water in the River Murray System required to deliver water to meet critical human water needs as far downstream as Wellington in South Australia.'

Ms Maywald drew attention to the subjectivity of critical needs, suggesting that what defines them may differ between people depending on their circumstances. She used a geographical example to illustrate her point, citing differences in perception of water criticality between urban and rural water users:

Ex. 4.2   *There comes a question on 'What is critical human needs?' And you know, the leafy suburbs of Adelaide would have a different view to those people who were being restricted to 2% allocation on their irrigation entitlement.*

In the city of Ta'iz in Yemen's Jibal as-Sarwat, Mr Omar Ghanem (M-Yem.) is a reporter and a prominent social influencer with a significant social media footprint. At the time of interview, Mr Ghanem was engaged as a communications advisor for an international organisation working with water. He reflected on basic human water needs:

Ex. 4.3   *I see that I am less affected than many people in the society, who live on a certain amount of litres of water that is not enough for their minimum requirements and who do not have the financial ability to buy water.*

Translated here as 'live', the Arabic verb Mr Ghanem used, 'عيش' ('*aysh*'), carries a connotation of modesty.[25] Thus, while Mr Ghanem did not say so explicitly, his comment implies that people's 'minimum requirements' for water are more than just what is required to keep people alive.

At the grassroots, Mr Farid Malik (G-Yem.) is a university-educated resident of the southern Yemeni city of Ta'iz who, in order to make ends meet under the circumstances of war in Yemen, is working as a water truck driver. Asked in what way water is part of his life or work, he spoke of water's essentiality for life:

Ex. 4.4   *Water is an essential component of daily life. Life has no value without water.*

Considering Mr Malik's occupation is so closely related to water, it would not have been surprising had he responded in terms of income or livelihood. However, the essentiality of water to his life was amplified by the fact that he instead focused not on the value of water, but on the value of life without it. Using the Arabic word 'قيمة' ('*qima*'), meaning 'value' or 'worth', his comments convey more than just physiological need, though he does not explicitly state what. Like Ms Maywald's, his comments indicate that what constitutes essential water needs is not always clear-cut.

Indeed, differing contextual interpretations of water criticality were offered by other participants, discussed in various terms of physiological need, critical utility for livelihoods, necessity in an

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[25] The term is sometimes used for bread, emphasising a modest subsistence.

existential or ontological sense, and a need for sustainability. Some interviewees stated the nature of water's essentiality explicitly, while others more indirectly alluded to it or offered commentary from which their perspective could be inferred.

4.2.2   I drink therefore I am: physiological water needs

Participants in all influence categories across both country-contexts discussed the essentiality of water in terms of physiological human need for survival. In most instances, though not always, this was presented as the physiological need for drinking water.

Mr Ruben Kelly (H-Aus.) is a high-level public official in the Department of Environment, Water and Natural Resources for the state of South Australia (SA). He is based in Adelaide, the capital of SA near the lower reaches of the Murray-Darling/Barka. While metropolitan Adelaide is not technically within the basin, the city nonetheless draws much of its water supply from within the final 150 km of the nearby Murray River. Discussing new legislation that prioritises drinking water in times of drought, he opined that an imperative to keep people alive trumps other, secondary water needs:

Ex. 4.5   *People have to be able to drink. So that critical human water need is now built in [to the legislation] with triggers with special accounting. If we end up in that [extreme drought] situation again, all rules go out the window and it's human health first and then we'll work out the rest afterwards. But everyone agrees that critical human water needs come first. Whether you're [asking for water for] irrigation or environment, you'll get it after that, but if people are dying because they don't have any water then it's all a moot point.*

Echoing Ms Maywald's comments in excerpt 4.1, Mr Kelly here prioritises "critical human water needs" over other water needs, offering irrigated agriculture and water for the natural environment as examples of secondary priorities.[26] However, where Ms Maywald did not specify what critical water needs are, Mr Kelly was more explicit. Firstly, he clearly refers to drinking water in the above statement as a "critical human water need". He then links drinking water to "human health", strongly implying that health too is considered critical. Mr Kelly's framing of critical water needs does not clash with the legislative framework per se, but the bluntness with which he states "if people are dying" strongly suggests that he is referring to physiological needs more than the social,

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[26] Mr Kelly here refers explicitly to 'irrigation'. This was interpreted at the time of interview as an example of water for agriculture broadly, noting that irrigation in the Murray-Darling/Barka is used for both food and non-food crops. It is foreseeable that Mr Kelly may perceive food-yielding agriculture differently as a critical need, though this is ambiguous.

economic, or national security concerns of the Water Act. Moreover, he suggests that this perspective is universal, claiming that "everyone agrees" with the prioritisation of water for drinking and human health.

Farther upstream, a personal account of drinking water criticality was given by Councillor Karlene Irving (G-Aus.). Cr Irving was interviewed from her family farm near the rural NSW town of Warren, a largely agriculture-dependent community on the Macquarie River in the mid-Murray-Darling/Barka. She is an elected local government representative on the Warren Shire Council and works in the town as a school teacher. Asked about her relationship with water, she emphasised the importance of "good drinking water":

Ex. 4.6　　*During the drought, our water became discoloured and became an orange colour. …*
We didn't worry too much, but it was a bit off-putting for when we had visitors. So
when you have guests come they don't want to drink that. Even though we weren't too
worried. … there was concern about the purity. We have bore water, [but] you can't
drink it - it's too salty. So, yeah, that's my direct relationship with water that's…
drinking it; having good quality. That's how I feel.

The immediacy of physiological drinking needs is evident in Cr Irving's discussion of it as her foremost consideration regarding water. Yet at the same time, the significant deterioration in water quality she experienced during times of severe scarcity was described understatedly as "a bit off-putting". Twice emphasising that "we weren't too worried", her comments subtly conveyed a culture of accepted hardship in her rural context. In effect, she described a clear impending threat to physiological needs, but with an accompanying optimism that the threat could be averted or mitigated, if necessary, albeit suboptimal.

In contrast to their Australian counterparts, Yemeni participants from all influence categories frequently conveyed an unequivocal sense of immediacy to their physiological water needs.

Mr Abdullah Al Saif (H-Yem.) is a provincial government law expert based in a large Sarawat Mountains city. He discussed the effect of water scarcity on physiological needs, though on a point of difference from most participants who discussed this theme, presented physiological need in terms of hygiene, as opposed to drinking water:

Ex. 4.7　　*Water is directly related to hygiene, and less water means worse hygiene for both*
individuals and for families.

Here, Mr Saif's comment while succinct is notable for its lack of hyperbole. Where other participants demonstrated their experience of water scarcity by referring to a potentially life-threatening shortage of drinking water, Mr Al Saif's focus on hygiene emphasises the severity of

his point through a matter-of-fact *lack* of exaggeration. His use of present imperfect tense ("means") carries the subtle but profound implication that "less water" and resultant "worse hygiene" is a circumstance he confronts now, or at least regularly. His use of the plural form for 'individuals' and 'families' conveys a collective suffering, though it is unclear whether he includes himself in this.

The immediacy of water needs was likewise demonstrated by Moh. Haitham Hadid (M-Yem.). A senior water and sanitation manager working with a prominent international organisation in the Yemeni capital, Sana'a, Moh. Hadid spoke of water with a sense of humanitarian urgency, describing water as "life-saving":

Ex. 4.8   *Water in Yemen is one of the biggest challenges for us, as citizens. In Yemen, you know, water is crucial for life-saving, if you were. But in Yemen it is not that easy to get your needed quantity, or essential needs of water quantities.*

While not explicitly referring to drinking or hygiene, Moh. Hadid's emphasis on water that is "crucial for life-saving" was taken to imply water needs that crucial for physiological survival. Here, his comments use a combination of community and self-focused language, conveying the challenge of meeting water requirements for individual need, while acknowledging that this challenge is one that affects all Yemenis.

Mr Khaled Abadi (M-Yem.), an influential public servant in the Ta'iz Provincial Government, likewise spoke of the physiological need for water. Asked to describe his relationship with water, he discussed it as both foundational and practically necessary for life:

Ex. 4.9   *[Water] is the pillar of movement and life for me: I drink it; I cook with it; it is the most basic source of energy [strength].*

At the grassroots, Mr Sami Bashar (G-Yem.) works as Supervisor of Wells for the provincial water corporation in a large Yemeni city [location redacted]. As part of this role, Mr Bashar has practical responsibility for monitoring and actioning the extraction of drinking water from bores in and around the city for consumption by its residents. Discussing his relationship with water, he specifically referred to the importance of physiological water needs:

Ex. 4.10   *My daily relationship with water is very important to me and to the whole community for personal use, cleanliness, and health.*

Like Mr Al Saif and Mr Al Hadid, Mr Bashar's response emphasised the physiological importance of water in both personal and collective respects.

Yet, while physiological need was a clear and common characteristic of people's orientation to water scarcity, it was not the only stated critical need arising from the interviews. In other instances, participants presented expanded perspectives of water criticality, extending this concept to uses and purposes that beyond drinking, cooking and hygiene.

4.2.3   Water for critical production

Mr Roy Butler MP (H-Aus.) represents the rural electorate of Barwon in the New South Wales Legislative Assembly. With a land area of 356,291 km2, the Barwon electorate covers over a third of the entire Murray-Darling/Barka Basin. At the time of interview Mr Butler had held office for slightly over one year, having won his seat for the Shooters, Fishers and Farmers Party at the 2019 state election ahead of the NSW National Party which had held incumbency since 1950. He described the water as 'critical', considering all that it facilitates:

Ex. 4.11   *It's the most precious resource we've got. You ask people 'What's our most precious resource?', and people say 'Precious metals' and that sort of thing. [But] Without water you can't have that either. You can't mine for gold without water. You can't mine for anything without water, … it's critical to everything we do.*

Mr Butler's description of water demonstrates its utmost value in his opinion. However, he then uses another strong term in "critical", which gives some indication of *why* water is for him so highly valued. For Mr Butler, "everything we do"—all action and behaviour—hinges on access to water, and he situates it accordingly as a *prerequisite* (though not necessarily in a hierarchy of importance) for production of other physiological needs satisfiers. While he does not specify who "we" is, his use of first-person plural labels this a human need beyond himself. As a parliamentarian, Mr Butler represents people from many demographics across his electorate, and it is inferred that 'we' refers to society in general.

Representing a far more specific demographic, Mr Mark Hall (M-Aus.) is an association representative for dairy farmers at the downstream reaches of the Murray River. He framed water criticality in terms of the economic survival of his organisation's members:

Ex. 4.12   *The Murray-Darling Basin's of critical interest to a subset of our membership. … We have about 30 dairy farms that are reliant to a greater extent / lesser extent on the lower reaches below Lock One of the Murray-Darling Basin, predominantly for irrigation, but also for stock water. Yes, so anything to do with the basin is of interest to them. They were significantly impacted by the Millennium Drought, and how the river was then – by the time any water got to them there wasn't enough. Even if they had an allocation, they couldn't get it. People still remember how hard it was and, in*

some cases, how devastating it was. There's a number of people that basically had to shut their farm down for three or four years and then rebuild following that.

Notably, Mr Hall's use of "critical" water matters was framed explicitly as "interests", rather than needs. It is not assumed that he was using such language in the way needs and interests were theoretically differentiated in Chapter 2, but his framing nonetheless draws attention to the notion that issues do not necessarily have to be life-threatening to be a considered a crisis. Tying his comments together with "That's my job: to represent them", Mr Hall seemed proud to be able to defend his members against the crisis he perceived they were facing.

At the grassroots, Mr Robert Collins (G-Aus.) is a mixed irrigation and dryland farm manager from the small town of Hillston in rural New South Wales, in the Murray-Darling/Barka Basin's Lachlan Valley. He described his relationship with water in terms of the enjoyment he finds in managing such a scarce and variable resource, because of its criticality in sustaining life through further production:

Ex. 4.13   *For me, it's the challenge of utilising water, you could say, ... and turning it into something that helps sustain life, as in food or fibre. Both are critical. I enjoy growing things.*

Here, Mr Collins describes water's essentiality predominantly in terms of its utility. The focus of his comment is not on water itself, but on the "critical" production it facilitates. In that sense, his comments reflect those of Mr Butler's around water as a prerequisite. Yet, in emphasising the criticality of the secondary resource, Mr Collins puts greater emphasis on waters *utility* value. In this simple way, Mr Collins' framing of water's essentiality for life raises an important question as to what constitutes critical human water needs. Using the language of the Australian Water Act, as referenced by Ms Maywald in excerpt 4.1, Mr Collins' conceptualisation of water criticality focuses on consumptive needs beyond drinking and hygiene that are nonetheless critical for social function.

In Yemen, water's utility value was also evident with frequent references to primary production uses such as agriculture and manufacturing. However, in every such instance, production was discussed alongside other water functions. Mr Ghanem (M-Yem.) offered an example of this, citing water's industrial utility and its effect on wellbeing when absent:

Ex. 4.14   *Water scarcity constitutes an ongoing crisis in Yemen in general, which is reflected in the life of the community which has always been suffering and struggling to get its need for water, whether for personal, domestic uses or in agriculture and the workplace.*

Whether Mr Ghanem's use of "always" was literal or hyperbolic, it shows that for him, personal and communal suffering in the face of water scarcity is constant and all-pervasive, and this extends across water's multiple purposes. Mr Ghanem's comment on water scarcity affecting "life and its course" as interpreted from Arabic emphasises existential challenges faced in the present and how they impact life as it is being experienced.[27] This serves to emphasise water scarcity and its resultant anxieties as obstacles in the present that prevent people from concentrating on other matters, as distinct from barriers to a future goal.

4.2.4   To belong: ontological connections to water

First Nations Australian and most Yemeni participants viewed water as being *integrally* essential for life. In such instances, the value of water comes not only from its utility, but from its presence and interconnectedness with a broader sense of being.[28]

Mr Rene Woods (M-Aus.) is a Nari Nari man who at the time of interview was Chair of the Murray-Lower Darling Indigenous Nations (MLDRIN) – a confederation of sovereign First Nations across the southern part of the Murray-Darling/Barka (MLDRIN, 2020). Discussing the essentiality of water for life, Mr Woods referred to the 2009 Echuca Declaration which asserts that 'the people of each Indigenous Nation obtain and maintain their spiritual and cultural identity, life and livelihood', (MLDRIN, 2009, p. 1). He reflected on his experience of these needs not being satisfied:

Ex. 4.15   *When it's [the landscape] healthy, when there's water flowing across it, everyone's out there. They're grabbing the reeds and the Aunties are weaving and stuff, but when there's nothing out there and it's dry and it's run down, no one wants to be out on Country. They don't want to be just down here in the river. So, there starts to become a bit of a disconnect with the cultural values and all that. A prime example now is the Darling: no water in the Darling, so the Barkindji mob are really unhealthy out there and their cultural values are disappearing in the landscape.*

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[27] The Arabic term used was الحياة ومسار عجلتها (*al hayat wa masar aajalatiha*), literally translated as 'life and the road of its wheel'.

[28] Referred to in this thesis as 'ontological' to reflect the essence of being, the ways in which water connects people to Country, ancestors, other life and time have also been described using terms such as 'connectivity thinking' (Weir, 2009), 'relational perspective' (Jackson, 2022), or 'relational dialectics' (Linton, 2010). It is respectfully acknowledged that the language used in this thesis may not satisfactorily convey the full depth of the concepts being described. As Yunkaporta (2019, pp. 192–195) points out, the English language 'inevitably places settler worldviews at the centre of every concept, obscuring true understanding.'

In Mr Woods' experience, the link between the presence of water and human health includes but importantly goes beyond physiological needs. The Echuca Declaration to which Mr Woods refers states that *cultural flows* are those that yield 'improved and strengthened spiritual, physical and mental health of the Indigenous people whose beliefs, cultures, identities, prosperity and physical wellbeing are inseparable from the environment and whose lifeblood is the waterways' (MLDRIN, 2009, p. 2).

No Australians of a non-First Nations background presented the essentiality of water in comparable language of spirituality and ontological connection. However, Yemeni participants frequently offered such conceptualisations across all societal influence categories. Every Yemeni participant in the study described water not only as a material resource valued for its utility; but as integrated into the very essence of being.

Ms Tawakkol Karman (H-Yem.) is a journalist, politician, and activist. In 2011, she was awarded the Nobel Peace Prize for her 'non-violent struggle for the safety of women and for women's rights to full participation in peace-building work' (Nobel Foundation, 2021). Ms Karman's view on water's essentiality was integrated with her faith background:

Ex. 4.16   *Since a young age, my relationship with water has run according to a well-known saying of our Muslim tradition: "Don't waste water even if you were at a running stream!"; a behaviour encouraged more by my parents who always emphasised the importance of not overconsuming water. Arguably, almost all people are aware of the importance of water, as it is the secret of life without which life would never have existed. But we may not be the same when it comes to dealing with water; some show much respect for it as a great blessing, while others do care little.*

Here, Ms Karman made two separate references to Islamic sacred texts. In the first instance, she placed a high value on water by recalling the Prophet Muhammad's insistence on not wasting water (The Hadith, n.d.). In the second, she references teaching from the Qur'an, by which every living thing was created from water (The Qur'an 21:30, n.d.).

The concept of water as "the secret of life" emerged repeatedly among Yemeni participants. One such example was offered by Mr Saad Al Najar (M-Yem.), who works as a state media broadcast journalist from the southern Yemeni city of Ta'iz. He reflected:

Ex. 4.17   *My relationship with water is the same as concerns every living creature, especially human beings. It is a relationship of constant need and existential connection. The journey of life does not continue without it. Water constitutes the first essence of life and is the key to survival in this existence.*

Here, Mr Al Najar situates his own existential relationship with water on a level footing with that of everybody else, articulating an inherent personal need as a part of a broader, collective need. "The essence of life" [literally: 'the first nerve of life'] as he uses it can hold physiological connotations.[29] However, "the key [literally: the secret word/password] to survival in this existence" closely echoes Ms Karman's wording and conveys a spiritual significance beyond the physiological need for water.[30]

Water as an origin, catalyst, or even as integral to a sense of self was echoed at the grassroots by Ms Lina Alawadi (G-Yem.), who works as a housekeeper in Ta'iz city and as such carries responsibility for the daily water needs of herself and her household:

Ex. 4.18   *Water is the basis of life. It is the source of life, and the source of self-confidence.*

Of course I am affected, because water is the source of life so when there is no water there is no life.

Ms Alwadi, speaking in Arabic, used the word 'أساس' ('*asas*'), coming literally as 'basis' or 'foundation', as well as 'منبع' ('*minba'a'*) as 'source' or 'origin', to describe water in relation to 'life' and 'self-confidence'.[31] Her view of water as the foundation upon which existence is built is reminiscent of the Qur'anic teaching discussed. So too, her comments speak to water needs beyond those for physiological necessity or utility, demonstrating a sense of stability provided by present water in the psychological sense.

Mr Ghanem (M-Yem.) initially emphasised an intimate personal connection with water before broadening this to life itself:

Ex. 4.19   *I live and thrive with water and renew my daily energy by its drops. … The flow of water constitutes my motivation for achievement and going on in life. For me, water is life. And its absence means inevitable death for me and all life forms!*

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[29] The Arabic term used was 'عصب الحياة الأول' ('*aasab al-hayat al-awal*'), literally translated as 'the first nerve of life'.
[30] Mr Al Najar used the term 'كلمة سر' ('*kalimat sir*'), literally translated as 'secret word' meaning 'password'.
[31] It is unclear if Ms Alwadi is referring to self-confidence at an individual or collective/community level.

4.3   Identity

4.3.1   Occupational obligations

In both the Australian and Yemeni contexts, participants who saw their occupational roles as prescribed by an organisational mandate, such as government officials, public water utility workers, or industry representatives, took on a personal responsibility to deliver effective water sharing arrangements for their communities.

Among Australian participants, all those occupying high-level influence roles described a personal feeling of the weight of responsibility. Mr Phillip Glyde (H-Aus.) is the Chief Executive Officer of the Murray-Darling Basin Authority (MDBA) – the Australian Federal Government institution mandated with planning the basin's water resources under the Australian Water Act 2007. As such, he lives and works in Canberra, situated in the upstream reaches of the basin near the headwaters (start) of the Murrumbidgee River – a major tributary of the Murray River. Leading the MDBA as it implemented once-in-a-lifetime water policy reform, he felt a strong obligation to basin stakeholders:

Ex. 4.20   *We're in the middle, I think, of one of the major reform tasks I've seen government and industries go through, certainly in my experience in the civil service for 38 years, and I feel this sense of tremendous responsibility to get that right.*

Senator Sarah Hanson-Young (H-Aus.) represents the state of South Australia in the upper house of the Australian Federal Parliament. Based in the state capital Adelaide, Sen. Hanson-Young represents communities at the downstream end of the Murray-Darling/Barka. She discussed the sense of duty she felt to "stand up" politically in addressing the water needs of constituents in a trying immediate context, while also keeping a long-term needs perspective:

Ex. 4.21   *I got elected at a time when we had quite extreme water restrictions in Adelaide, for householders. I remember the stories during the election campaign and of hearing people talk about, you know, putting buckets in their showers that they could collect the extra water so they had water to water the garden with – those types of stories that, for a metro city, really did dominate the local politics and political landscape. So I entered at a time when you had to be prepared to stand up on the issue. Of course, I come from the environment perspective, because I was elected on an environmental platform with the Greens. It was quite clear to me that the environmental health and sustainability of the Murray-Darling was in disarray, and that the longer that continued the worse it was going to be for South Australia. And the worse, the harder it was going to be to restore the environment's health.*

Being more proximate to their constituent base, participants in the mid-influence category were heavily focused on the nexus of policy and practice, often acting as a medium for two-way

information exchange for and between high-level and grassroots counterparts. Participants in such roles assumed a great deal of personal responsibility for favourable water sharing outcomes that relied on upward advocacy for a particular group's interests or for downward distribution of information.

Mr Hall (M-Aus) spoke of his responsibility to advocate for the interests of his association's members with "critical interest" in the Murray-Darling Basin due to their dependence on it for irrigation and stock water:

Ex. 4.22   *My role now is very much focused on supporting the members and representing members ... That's my job: to represent them.*

Mr Woods (M-Aus.) spoke of the challenge of one person being asked to represent a huge geographical area with multiple Indigenous Nations:

Ex. 4.23   *It's a tough ask to be the only person in the room sometimes and speak for the catchment, which is not what Aboriginal people usually do. They talk about, they speak for their little patch. So it's tough. ... We're just advocating on behalf of those Nations groups. But hopefully we can put them [government] in touch with the Nations groups themselves to have those finer discussions on the impact on their country.*

Ms Maywald (M-Aus.) described the "important role" she had to play as a prior state water minister to ensure the voice of rural constituents was heard in a largely city-based cabinet:

Ex. 4.24   *When you're talking about an environment where the competitive tension between sectors is so intense, and the stakes are really, really high, and you also overlay that with the political imperative - more votes in the city than there is in the country - being a National Party person representing a country electorate in a very city based cabinet was a very challenging but important role to play because otherwise, I guess if I wasn't there, there would have been virtually no rural voice around that cabinet table.*

Among the Yemeni participants who held occupational responsibility for water sharing arrangements, there was less sense of ability to enact arrangements effectively. This was often communicated as not just a lack of agency, but a loss of it.

Mr Rami Al Hassan (M-Yem.) is a law expert working as a legal adviser for a provincial water board in a prominent city [location redacted] in Jibal as-Sarawat. He acknowledged that many people look to him as responsible for provision of water services, yet he was frustrated that the policies and laws that he implements are not well policed:

Ex. 4.25   *Regarding the drilling of wells, there was a legal and legislation gap, and this is the responsibility of the Water Resources and Rural Water. Everyone says I am the*

specialist, and this is our responsibility. But there are not enough laws or deterrent penalties for digging random wells.

However, unlike his fellow Yemeni participants, Mr Bashar (G-Yem.) described feeling a degree of agency to improve the water scarcity situation through the practical application of his specialist knowledge as a wells supervisor:

Ex. 4.26   *When the daily production of wells is reduced, this affects my work. I'm also affected by water scarcity, but it was quicker to develop solutions or build up reservoirs so as not to reduce water on the city or citizens. Of course, I am not affected like the rest of the citizens. I am saddened by the lack of water, but I know that we will find solutions to these problems or run back wells and follow them in order to avoid water shortage.*

Where other participants felt hamstrung to effect positive change, Mr Bashar's skills seemed to provide him with a sense of confidence that he could control his circumstances more readily than could his fellow citizens. Information – in this case knowledge of groundwater well function and as a result the ability to source water – offers Mr Bashar a degree of control over his circumstances that his compatriot participants do not have.

4.3.2   Social identities

Beyond individual roles and often more explicitly, participants also cited collective identities in how they related to water scarcity. In both country contexts and at all levels of social influence, overarching views of humanity and nationalism were frequently cited as influences on people's views of themselves and their interactions with others. Even among deeply divided communities, these collective identifiers were raised as actual or prospective arguments for unity among divided water sharers.

All Australian participants in the high-influence category cited the Murray-Darling/Barka as a national unifier, including for people beyond the catchment. Mr Glyde (H-Aus.) invoked the grandeur, scale and complexity of the basin as integral to an Australian sense of identity:

Ex. 4.27   *The Murray-Darling Basin is Australia's largest river basin. It's very complex; a million square kilometres. Half of Australia's irrigated agricultural production comes out of it – irrigated agricultural production worth $7 billion. There are lots and lots of internationally listed wetlands; lots of native species that are threatened and endangered. It's the lifeblood of the country. It's what I think a lot of people think about if [they ask] what does being Australian mean? It's part of our DNA, that notion of country. From where I'm sitting, I see it as a really important challenge to actually get it onto a truly sustainable footing. Our throwaway line – that we're working on a healthy basin – is laden with meaning.*

Sen. Hanson-Young (H-Aus.), who in a later excerpt describes the Murray-Darling/Barka as "our nation's food bowl" (Ex. 4.37) discussed the simultaneous centrality of water to the South Australian identity:

Ex. 4.28   *[In] South Australia, unlike in any other state, water and water politics will often be on the front page of the newspaper, the daily metro newspaper, which is just not the way it is in any other capital in the country. This issue is very much tied to the political and the parochial identity of South Australians. Because we are at the bottom of the system. And it's been like that long before 2007, of course, long before there was any talk of a Murray-Darling Basin Plan or some kind of national management system. It's been there since before Federation.*

Mr Kelly (H-Aus.) linked his own perception of self as a state public servant with the common interests of upstream neighbours. In his opinion, a common national identity transcended inter-state rivalry:

Ex. 4.29   *We have a very good relationship with the Commonwealth and it's probably because the positions we'll tend to take here, at least as an agency level, will be balanced and we don't put forward anything that we don't believe is in the best interests of the nation. So it works for South Australia because we don't want to put up something that shafts [isolates] us out of Australia. If it's something that's good for South Australia and not good for someone else, we don't run with it because well – this sounds awful – I'm a public servant. While I might be employed by the South Australian government, I'm a public servant paid for by Australian taxpayers at the end of the day. And a healthy Australia is good for South Australia. If you take a broader view, you can set up win-win scenarios rather than win-lose.*

Mr Woods (M-Aus.) described the obligation of both Aboriginal people and all water sharers to care for and maintain the river system:

Ex. 4.30   *If we haven't got a healthy basin, Australia will struggle. That's so iconic to Australia that, if it's not working, if it's not connected north and south, we're not doing our jobs, first as Aboriginal people, and even stakeholders across the board.*

Cr Irving (G-Aus.) saw hydropolitical tension in local government.[32] This related to "The predominant role of Council" which "is to serve the community", and the desire to share water collegially with neighbouring towns:

Ex. 4.31   *I think Council has a philosophy [whereby] the council likes to think they work with other neighbouring councils. But I think that becomes difficult when you come to the issue of water. So you want to work with your neighbouring councils, and that's what*

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[32] Cr Irving represents the rural community of Warren in NSW, a community heavily dependent on river water for irrigation. Immediately upstream of the township, a controllable sluice gate diverts water from the Macquarie River to the neighbouring communities of Nyngan and Cobar via a constructed canal.

councils like to do, [but] I think that becomes a bit of a conflict when the people start going, 'Why are you supporting water going [being diverted] to Nyngan and Cobar when we're not getting water?' And then you basically [see] the inactivity of council in lobbying on behalf of its people. I don't think they [constituents] want to maintain relations with other councils, and so becomes a dilemma. Yeah, I can see how wars happen in other countries.

Cr Irving points out that the tension between competing senses of individual and social responsibility can be difficult to reconcile. Conflict is here perceived as win-lose, attached to individuals taking on social identities associated with meeting needs.

Far downstream in SA, Mr Clancy Lee (G-Aus.) owns a water-related small business in the town of Murray Bridge, less than 100kms from where the Murray River meets the Southern Ocean. He echoed the nationalistic perspective of participants in the high-level influence category:

Ex. 4.32   *Well, it's got to be equal across the board. I mean, we're all one country and it's one river. And you can't have different laws in different states.*

Here, Mr Lee invoked a national collective identity to argue for homogenous regulation across the basin.

Yemeni participants also referenced a uniting national identity, though in contrast with the Australians, it was expressed in the hope of regaining it. Where Australian participants claimed national identity as something they *have*, Yemeni participants instead referred to an *ignored* common identity, often juxtaposed with deep societal fractures along political lines.

Mr Saleem Nader (H-Yem.) is a prominent government minister, who at the time of interview was residing in Cairo with UN-recognised Central Government operating in exile. Consistent with his government's position on a united Yemen, he referred to the collective identity of 'our country' and 'the population' despite the divisions of war:

Ex. 4.33   *Certainly, the current pressure is much greater for a number of reasons, the most important of which is the political division that is taking place in the country in addition to the state of war, which has been reflected in our ability to meet the needs. We have political division in our country, we have a war in our country. And therefore the possibility of passage and meeting the needs of the population are no longer the same as it was. We have many confusions in obtaining data which has become a rarity, in addition to many things. So now our ability as a group working on water and our ability as an institution has also declined.*

Alongside his references to the self-inclusive 'our country', he also refers to 'our ability as a group' and 'institution', the latter of which refers to the public service.[33] Significantly, he refers here to the ability *as* a group or institution, as distinct from the ability *of* the group or institution. It is a subtle but significant difference, emphasising the relationships and cohesion between group members, more than the group's effectiveness in carrying out its task. It is a focus on the means, more than the ends.

When Mr Ghanem (M-Yem.) was asked what is important for fair and peaceful sharing of water resources, he replied suggesting that the community would benefit from messaging around strengthened 'interdependence':

Ex. 4.34   *Official [sanctioned] interest in activating water awareness programs and agricultural guidance to reduce wasting water and other factors that concern the society themselves – of interdependence, community justice and wise consumption without waste or extravagance.*

Ms Fakhoury (M-Yem.) said the political divisions in her water-sharing community carry suspicion and mistrust. Trust, she said, can only be achieved through a message of community and "togetherness":

Ex. 4.35   *We try to be not provocative, because in Yemen, everybody, you know, we have mistrust now. And the social fabric of the community has been completely disrupted. That's my most concern. People are very sensitive to who you are; who you're affiliated to. 'Are you with the Saudis? Are you with the Houthis? Are you with this group?' So if they really feel that you're very neutral, and your message is for the people, this is very important. … It's like a confidence-building measure, just like when they do the peace agreements. You have to first of all have empathy and gain their trust. And that can only be made or achieved when you really have a consistent message of togetherness and the benefit for all. Like a win-win, kind of. You know, 'We do this together.'*

Mohandas Rafiq Shadi (G-Yem.) is a former infrastructure engineer turned carpenter from Ta'iz. At the time of interview, he reported living near the front lines of the armed conflict besieging the city, and as a result found getting water delivered to his residence difficult. He described the friction that this caused in his community:

Ex. 4.36   *We are deeply affected by the lack of water, and this often creates problems with our neighbours when there is not enough to share. … Therefore, each person must try to provide water for himself to the best of his abilities. Sometimes an actor [NGO] may manage to deliver water once a week, but the area includes more than seventy families,*

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[33] The Arabic terms translated here as 'as a group' and 'as an institution' were كمجموعة ('*kamajmoua*') and كمؤسسة ('*kamuasasa*') respectively. In both instances, the translation is 'as a' group/institution, as distinct from 'of a' group/institution.

> *so this is not enough [to meet our needs]. Each takes as much as he can, meaning that each person takes according to his strength and influence, the weak lose, the strong get what they want, and the rest all get what they can manage. This is what is common now.*

Though his comments carry a strong undercurrent of community – including neighbourly relationships and collective suffering – the situation has become one of desperation in which community cohesion has broken down into self-protection.

Cr Irving's (G-Aus.) and Mr Lee's (G-Aus.) construction of identity, considered alongside Yemeni accounts, suggests that presentations of conflict-related identities may in some cases override broader social identities that would foster cooperation rather than competition over scarce resources.

4.3.3   Sustainability: ongoing existence

Incorporating time into concepts of critical water needs gives rise to *sustainability*, which concerns satisfying 'the needs of the present without compromising the ability of future generations to meet their own needs' (Brundtland, 1990, p. 3). Water sustainability as discussed by participants incorporated elements of ontology, security, and identity. Though framed as a concern for future requirements, sustainability is nonetheless addressed as a need in the present.

Sen. Hanson-Young (H-Aus.) spoke of water as an "essential service" and reflected on the sustainability of the Basin in terms of the survival of communities, the production of food, and the difficulty in prioritising competing issues. A healthy Murray-Darling Basin, she said, is about:

Ex. 4.37   *Fundamentals. It's [about] the sustainability of the river system. And this is our nation's – we're watering our nation's food bowl. But it is also fundamental to the survival of our communities that we have a living breathing, Murray-Darling Basin. And if we don't prioritise that, then we're then we're doomed as far as I can see. … Water hasn't been seen through general public policy and management as an essential element or an essential service. And I think it's time that it was.*

Here, Sen. Hanson-Young places water scarcity in stark and catastrophic contrast with the alternative of a healthy river system, something that is necessary for providing livelihoods both in the present and into the future. She does not make explicit who is doomed, though it is implied to mean Australians who benefit from the basin, and her use of first-person plural clearly indicates that basin sustainability is a collective responsibility, including for herself.

Even greater weight was given to a collective interest in basin sustainability by Mr Linton Besser (M-Aus.), a reporter for the Australian Broadcasting Corporation's (ABC) national investigative journalism program '4 Corners'. In 2017, Mr Besser broke a significant story of water sector misconduct in the NSW public service, as well as allegations of agricultural water theft (Besser, 2017). The essentiality of water in the basin and the need to sustain it, he asserted, was central to why the story was important:

Ex. 4.38   *It satisfied the public interest [test] because we are talking about a vital resource for*
            human life. And it's not like we're debating something of which there is plentiful supply
            - tins of paint, or plastic bags – it was a question of the sustainability of inland
            Australia. Some things are difficult to determine 'Are they in the public interest?'... Some
            things are not as clear as others. But this is crystal clear.

Presenting water as both vital and scarce, Mr Besser spotlights the threat that the alleged mismanagement of water in his report story poses. Invoking the public interest, he situates basin sustainability squarely as the concern of the collective Australian public in similar fashion to Sen. Hanson-Young's comments on food and community survival. The invoking of national identity to argue for sustainability as an essential need was common among Australian participants.

Yemeni participants did not tend to frame their relationships to water in terms of sustainability, despite the English term having a literal Arabic equivalent.[34] However, several Yemeni participants did reflect on access to water over time, as illustrated earlier in terms of ontological connection by Ms Karman (H-Yem.) (Ex. 4.16), Mr Al Najar (M-Yem.) (Ex. 4.17), Ms Alawadi (G-Yem.) (Ex. 4.18), and Mr Ghanem (M-Yem.) (Ex. 4.19). Yemeni framings of water requirements over time included satisfied, neutral, and unsatisfied needs.

Mr Al Saif (H-Yem.) subtly blended his personal need for water in the present with a deterministic relationship between water and the future of humanity:

Ex. 4.39   *It is an inevitable relationship, and it is connected to human destiny and life. It is an*
            essential part of my life and work.

Mr Al Saif used the Arabic term 'مصير' ('*maseer*'), which like its English equivalent 'destiny' emphasises an end result more than the means of getting there.

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[34] The English 'sustainability' has a direct Arabic translation in 'الاستدامة' ('*al aistidama*'), which is applicable to human life and other aspects of the natural environment, including water. Analysis here was not limited to synonyms and looked for broader thematics in participants' responses that could also be considered comparable in meaning. No such instances were found.

Mr Abadi (M-Yem.) spoke of water as his close personal "companion", and in doing so presented his essential water needs in terms of what he has, rather than what he lacks. He implies a sense of reliability over time; a need that is prioritised in both sequence and value.

Ex. 4.40   *Simply speaking, water is my first and most important companion. My need for water is permanent, comprehensive, and not limited to circumstance. I am a human being who lives within this vast environment; who reacts to and is affected by its events and problems, including water scarcity. The availability of water is essential for the continuation of life and the presence of services.*

Mr Ahmed (G-Yem.) is the owner of a privately run drinking water station in Ta'iz city. As such, water sales form his primary source of income. Taking a different approach to other participants, he framed sustainability as unachievable in the face of long-term suffering. He described the biggest impact on his business as being:

Ex. 4.41   *The continuation of the war, since there will never be a solution to the water problem until the war stops.*

While Mr Ahmed did not specify what he meant exactly by "the water problem", for many participants, the interwovenness of water in their identity was multifaceted and went beyond direct functionality of water. Often, indirect relationships with water were just as impactful on people's lives, facilitating livelihoods and supporting wellbeing.

4.4   Livelihoods and wellbeing

4.4.1   Economies and jobs

Perspectives discussing the relationship between scarce water and economic livelihoods were concentrated towards the lower influence level categories. This is unsurprising, considering that the grassroots in particular are represented by people reliant on industrial and agricultural water use and their representatives. As such, it is these participants who are most likely to affected by job security as impacted by water scarcity.

Cr Davies (M-Aus.), the mayor of a primarily cotton-farming shire in the NSW Macquarie Valley, expressed frustration at the economic impacts of government water buybacks,[35] particularly on the job market:

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[35] 'Water buybacks' refers to an Australian Federal Government initiative to purchase water licences from water licence holders as a means of compensating them for water reclaimed by the government for environmental purposes.

Ex. 4.42   *The Valley – it's only two shires, Narromine and Warren – lost just over 500 people; 500 permanent jobs. To date, the shire that I'm the Mayor of, Narromine, has received the princely sum of $47,000 to compensate us for that loss of employment. What a wonderful gesture from this government [said sarcastically]. … 500 people who wanted to work have been denied access to permanent jobs in our Valley… people who wanted to work; who will never come back because the jobs are gone.*

Here, Cr Davies places the blame for economic hardship in his community squarely at the foot of the government. The combination of job losses with disproportionately minimal compensation is interpreted as contempt for the economic stability of the community.

Mr Collins (G-Aus.) also reflected on the impact of buybacks on local economies. The policy, he suggested, worked less well in practice than it did in theory, since it failed to take flow variability into account in economic terms:

Ex. 4.43   *The theory of doing that works really well whilst we're not hitting the limits of the resource. [But in drought, when we do hit the limits] those people at the other end [downstream] no longer have a job. There's nobody living there, there's nobody at the school, there's nobody going to the local library, there's nobody getting their tyres changed.*

Instead of 20 farms, you have one. And 20 farms used to employ two families and all that, and now you have one with [only temporary] labour when they need it.

Mr Collins' anecdotal account is consistent with national statistics for the 2017-2020 Australian drought. In 2019, the Australian Bureau of Statistics (2009, 2019a) reported a total of 89,400 farms in Australia, down from 135,996 only 10 years prior – a decrease of 34%.

Operating a dairy farm at the downstream end of the Murray-Darling/Barka near the mouth of the River Murray, Mr Theo Conti (G-Aus.) is the type of river-dependent farmer to whom Mr Collins was referring. Mr Conti likewise lamented the depletion of local farm ownership due to the area's s sensitivity to rainfall:

Ex. 4.44   *There used to be 94 dairies between Wellington and Murray Bridge. Now there's 10.*

All it takes is one drought for a swamp [river-mouth farm], and it's back to square one.

It was clear from Mr Conti's dejected body language that he was not simply observing his neighbours' circumstances with objectivity. His comments were delivered with obvious fatigue, with both the precariousness and recurrent nature of the situation conveying a sense of near defeat.

Others offered insight into why their experience of water scarcity is so taxing, describing the interwovenness of productivity and identity. Mr Glen Whittaker (G-Aus.) has predominantly farmed irrigated cotton for 28 years near the small rural town of Warren on the Macquarie River

in central-west New South Wales. He spoke of water and cotton almost as one entity and discussed life on the farm in a holistic manner fusing business, family, and life in general:

Ex. 4.45   *Water would be, well, cotton is probably 70 to 80% of our business. So, it's our farm, our life, our family, our whatever. I think it's probably a bit the same from a community perspective.*

Mr Whittaker's interchangeable use of 'water' and 'cotton' illustrates the dependence of the latter on the former to a point of merging. He then fuses this with identity and purpose, productivity, and the livelihood of his family and broader community. Water, as per Mr Whittaker's perspective, is interconnected through all aspects of life to the extent that he says it *is* life.

The concentration of economic adversity among grassroots water users in Australia was indicative of the distance from and insulation to it offered by Australia's domestic geo-political structure. Typically, government offices and with them lobby group headquarters are located in jurisdictional capital cities which, with the exception of Canberra and Adelaide, are not dependent on the Murray-Darling/Barka for their water supplies. However, the same cannot be said for the Sarawat Mountains, where the water scarcity challenges faced by residents of Yemen's biggest urban centres are far more hydrologically interdependent with rural areas. As a result, decision makers residing in these cities are not as geographically insulated from water scarcity as their Australian contemporaries.[36]

Mr Abadi (M-Yem.), echoing the comments of Australian participants, described the economic hardship caused by severe water scarcity in its pervasion of everyday life. Further explaining his earlier comments on why water is essential for life (Ex. 4.40), he said:

Ex. 4.46   *It [water] is important for the agriculture and industrial sectors, and conversely, its scarcity leads to the disruption of services and has negative repercussions for the community, such as high prices, high rates of unemployment, and poverty.*

By most accounts, economic hardship in the face of water scarcity was described as a secondary outcome, stemming from reduced productivity of water-dependent goods and services. However, in extreme circumstances, the economic impact of water scarcity was a question of basic subsistence. This was demonstrated by Mr Ghanem (M-Yem.), who described circumstances in which people in his community were forced to give up work in order to spend that time finding water to satisfy physiological needs:

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[36] The emphasis here on geographical/hydrological integration does not discount other factors that can insulate people from water access, such as economic or political inequality.

Ex. 4.47   *Water of a quality suitable for drinking, cooking, or hygiene is double the price, and [some people] are unable to purchase it, which compels people to quit their jobs since their main concern becomes searching for free alternative sources of water, even if it is not healthy.*

In the vicious feedback loop Mr Ghanem describes, economic conditions prohibit people's purchasing of water, which in turn leads to people to forfeit their source of income in order to find alternative water sources. His consistent use of present tense in this statement highlights that the issue is current and immediate, rather than a hypothetical or a recount of past experience.

For some people, including those employed in the public service, work was no guarantee of income and even a job did not provide protection against the impacts of water scarcity on livelihoods. This dire economic situation was described by Moh. Hadid (M-Yem.):

Ex. 4.48   *Since December 2016, people or governmental employees did not receive their salaries. Imagine, no salaries! For 3 of 4 years now, no salaries for governmental employees, specifically in North Governorates. You know Yemen, you know governorates, north and south. Aden, Lahj, Abiyan, Shabwa, those in the South, somehow they are getting you know, not regular salaries, but they are getting some salaries. But in 13 governorates in the North - Sana'a, Damar, Al Beydah, Amran, Sa'ada, Al Jawf, Ibb, Hadja, Al Mahweeb, Hodeidah, Reymah – all those governorates, they didn't receive their salary. So imagine no basic services; no salaries as well. I mean, water comes as one of the biggest challenges for us in Yemen because you can cope with many other things, but with water you can't. I mean, [to] wait a few days without water - this is something difficult.*

Moh. Hadid here links the significant challenges of economic hardship with broader personal and community wellbeing, alluding to the stress of related and compounding economic hardship and water scarcity that people must 'cope with'. His comments offer a window into a frequently raised topic throughout the study: the burden of water scarcity on not only physical, but also psychological wellbeing.

4.4.2   Stress and fatigue

Mr James Murphey is an influential public official in the New South Wales Department of Planning, Industry and Environment (DPIE). With the Department's headquarters situated in Sydney, the state's capital city, Mr. Murphey's base is technically outside the Murray-Darling/Barka Basin, though its catchment boundary lies a short distance from the city's western suburbs. Along with his colleagues, he is responsible for implementing water policy across the state, including river-water extraction allocations. Mr Murphey (H-Aus.) spoke candidly about the personal toll of his work, and of the pressure he feels in this role, especially in times of drought:

Ex. 4.49   *I've been working for this agency for close to 30-odd years, maybe a tad over, and the last six months are probably the most intense and stressful period of all my working career because of drought and the role I'm in, and particularly in an extended drought. For example, in the Murray we've had three years in a row of zero percent allocation for general security users – so that includes lucerne growers, the rice industry, a whole lot of high value industries that haven't had an allocation for three years. So it's a hotly contended space… it's a very tricky space. And it's as I said, quite contentious when you've got farmers who haven't seen a drop of water for a number of years now. Then they start to lobby and that can be quite powerful, but they're also quite desperate at the moment - understandably so.*

Here, Mr Murphey describes the stress both he and members of the public experienced during intense periods of drought.

Exhaustion stemming from the fear of returning to difficult times past was described by Sen. Hanson-Young (H-Aus.). She argued that the protracted nature of water scarcity in the Murray-Darling/Barka meant communities become willing to accept suboptimal outcomes in order to achieve the relief of stability:

Ex. 4.50   *I think people can be really angry about it [ongoing conflict in the Basin]. You know, here in South Australia, I think people are exhausted of the debate. I think they're really… we… I think that the Millennium drought that put South Australia under strict water restrictions for quite some time, and the Murray Mouth closing, and Alexandrina and Lake Albert effectively drying up into a mud pond – towns, school shut [closed down]. South Australia's quite a tight knit community even though we're spread out, and I think people were… when the Murray Darling Basin Plan, even though it wasn't what science had asked for and what the expertise had said, once it was finally delivered in 2012, people were exhausted and just wanted anything – 'We don't want to have to go through that again!'*

Such exhaustion was also referenced by Mr Hall (M-Aus.), who spoke of increased defensiveness in the face of fatigue and past trauma when communities faced the prospect of having to renegotiate the ground rules that they thought were settled and would provide certainty:

Ex. 4.51   *People still remember, as they should. People still remember how hard it was and, in some cases, how devastating it was… they just don't want to go back there again.*

You could almost see them strapping on their armour again. You know, they were almost immediately exhausted because they just went back to where they'd been. Just coming out of drought, and they thought that they got through and got better and there was hope, and security and all that, and then when it was challenged you could just see them thinking 'Shit, I've got to go back out and fight again'. It was immediately exhausting for them because they immediately remembered what it felt like.

Cr Irving (G-Aus.) suggested the longevity of protracted conflict can be tiring. Such fatigue was evident when the Shire Council she sits on met with graziers from the Macquarie Marshes to listen to their arguments:

Ex. 4.52   *We went down and had a meeting with them. All the councillors. And they were expressing their concerns to us about the Murray-Darling Basin Plan. But I think that, in the end, they weren't really listened to. Sometimes you think that people get a bit tired of people who are perceived as complaining when they're not really complaining. They're just very good at being persistent in putting their concerns across. But then other people get a bit tired of it.*

Stress and fatigue from conflict was likewise prevalent in Jibal as-Sarawat. Moh. Hadid (M-Yem.) described water scarcity with exhaustion:

Ex. 4.53   *This brings a lot of stress on us; brings extra burden on us. This is actually affecting our capacity to deal with life because it is really, really difficult to live where your essential needs are not met.*

An effect of such fatigue, according to Ms Fakhoury (M-Yem.) was an emergence of public apathy that made public health messaging around water increasingly difficult:

Ex. 4.54   *When we're trying to do the [sanitation] awareness, you know, it's difficult in a conflict area because the people say that 'We've been through everything: we've seen Cholera, we've seen epidemic diseases, we've seen everything. The public… it's really difficult to get the message through, but we're trying our best.*

Here she highlights that conflict weariness can compound stress and fatigue that have other causes, such as disasters and public health crises.

Mr Malik (G-Yem.) describes how the challenges of water scarcity are not only physiological, but include financial stress, personal exhaustion and family difficulties including access to education:

Ex. 4.55   *The challenges and sufferings are firstly financial because there is no water supplies and purchasing water from different sources at a higher price. Secondly challenges at a personal level due to the efforts and fatigue to have access to water, as well as, cultural suffering for families who make their children drop out of school and go to search for water.*

Mr Farraj (G-Yem.) said that he was preoccupied with the constant search for water. Like Mr Malik, he too encountered social and family conflict which he attributed to water scarcity:

Ex. 4.56   *The word "water" occupies a lot of space in my conversations and daily activities as a rural resident. Almost, every day I have to check the tanks on the roof and check the available amount of water, besides going to the fields every two days to check the farm needs of water. As long as I am not independent, and I rely on my family, which in turn depends on agriculture, my duty to stay with them is often determined in the provision*

> *of water. Here I must always fight for water among the hundreds of families they are urgently in need for it. … Personally, I feel that a large part of my daily life is turning into a constant quest to secure water.*
>
> *A lot of chaos and instability in the social environment because of the water problem. Sometimes, I argue with my mother sometimes because of what she thinks as my lack of interest in searching for water. And sometimes because of what she says concerning my excessive consumption of water.*

Indeed, Mr Farraj's encounter with social "chaos and instability" in the face of water scarcity was a frequently, and in many cases desperately raised theme, by participants across both basin contexts.

4.4.3   Uncertainty and change

Participants regularly described the destabilising effects of uncertainty in the face of variable water supply conditions. Mr Kelly (H-Aus.) explained that drought was especially tough to manage psychologically in comparison to other natural disasters because of the unknown timeframes involved and, relatedly, the longevity of resilience required:

Ex. 4.57   *The insidious thing about drought is you never know when it's going to end. At least if it's a bushfire, you know that's when it started, there, it's going; now we've put it out. Terrible impact, but you can sort of move through the decision process because it's a definitive start, moving to an end point. Drought you don't know. Drought you're not even quite sure when it started… you actually don't realise it's started… you know 'It might rain next week'; or actually 'No, we're really in trouble now'. You don't know when it's going to end; you can't tell when it's going to rain, and if it rains is it going to rain enough and all of that. So in terms of managing the psychological side of that, it's quite tricky because you can't go through a normal grieving type process because you're still going 'I can get through one more year, I can get through one more year. Uh oh, it's another year. Oh, it's another year.' You can imagine doing a marathon, and you're 100 metres to go so you put in a sprint and when you get to 95 metres someone shifts it [the finish line] back a kilometre.*

Whether Mr Kelly was referring to the personal toll of uncertainty he experienced as a high-level decision maker or empathetically to the stresses experienced by those who directly experience the impact of his decisions, his comments reflect his earlier description of his rural upbringing and personal identification with the challenges of agricultural life.

From his high-level decision-making position, Mr Glyde (H-Aus.), who reflected on the frequent interactions he has with people throughout the basin in the course of his work. He said that in his experience, people speak of water scarcity in terms of loss or frustration at missed opportunities:

Ex. 4.58   *Every meeting I attend – and we do a lot them in regional Australia – you confront*
            people dealing with scarcity in a different sense to not having enough water to survive
            on. It's dealing with the owners of the businesses in small country towns that have been
            particularly affected by water being taken back for the environment. They're really
            struggling with that notion that they no longer have access to what they thought they
            had. Similarly, when you go out with the representatives of the conservation movement,
            they point out what could have been, what used to be, in terms of the physical
            environment. You get their sense of loss; of how the hell do you turn around 100 years
            or more of overallocation? You get that sense of they're very deeply affected by it. We
            go out and talk to Aboriginal groups, and you get them, if you can, to start to tell their
            stories about what they as kids or their grandparents' grandparents, etc., have passed
            down to them, and you get a real sense of frustration and loss as well. Most of the
            places, … people who complain are going through some sort of change that they don't
            like. We hear a lot of that sense of scarcity, and in some places, it's an absolute scarcity.

Picking up the earlier theme of stress, Mr Glyde's reference to "absolute scarcity" emphasises the
extremity of the situation and highlights the dissonance between what *is* at the present moment
and what *was* or *could have* been.

On the other hand, Mr Hall's (M-Aus.) problematic depiction of change focused on anxiety about
the *future*. Farmers were left frustrated, he said, when they built their businesses on expected policy
consistency but were instead confronted with uncertainty:

Ex. 4.59   *It was reasonably ugly, the most recent discussions. And it was pretty disappointing,*
            the amount of grandstanding that went with it, you know, for political gain, not
            necessarily being aware that there were people's livelihoods that are [at stake]. … It's
            that increased unpredictability about the future, particularly when they [farmers]
            thought that there was predictability. So they thought 'Okay, the governments have sat
            down and they've come up with a decision. We're convinced that at [an environmental
            water target of] 3200 gigalitres we can continue to operate our businesses in anything
            other than a Millennium Drought entitlement.[37] *And we're happy to weigh that risk. If*
            we have another Millennium Drought, you know, 10 years, 20 years after the last one,
            then shit, that's [just] bad luck.' … But the uncertainty of the debate, a lot of which is
            political … – that's the major issue for our farmers. It might not be a Millennium
            Drought that sinks us; it could be some dickhead putting a dam across the Murray.
            Because that's the logical extension of them protecting their own without giving a care
            for either the system or the people below it.

To Mr Hall, it is the unpredictability of people and politics that makes water scarcity so frustrating,
as distinct from climatic variability. As an industry organiser and representative, it stands to reason
that Mr Hall's comments are geared towards aspects of water sharing that are under human control

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[37] Mr Hall's reference to '3200 gigalitres' here refers to the Australian Water Act Part 2AA, which sets an average
annual target of 3200 gigalitres of water to be reserved for environmental outcomes. Thus, in the context of Mr Hall's
comments, an increase in this number would represent less water available for agricultural use.

and over which some influence can be exerted. Indeed, he contrasts aspects of water scarcity that are and are not subject to human decision-making to emphasise his point. The hardship of drought is presented as harsh yet bearable; while the ability of policy makers to ruin livelihoods regardless effectively paints them as absurd and unpredictable; something to be feared. Subtly, his mix of tenses in saying 'there *were* people's livelihoods that *are* [at stake]' serves to further emphasise his point by bringing past actions into the present.

Mr Butler (H-Aus.) discussed the need for certainty around water access, emphasising that this certainty is achieved through the transparent and timely sharing of information:

Ex. 4.60   *I think it's all about trying to strike a balance where we can have ... some certainty around water. And this comes back to the transparency of information because when there's not transparency and there's not timely information, then that provides uncertainty. And that's what we saw in in February, March this year with the 324s that were put on. [38] Yeah so I actually agree with the embargo that went on, because it probably did help us get more water down the system. But the way it was communicated, wasn't that crash-hot. And there was a lot of people with water access licenses who are calling my office saying, how long is this embargo going to be on for?*

At the grassroots, Mr Whittaker (G-Aus.) said the difficulty of living and operating through extreme rainfall variability in the Murray-Darling/ Barka was "a grind":

Ex. 4.61   *It's bloody depressing. It's frustrating. You know, I think most farmers in Australia, or certainly out here, accept the variability. You have to be able to accept that. I'm sure you put a European or even an American farmer out here, he wouldn't deal with it at all, you know, the variability in rainfall. If it doesn't rain, no one gets water. It's a grind. But you just sort of shut up shop and try and get through, and that's how you work it. I mean, Narelle [his wife] works, so that's a good... puts food on the table, I guess. I can go and pick up jobs doing other stuff if I need to. [But] it gets a bit tricky, because you've got to be careful you're not ignoring the hard place too much because you need to be ready when things turn around pretty quickly. So, it's a bit of a Catch-22.*

The "Catch-22" Mr Whittaker points out is a paradox of water scarcity whereby drought demands farmers to divert their attention away from hardship in order to withstand it, yet in doing so risk missing the opportunities of eventual rainfall.[39]

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[38] '324s', later also referred to as '324 embargoes', is a reference to section 324 of the NSW Water Management Act (Water Management Act 2000 (NSW) No 92 (Austl.)) which allows for temporary restrictions on water extraction 'to cope with a water shortage, threat to public health or safety or to manage water for environmental purposes'. The responsible Minister may issue orders to that effect if they satisfied it is 'in the public interest'. The Act does not specify trigger points for the enactment of restrictions, leaving considerable interpretation to the discretion of the Minister.

[39] From the book of the same name by Joseph Heller (1961/1999), a 'Catch-22' refers to 'a dilemma or difficult circumstance from which there is no escape because of mutually conflicting or dependent conditions' (Oxford Languages, 2021).

In Yemen, Moh. Hadid (M-Yem.) reflected on the destabilising effects of water supply instability and unpredictability on consumer confidence:

Ex. 4.62   *The economic situation is integrated or comes into several aspects [of life]. Even a rumour about cabinet or government affects things. Also the timing: in Sana'a it is very cold in winter. So, the consumption of water in summer is not like [more than] in winter. All these factors affect the security, let's say, or confidence. When people think that there is no foreseen solution for the existing or for the chronic problem of water in Yemen, this makes all nervous and worried about the situation.*

Moh. Hadid here frames anxieties around water scarcity in terms of lack of security and 'confidence' into the future, which produces nervousness and worry. Like Mr Hall (see ex. 4.52), he presents this primarily as concern over what may happen in the future.

4.4.4   Psycho-social health and wellbeing

Psycho-social health and wellbeing was a prominent issue of concern for participants. Mr. Kelly (H-Aus.) described the impact of everyday drought conditions on mental health, and the related importance of water for community morale:

Ex. 4.63   *And then [when the drought worsens], suddenly the lawn that's dying is terrible, because it gets you quite depressed. All those things – [there are] lots of studies. You've probably seen about the importance of swimming pools and green space in towns during drought. It's not a waste of water actually – the mental health benefits are significant.*

Mr Murphey (H-Aus.) recounted his own experience of people's desperation during drought. He described receiving threats of self-harm from farmers when his department restricted extraction of the first drought-breaking rains of 2020:

Ex. 4.64   *The idea was getting a first flush down the river so that water would move down the northern tributaries, make it into the Barwon-Darling, make it into Menindee Lakes, and then hopefully we could release that and it'll go all the way down and reconnect with the Murray. It is what we achieved, but along the way, there was two days there I reckon I was dead-set getting a text every 30 minutes from a desperate land holder in the northern basin saying, 'I'm going out backwards, you got to give us water!'. One from a wife saying she was picking up the pieces of her husband who was a mess on the ground because we wouldn't give him access to water. Another guy saying there'd be a suicide note with my name on it. So that's how contentious water's getting. During the long drought it's pretty intense.*

Mr Butler (H-Aus.) said that from his own observations, a link between river flows and community wellbeing was clear:

Ex. 4.65   *You travel to some places a bit further down the system like Wilcannia or Menindee,*
            and very much still the wellbeing of the community's linked to the wellbeing of the river.
            I know that sounds a bit a little bit out there – I'm not about to start reading tarot cards
            or anything like that – but it's one of those things that those communities… not just the
            financial wellbeing, but even their social wellbeing is very much linked to water. And
            what we saw happened between 2016 and 2019, early 2020: we had an incredibly dry
            period …there's no water in the system. And that's where we found ourselves for four
            years. It was very tough for communities; very tough for the riparian graziers; and
            very tough for irrigated agriculture. … Those towns which are agriculture-dependent
            economies didn't have the ability to get crops in the ground; employ that whole supply
            chain to transport chemical supply, seed supply, and the laborers who work on the
            farms. … so one of the things that is always a challenge for me is understanding the
            sentiment; understanding how people are feeling and thinking in each of those
            communities and up and down our rivers.

Drawing on his experience in the NSW Police Force, Mr Butler expanded on this theme to suggest
a link between water scarcity and crime rates, including violence:

Ex. 4.66   *Yeah, look, and everyone's different, you know, everyone's different. Some people, their*
            wellbeing is possibly not as directly affected by there being water in the river. But I
            know from my days with the police, the rates of domestic violence and assault, and just
            general call outs for the police in Wilcannia when the river was dry was far higher than
            when there was water in the river. When there's water in the river, there's a social
            outlet, there's a place for kids to go and play. People can throw a fishing line in, the
            town gets more visitors, they spend more money, they stay longer, as opposed to when
            the rivers dry, and that feature's not there.

Mr Woods (M-Aus.) observed the same link between water scarcity and crime rates, further
suggesting that physical and mental health also suffered when the river was dry:

Ex. 4.67   *When there's no water on the river here and it looks unhealthy, and the country's*
            starting to dry off because we've got no water in the wetlands and stuff, when you're
            out there, you feel dragged down. You feel run down because the country looks run
            down. It's the same up north as well, and there's data up about the Northern Basin and
            when there's no water in the river, around the impacts on the communities and the
            crime rates and even visits to the doctors. When there's no water in the river, the
            increased visitation to the doctors up there. Here is much the same.

Indeed, the link between water scarcity and crime is supported by McCausland and Vivian (2010),
who demonstrate an inverse relationship between water in the Darling River and crime rates in
riparian communities. As Barkindji elder Badger Bates (2017) stated: that 'When the river is up,
the crime goes down. As soon as the river drops, the crime rate goes up'. The authors found that
relationships with water are interwoven with culture attached to the river, and when that river runs
dry, the associated experience of loss is a significant cause of grief and trauma.

Upstream, Cr Davies (M-Aus.) reiterated his earlier point on water-related economic downturn in his community, before emphasising its implications for psycho-social wellbeing. He described the desperation in his community during years of drought, which could be seen materialising in substance abuse:

Ex. 4.68   *Clearly we get social issues regardless, but if people are gainfully employed they are far less likely to occur. ... The last thing we want to see is, you know, 40 year old blokes who are bloody coke-heads or ice-freaks and, you know, sitting amongst their peers [wondering] who's going to be the next one to die.*

The breakdown of social wellbeing ascribed to water scarcity was not unique to the Murray-Darling/Barka. "Hell" was the word Mr Al Hassan (M-Yem.) used to describe the daily hardship he faces with water scarcity, both personally and professionally:

Ex. 4.69   *Water scarcity makes life difficult and unbearable; it feels like a hell to wake up in the morning and not find enough water to wash your face or have a shower. This is a disaster and influences all aspects of life, whether at personal level to keep hygiene or work related. Its effect is not simple on us especially as in Yemen we suffer from water scarcity in addition to the situation [of war] we live in. I think I'm more affected than the most people – since I work at the Water Board this affects me very much. The lack of water is a problem for my daily life. ... If there is no water, my source of livelihood decreases. And when water problems increase, all problems increase and troubles accumulate.*

Notably, Mr Al Hassan here distinguishes between water scarcity and the war. He does not suggest that there is no causal effect between the two, but in saying 'in addition to' makes a clear distinction between them. Translated here as 'livelihood' Mr Hassan used the Arabic term 'رزق' (*'rizq'*) which, as discussed further in Section 7.2.3, encapsulates faith-influenced concepts of 'sustenance, provision, blessings and more' (Hakim, 2020).

As with Mr Butler's linking of water scarcity and crime rates, Ms Fakhoury (M-Yem.) too observed a link between water scarcity and domestic violence. Describing her organisation's implementation of a local water project, she pointed to reduced instance of domestic violence following significant improvements to the community's water access:

Ex. 4.70   *A big shock was when one of the women – because I call them constantly when our teams go there; I ask them to let me speak to them – the shock to me was when one of the women said that her husband has, you know, there's been less tension between her and her husband now. And there was quite some violence in the family. And I was really shocked that that means that, you know, we'd been able to reduce the violence without even knowing it.*

Moh. Hadid (M-Yem.) said that water "brings a sense of life and enjoyment" and that when it comes, "people feel optimistic". He then juxtaposed this with its scarcity to highlight water's impact on social wellbeing:

Ex. 4.71   *In Yemen it is not that easy to get your needed quantity, or essential needs of water quantities.*

This is, you know, it brings a lot of stress on us; brings extra burden on us. This is actually affecting our capacity to deal with life because it is really, really difficult to live where your essential needs are not met.

Mr Ghanem (M-Yem.) said impact of water scarcity on mental health in the community was pervasive, at least in part because water is so fundamental to life:

Ex. 4.72   *It is a very difficult feeling when the most important element in life and the most basic need becomes a [foremost] daily concern and cause of anxiety among the people, instead of getting busy attending to other concerns. It negatively affects all aspects of life and its course.*

A recurring topic that cut across several emerging themes, anxiety over water scarcity was referenced at all levels of influence in both basin contexts. Anxiety, considered here as real or perceived fear of what is to come, is related to feelings of lack of control over circumstances and as such is 'fuelled by uncertainty, overwhelming and competing demands on our time, and … social discomfort (B. Brown, 2015a). Like Mr Ghanem, Mr Ahmed (G-Yem.), at the grassroots, explicitly referenced these drivers, describing the strain on mental health involved in obtaining water, and observed that this problem did not discriminate between rich and poor:

Ex. 4.73   *Suffering lies in the constant anxiety when the time to fill the tanks comes, since we have to rationalize the use of the existing water so that it doesn't run out of us quickly. And when it ends the real suffering [is] with the search for water at the neighbours as a temporary solution until we find a water truck. Sometimes we go out to the street to fill up water from the water points distributed through organizations or charities. [But] For the rest of the neighbourhood, access to water in this water scarcity season has become the biggest pressure. Maybe, it's more difficult than getting more food, because getting food is easy for those who have money. While for the lack of water it makes no difference if you have money or not.*

4.5   Chapter conclusions

This chapter has presented the emergent themes around which participants situated themselves in relation to water. Such contextualisation serves as a platform from which to understand the nodes of conflict that arise in the face of water scarcity, which are presented in the next chapter.

In participants' own words, the language of critical human water needs is common and pervasive. Concepts of water's essentiality for life presented across all social influence categories in both basin contexts. However, significant divergence in the meaning of criticality revealed that what constitutes 'critical human water needs' is not clear and is subject to interpretation. Formalised water sharing arrangements, including legislation, treaties, and development targets provided little clarity on the matter, and in some instances served to reinforce the ambiguity of water criticality.

For some participants, critical human water needs represented acute physiological requirements for human survival on a short-term basis, namely drinking, hygiene and cooking. For others, critical needs included water for production of food and fibre, which are likewise crucial for human survival but are satisfied with less immediacy than physiological needs. Still others placed critical value on water as deeply interconnected part of their world view, whereby water is an inseparable component from holistic, ontological understandings of life itself.

Individual and social identities of participants were informed by water. Some felt personal responsibility to their communities through their water-related occupations; for others, water and in some instances its scarcity played a significant part in the construction of national and cultural identities; while for others, water's essentiality for the continuation of human life was tied to how participants viewed and understood themselves and their communities.

Participants saw water as essential for its role in enabling economic activity and livelihoods through employment. This in turn was widely reported to impact social cohesion, with water scarcity causing significant psychological hardship including struggles with mental health, stress and fatigue, crime, and substance abuse. For many, the unpredictability of water scarcity and particularly its variability over time represented an especially difficult challenge to deal with.

Differing perspectives regarding water's essentiality for life presented in this chapter have served to illuminate the subjective values that participants attach to water. The next chapter identifies the nodes at which participants' differing values around water are perceived to be conflictual.

5   Conflict dynamics

5.1   Chapter introduction

This chapter presents the nodes of conflict that participants identified in relation to water scarcity in their respective contexts. 'Conflict' is used here as per the definition given in section 2.3.4, whereby perceived differences between individuals, communities, or institutions present with a belief that those differences cannot be simultaneously satisfied.

In this chapter, comparison between participants who share water within a single hydro-geographical context serves to identify points of contention within that common environment. Comparison between the Murray-Darling/Barka and Jibal as-Sarawat contexts does not identify nodes of conflict as they do not share a water resource, but instead serves to identify commonalities in how participants view water scarcity conflict despite their contextual differences.

The inclusion of conflict nodes herein satisfies the comparison criteria explained in Chapter 3 (Section 3.4.43.4). It should be noted, however, that in practice nodes of conflict rarely stand alone. In this chapter, the components of disputes raised by participants interconnect and overlap with others. By nature of the interview techniques employed in the study, participants were given freedom to answer each question as they interpreted it, and in many instances multiple points of contention emerged in only one or two sentences. Thus, while the data in this chapter is clustered as it emerged through the IPA coding process, single quotes are in many instances also relevant to other parts of the thesis. Where this occurs, cross-references are provided.

Firstly, section 5.2 presents differing opinions regarding responsibility and influence in water management. Some participants discuss challenges navigating water sharing arrangements legalistically, while others incorporate moral judgement. Divergent views on individual and collective responsibility for sharing scarce waters is observed, along with their materialisation in how participants approach water allocation and extraction.

Secondly in section 5.3, the role of regulation and the state is raised as a contentious issue, including the impact of participants' values around common pool resource compliance and accountability. The playing out of this tension likewise emerges as a tension between predictability for flexibility as a pathway to pursue security in the face of scarce water.

Thirdly, section 5.4 presents the various functionalities of water that participants value, and how these are often viewed as either competing or complementary. On this matter, participants discuss the perceived threat of imposing industries; the problem of non-consumptive water functions

being seen as a single entity; and the complex allegiances between individuals and communities that form in pursuit of common goals.

Fourthly, data presented in section 5.5 relates to the more traditional understanding of conflict over shared waters in a hydro-geographical sense. For Australian participants, conflict between upstream and downstream riparians emerges as a frequently referenced point of contention within the Murray-Darling/Barka; while for Yemeni participants with little overland water flows, a variant on spatial water sharing emerged as tension between urban and rural water sharers.

Lastly, section 5.6 reports conflicting participant views as they relate to the sharing of water over time. Participants discuss their perceptions of sustainability where it conflicts with competing values, as well as differing views on the urgency and prioritisation of water needs satisfaction in the short-term.

Chapter conclusions are presented in section 5.7.

5.2   Responsibility and influence: who manages water?

5.2.1   Who is in charge?

In the Murray-Darling/Barka Basin, where the control of water is constitutionally split across three levels of government in five state and territory jurisdictions, water governance is a complex web of power and responsibilities.

From his perspective as CEO of the MDBA, Mr Glyde (H-Aus.) suggested that the biggest source of conflict in the basin was not around a particular stakeholder or self-interest, but a lack of clarity as to who is responsible:

Ex. 5.1   *Probably the biggest conflict in relation to natural resource management isn't between the environment and industry or the various other interested groups; it's actually sorting out who's responsible for what between the three layers of government.*

He observed that amid this structural ambiguity, many stakeholders look to the MDBA for leadership, even though the organisation does not hold the degree of power that many attribute to it:

Ex. 5.2   *I thought before I came into this job that the [Murray-Darling Basin] Authority actually was an authority and actually did have a greater degree of control than what it does. And I think in the community at large, I think the environmental groups, the industry groups, and sometimes even the state officials, think we have a lot more control than*

> *we do. But it's such a shared responsibility under the [Australian] Constitution. ... I think*
> *everyone, and no one, controls the way in which water is used.*

Similarly, Mr Woods (M-Aus.) said that the MDBA's public profile leads people to assume it holds greater management authority than it does:

Ex. 5.3   *That's the real disconnect: on even who manages the water in the basin. You could*
probably talk to people here and they said, 'Oh, they're the Authority, they manage the
water that's in the river there.' Well, no, it's Water New South Wales and DPI-Water [40]
that are the managers of the infrastructure along the river. So, that whole information
or communication of who the regulators are and all that, across the basin, for the
common man on the street, they still point the finger at the authorities because they're
the only ones that are always in the public eye.

Mr McLaughlan (M-Aus.), a former minister in the SA state parliament and a now-prominent industry leader, agreed:

Ex. 5.4   *I think what's been lacking for a hell of a lot of people is an understanding of where the*
power lies. I think if you were to ask most people in the street who controls the Murray-
Darling Basin they'd say the Federal Government. And that's because the Federal
Government tried hard – they've spent a lot of money.

The feds have got powers of coercion, but they've got no constitutional power over the
water. ... If New South Wales walked away [from the MDBP], then we lose all control
of what happens. And the Feds have very little power. All the Feds can do is bring people
together. [But] There is no doubt that constitutionally I think the general public sort of
thinks it's the Federal Government that controls this [sharing agreement].

It must be noted that the study did not seek the opinions of the public outside the targeted participant sample, whose opinions are relevant in the Australian democratic process of determining basin policy. Yet, grassroots participants who faced water scarcity in close proximity appeared well-versed in the division of responsibilities despite its complexity. Mr Whittaker (G-Aus.) suggested "the noisy few" made the division of authority unnecessarily complicated:

Ex. 5.5   *I think the Murray-Darling Plan is a good philosophy – to take it federally rather than*
the states. If it involves four states, they're all 'Me, me, me.' So you take a broader
picture and try to generate a plan for the whole river; the whole Murray-Darling. That
makes sense. But just too much politics and too much bloody influence from people that
shouldn't have as much influence. The noisy few is our frustration.

Where governance ambiguity in the Murray-Darling/Barka stemmed from complexity of navigating complex rules, participants in Jibal as-Sarawat were exasicerbated that existing

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[40] At the time of interview, this responsibility was held by NSW Department of Industries (DPI) – Water division, which preceded the NSW Department of Planning, Industry and Environment.

governance frameworks were not being enacted. For them, governance ambiguity stemmed from a question of legitimacy, where water sharers faced a complex situation of dual and disputed government, non-functional public institutions, and war.

Moh. Nader (H-Yem.) distanced his ministry from direct water services provision, clarifying a division in tasks between governance and operations. Both, he claimed, were significantly disrupted and complicated by disputed authority in Yemen:

Ex. 5.6   *The Ministry is not a direct service delivery format. The Ministry is a supervisory body that develops policy and conducts the process of monitoring the work of the administrative units decentralized in cities, villages, and rural areas. The Ministry oversees this process and provides advice and support to the providers of these services. What happened immediately after the war[41] is that the Ansar Allah Houthis group has taken control of the capital Sana'a and a number of institutions in the northern regions. But we in the southern and eastern regions, division is taking place and therefore the possibility of working has become more difficult, especially with the areas controlled by the coup group. So for us, in the areas that are subject to our control I find that [way of] dealing is new. But in general, when it comes to the management of city water as a whole, as a unified state, we find it problematic in dealing with the areas controlled by the coup d'état. The government is trying to … provide assistance in relation to the Cholera, or in relation to some of the problems that occur in all areas of the country, but of course… [this is challenging].*

Mr Ghanem (M-Yem.) complained that despite an established governance structure, "the absence of the state" to enact it rendered the framework useless in a time of war:

Ex. 5.7   *There are laws pertaining to water resources that contain legal texts that regulate the process of managing and exploiting water resources, whether at the official level represented in organizing the works of the General Water Corporation or at the level of organizing people's use of water such as investing in groundwater wells or agricultural folk and others. But such laws will not be used in the time of the war, we are living in today, and the absence of the state despite the importance of these laws for all in organizing the process of managing and using water and distributing it to all citizens alike.*

Mr Ahmed (G-Yem) said the ensuing "chaos" left people confused and agitated:

Ex. 5.8   *There are no regulations or arrangement of these (water resources) if they (people) rely on a single source of water, and there is chaos and they (people) are unable to know with whom to deal to get water, which keeps them in a state of confusion, and then chaos or perhaps violence in order to get water.*

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[41] Though Yemen was generally considered to be in a state of "war" at the time of interview, Mr Nader is here referring to the civil uprising of September 2014, which he also here calls a "coup d'état".

5.2.2 Ideologies: individual or collective responsibility

Related to governance ambiguity, responsibility also emerged as a point of contention. However, discussions of responsibility took on a more explicit moral imperative than the broader discussion of governance, with participants expressing divergent views on the ethical behaviour of individuals, corporates, and government. In some instances, participants saw water sharing responsibility as a demand-side problem, placing the onus on individual water users to take only their fair share of resources. For others, fair sharing was a supply-side issue, in which fair water sharing is the responsibility of the governing authority through an equitable system of distribution.

Mr Butler (H-Aus.) said his political party saw a fair water sharing system as the responsibility of government, rather than water sharers themselves:

Ex. 5.9   *We've tried to say 'Well look, at the end of the day, if you're unhappy with the rules, that's not a problem that's created by the people who are following the rules. That's a problem with the people who made the rules, and that's the regulator and it's government', and tried to steer people back towards the water minister and to the state and federal governments, rather than seeing them cranky at each other and attacking each other because it just gets us nowhere.*

In that sense, Mr Butler's view was that the collective is responsible for the water security of the individual. However, this did not apply on the larger scale where a collection of individual states forms a federation, as is the case for Australia. Introducing morality, he questioned whether the legal right of individual states to implement their own water allocation plans absolves them of a moral obligation towards their neighbours:

Ex. 5.10   *The discussion that we haven't had and we haven't even touched on yet is Queensland. Because, you know the catchment up there, west of the ranges at Toowoomba is a huge determinant in how much water we get down our system. And when the 324 embargoes were put on in February this year, Queensland had no such embargoes – they just allowed people to access water under the existing plans that they had. And that's their right, they can do that as a state, they can make that decision. [But] If it was morally the right thing to do - I'm not sure. ... If we're saying the Murray Darling Basin Plan's an agreement between four states and one territory, then the decisions that are made by those states also need to have consideration for other states that, you know, might be relying on water to come across the border.*

Mr Taylor (G-Aus.) is a former water management executive in the Australian public service from Canberra, who in his retirement has taken up grassroots wetlands activism in rural communities across the Murray-Darling/Barka Basin. He too said the issue of legal entitlement was a long-standing point of contention in the basin. Not himself an agricultural water user, he reflected on

whether government-legislated responsibility for regulating water allocations meant users were free to extract water up to their legal entitlement:

Ex. 5.11   *The situation on that river [the Macquarie] has always been who gets the most water and why. And the irrigation [industry] has always claimed that it was the most profitable, and that if they bought water entitlements legally, it wasn't their problem that government had over-allocated the licences.*

Here, profitability was cited to support claims of legitimacy. However, the same point was used to the contrary by other participants to portraying irrigators as greedy (see section 6.6.3).

In Mr Glyde's (H-Aus.) opinion, responsibility for water access in a democracy is shared. While government sets the rules on allocations, he said, those governments are nonetheless influenced by their constituents. On that basis, corporate responsibility and public opinion can have a significant influence on regulatory outcomes:

Ex. 5.12   *It's a combination of the states and the Commonwealth that determine how water is allocated. [But] You then add to that past use and history of use is also a really strong determinant, and that you can't underestimate the power of the lobby, of particular existing interests. If I think about... well all the bureaucrats and scientists were able to say that we'd overallocated the water in the Murray – 'Look at all the problems, it's obvious to everybody' – it's the power of all of the interests who are using the water that can often sway governments in how that water's used. So I'd say they have a strong role in all of that, in the same way that they could all play a strong role in the long-run solutions in a corporate social responsibility sense as well. I'd add into that, ... that public opinion's really important.*

Participants in Jibal as-Sarawat likewise differentiated between individual and collective responsibility. Yet in this context, participants consistently pointed to individual responsibility as unideal but necessary due to the failure of the state to fulfil its obligations.[42]

Mr Al Saif (H-Yem.) asserted that fair water sharing should be organised at a local level, but that the state carries responsibility to make sure fair water distribution is carried out. In both instances, however, he implies that it is not currently the case:

Ex. 5.13   *Raising awareness among people of what is going on with water scarcity [is important], and [so is] organizing committees responsible for fair water distribution. The state should impose its authority in distributing water fairly.*

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[42] Governance structure undoubtedly has a significant impact on participants' views towards state responsibility for water management. Mr Glyde's comments regarding the influence of public opinion on government allocation policy is a clear indication of this. While a thorough analysis of this impact is beyond the scope of this research, it is assumed here that Yemeni participants' insistence on state responsibility is at least in part influenced by a lack of individual or local-level agency to influence government water policy.

From Mr Al Saif's perspective, noting his position as a high-level legal advisor, though the state is absent in implementing its water management responsibilities, it still has the authority to do so.

Ms Karman's (H-Yem.) view is that responsibility for fair water management is shared between local communities and the state but was sceptical of government interest in meeting their obligations. In practice, she reflected, services offered by government are 'modest', with the individuals, private enterprise, and altruism filling the void of state responsibility:

Ex. 5.14   *As is common practice, water is managed at two levels: at the governmental level and at the grassroots level. The government carries out public projects, which cover only a small number of the population in some major cities and neighbourhoods. As for the largest part, it depends on self-initiated well drilling with funding from community members themselves, commercial figures, or philanthropists. Some powerful individuals resort to random well-digging to obtain water. In short, the government's contributions in this regard are very modest if not absent in most cases. … There is no real government role [at present] to regulate water consumption, which has opened the door to tribal and social conflicts.*

         In my view, groundwater should not be allowed to be used in agriculture. Many studies and plans have been carried out to reduce the catastrophic water scarcity in our country, but no relevant seriousness shown by the government due to irresponsibility and corruption.

However, in contrast Mr Ghanem (M-Yem.) said that:

Ex. 5.15   *The state is responsible first and foremost for water sources, and [then] for separating people's disputes over water or its use in illegal ways by enforcing these laws and obligating everyone to comply with them.*

In saying 'obligating', he emphasises the role of the state to compel water sharers to comply, which suggests that a moral imperative on the individual is insufficient.

Moh. Hadid (M-Yem.) indicated his approval of the existing Yemeni water regulations, but despaired at the lack of enforcement which he saw as the responsibility of government authorities:

Ex. 5.16   *There is no Integrated Water Resources Management or policies reflected. Imagine, we have policies - we have really nice policies! But there is no government to impose or to watch these policies or apply these policies. Imagine, Yemen is about to go to a scarcity, while there is no authority to stop people from digging new boreholes. This is the thing.*

However, like Mr Glyde in Australia, Mr Farraj (G-Yem.) suggested water access is a shared responsibility:

Ex. 5.17   *Firstly, these sources must be perceived as a public right, and the circle of beneficiaries should be expanded as much as possible. Secondly, individuals should feel responsible for water and the need of others for it during their consumption.*

It should be noted that, while many Yemenis lamented a lack of effective water governance, this does not mean that there is no social contract, but rather indicates that a social contract is not formalised in authoritative legislation.

5.2.3   Allocation or extraction

As the previous chapter illustrated, clear tensions emerged between the role of the individual versus the role of the wider governance system within which water users operated. The different ways in which participants viewed their own roles and responsibilities influenced their response to water scarcity problems.

Some water sharers saw no issue with their water consumption since their water entitlements had been legally acquired through government licensing. However, others saw a degree of individual responsibility to act with consideration for other water-sharers, beyond and despite the existing water governance system. In both country contexts, a flashpoint for this issue was the cultivation of high water-demand crops. In the Murray-Darling/Barka, cotton, rice, and almond crops were frequently cited, while in Yemen, qat production was likewise a widespread point of contention.

Mr Glyde (H-Aus.) said that the extent of negative public opinion towards crop choices continued to surprise him:

Ex. 5.18   *I'm struck by the number of people I meet in my private life who really think that we've overused the water and we shouldn't be using water for growing cotton and rice.*

His phrasing of 'who really think' suggests that such a degree of conviction may be somewhat misguided, though he does not explicitly confirm this or say why.

Mr Butler (H-Aus.) suggested that the conversation around crop choice is a façade for the deeper issue of water allocation management.

Ex. 5.19   *People try and drag you into a discussion about cotton. And I love to tell them that cotton and corn use pretty much the same amount of water but I don't hear anyone complaining about corn. It's not about crop types. It's about the management and allocation of water. And this is the thing I mean, any of those licence holders, water access licence holders who are on their systems could take their water licence and pump it out on the ground, let it soak into the ground and evaporate, whatever they want! I mean, it's an entitlement that they've legally acquired. So I think that some industries have done better at maintaining their social licence than others. ... There's plenty of*

> *people who say 'Oh, you shouldn't be able to grow cotton in Australia'. Well, you can grow whatever you bloody like if you've got the legal allocation to do it. The bigger question is: do we have the settings right in terms of the allocation of water? Have we over-allocated water? And if we have over allocated water, how do we provide a fair and reasonable exit strategy for those people who may have invested significant amounts of money in that infrastructure on the basis of a legally acquired right that they've got.*

Mr McLaughlan (M-Aus.) likewise indicated vehemently that he did not believe rice or cotton is the issue:

Ex. 5.20   *If you look at where the cotton's growing, that water's got fuck-all chance of getting to us. If there's a use for it, use it rather than just let it spread out somewhere and all evaporate. And rice is really interesting because I always see the rice guys as almost beneficial to us down here because when water's short the rice guys sell their water. ... So they actually help by bringing casual water on [elsewhere] when water's short. But then the other end of things, when you've got really wet years they're almost flood mitigation. ... So I've never had a problem with rice or cotton, and yet ... You mention cotton and rice to anyone in South Australia, and 99 per cent of them think its evil. Yes, because they think that it's bloody taken all our water, which is not the case!*

In Yemen, where water allocation regulation was either 'modest' or not enforced, responsibility for over-extraction fell to users. Mr Ghanem (M-Yem.) who earlier said that the state was obligated to enforce regulation on extraction (Ex. 5.7; Ex. 5.15), described the cultivation of qat as a 'waste' of water and an 'obstacle' to fair water sharing:

Ex. 5.21   *There are natural causes that were an obstacle for an equitable distribution of water, such as late rain season, low water levels in the underground wells, [but there is also] the waste of water resulting from the expansion of the phenomenon of cultivation of the qat tree in the absence of water awareness programs and agricultural guidance.*

Mr Al Hassan (M-Yem.) initially emphasised a causal link between qat production and over-extraction, yet indicated that poor usage practices may then create a feedback loop:

Ex. 5.22   *[Production of] Qat is one of the worst problems affecting Yemen. It leads to the uncontrolled withdrawal of water without regulation and drawing down the water table, besides the irrigation without rationalisation [enlightened usage/allocation].[43]*

Ms Fakhoury (M-Yem.) painted a destructive picture of qat cultivation, describing how she used to enjoy it but can no longer bring herself to consume it on moral grounds.

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[43] 'Rationalisation' as used here is translated from the Arabic 'ترشيد' ('*tarshid*'), which can convey rationing of supply, but also guidance – and particularly right guidance.

Ex. 5.23   *We must not forget that apart from the conflict and the mismanagement, it's the qat! The qat which is growing in Yemen. This is a big, big issue. ... Because the qat is like gold. It brings them a lot of money. ... And the water irrigation that it needs - because it needs a lot of water - I think this is really causing an issue. ... I call it the devil crop. I used to chew qat also; I enjoy it very much. But it's causing such a terrible impact.*

Referring to qat as 'the devil crop', the ethical lens Ms Fakhoury applied to the matter of flood irrigation in water-scarce contexts is akin to the public opinion referred to by Mr McLaughlin (Ex. 5.20) in which cotton and rice cultivation in the Murray-Darling/Barka is 'evil'.

Mr Farraj (G-Yem.) recounted how his enjoyment of chewing qat as a social release caused arguments in his family. Though in this instance, the dispute was associated with qat consumption rather than its cultivation:

Ex. 5.24   *Sometimes, I argue with my mother sometimes because of what she thinks as my lack of interest in searching for water. And sometimes because of what she says concerning my excessive consumption of water because I still adhere to a lot of my habits as a student in the city, such as constant showering, washing clothes regularly, and inviting my friends to qat sessions that require a great deal of drinking water.*

Mr Assaf (G-Yem.), a university graduate and youth activist from Ibb governorate, reported that not a great deal is known about the 'dilemma' of water scarcity, yet stated with surety that qat cultivation was culpable:

Ex. 5.25   *Water scarcity is a dilemma that has been disturbing societies in a number of countries of the world, and this suffering has ended now except for in Yemen. We do not know why. [Although] Maybe I should add that the depletion of water is caused by the qat tree.*

5.3   The system: how should water be managed?

5.3.1   The role of regulation

Participants often talked about rules that govern water access throughout their catchment, raising three distinct issues. Firstly, while some viewed hydrological precision in water regulations as the fairest sharing option, others advocated for a one-size-fits-all approach. Secondly, some participants took issue with the inconsistency between laws and actions. Thirdly, some highlighted the absence of rules altogether.

Mr Murphey (H-Aus.), a high-ranking water manager in the NSW public service is responsible for implementing state-level water regulations. He said significant differences in allocation policy

between NSW and its neighbouring states created tension when there is an unequal division of water.

Ex. 5.26   *The MDBA will say 'Here's your bucket of water' for New South Wales, Victoria and South Australia. [But] We have different state allocation policies. Ours is – at the moment at least, we may review it – is boom or bust. If we get water, we allocate a lot of it. We hold water back for towns and High Security, but soon as General Security water becomes available, we allocate it and make it available. So in wet years, ... New South Wales is probably far more productive: more crops in the ground, more water allocated. So we have a quite, let's call it an aggressive allocations policy. [But] When we start to hit three very dry years in a row, you've got the flip side: the more conservative states still have a lot of water to allocate, and they do. Whereas Water New South Wales is down to zero percent.*

Downstream, Mr McLaughlin (M-Aus.) expressed significant frustration at the NSW approach.[44] As a downstream policy leader in South Australia, he said overcoming different regulations between states was a "nightmare":

Ex. 5.27   *[NSW] have got such a shit bloody water licensing system. Look, ours is a very simple system but New South Wales has probably, I think at one stage they had something like 20 different water products, so to speak. ... So many different variations and every bloody catchment seemed to have different rules. It was a bloody mess. It was a friggin' nightmare trying to drag all those things together. We introduced water trading between states, ... [but] trying to find a way of converting those different products in New South Wales into a South Australian product is bloody difficult.*

Mr McLaughlin's frustrations centred on the difficulty of building congruent sharing policy across borders, with the NSW approach seeming unnecessarily complex for SA purposes.

Also in SA, Mr Lee (G-Aus.) likewise complained of rule disparity between the states. Asked what he thought is important for fair water management in the basin, he said there was a need for more equality across the board:

Ex. 5.28   *We're all one country and it's one river. And you can't have different laws in different states. You know, you hear ugly stories up – right at the top [of the basin] – of where one bloke's allowed to build a dam. ... The story the other week: this guy, he's filled up! He said 'Shit, I've got to let some water through' [because now he has too much]. ... So yes, that's where greed's got a hold of it. So, whoever got permission to do that should be called to answer for it.*

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[44] Mr McLaughlan refers to 'licensing', which is related to but different from 'allocation' as discussed by Mr Murphey. An allocation is the proportion of a licenced entitlement that is available for use, expressed as a fraction or percentage. Licences are granted to users for different water 'products' categorised by purpose, source and sharing priorities.

Mr Lee said the failure to have homogeneous regulation across the basin allowed for greed to flourish. Instead, a homogenous basin-wide regulation offers a means to rein in unethical resource hoarding.[45]

Mr Collins (G-Aus.), however, sees merit in both a one-size-fits-all approach to regulation and its alterative. As manager of a cotton farm on the Lachlan River in the NSW Riverina – upstream of Mr McLaughlan and under the allocation jurisdiction of Mr Murphey – he described the complexity of an individual catchment approach; the inaccuracy of a homogenous policy approach; and the politics of both:

Ex. 5.29   *The conflict there at the moment is about the rules, about when can people take water and what will that parcel of water do. Within the Murray-Darling Basin, every one of the rivers has its own plan which is meant to reflect the security and reliability of that and equally share somehow the amount of water diverted, and the amount of water that goes to the environment. The Lachlan [River] is a good example, because it's not actually connected to the [wider] Murray-Darling system.[46] ... The rules and the caps and all the other things are applied to the Lachlan, even though none of the water in the Lachlan [flows downstream]. A tiny little bit might get across in those floods, but generally the water doesn't make it into the other system. It's not involved; but it is politically all involved. ... There's a recognition that physically they don't connect; but all the rules are pretty well the same.*

He expanded on what he meant by 'politically all involved'. The Federal approach, he said, attempts to view the basin as homogenous because it, holistically, is a "national asset". In this sense, it bears similarity to the earlier excerpts from Mr Glyde (Ex. 4.27), Sen. Hanson-Young (Ex. 4.28; Ex. 4.37), Mr Kelly (Ex. 4.29); Mr Woods (Ex. 4.30), and Mr Besser (Ex. 4.38) on national identity. Mr Collins continued, explaining that what he saw to be the Federal Government's "blanket approach" stemmed from a view that the basin is a national asset:

Ex. 5.30   *They were saying 'It's [all] water, it's water, it's water'. [But] How do we get a national approach? If we can get rid of the states tomorrow it would be a darn good thing, but anyway, we can't. They're not about to go. And so then you have the states having their say. And then within the state, they break it into management plans that were trying to reflect every river. But the Romans were right when they said 'Divide and conquer'.*

Division between the state and federal governments, he indicated, would likely benefit the latter. The 'divide and conquer' mantra was also implied by Mr Butler (H-Aus.), who suggested that the

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[45] This is on the assumption that 'greed' is seen by Mr Lee as unethical.
[46] Mr Collins qualified this statement to acknowledge that there is some underground flow that connects the Lachlan to the wider basin, but that his comments were referring to overland flow in the river.

NSW Minister for Water preferred to have communities fighting each other than have them "coming after her".

Mr Kelly (H-Aus.) said that regulation needed to allow room for adjustment, both from a management and a water user perspective. This, he said, allows basin stakeholders to prepare for disaster, which he links to resilience:

Ex. 5.31   *Good governance frameworks. And good rules, but rules that allow for adaptive management and flexibility but people can see they're being treated with integrity, they're not being shafted. You know, they can see the rationale. So with climate change, the consequences are so great you've got to prepare for it. We're probably more resilient to drought and climate variability because of lot of it addresses this climate variability as well as long term climate change so you're actually going to win either way. So its good practice.*

A clear tension exists between complexity and manageability, and the optics as well as the practicalities of this clearly mattered to participants in determining fairness. This tension is analysed in section 7.3.6.

The emerging theme of regulation applicability took on a different light in Jibal as-Sarawat, where the hydrological context is quite different from the Murray-Darling/Barka Basin in that surface water flow in rivers is uncommon. This has a significant impact on water sharing dynamics not only from a regulatory point of view, but also in everyday perception. While groundwater aquifers are well-understood in Yemen to be shared resources, the dynamics and impacts of extraction are less overtly or immediately obvious. In this context, incongruence between water sharing rules and conditions reported by participants centred primarily on the weakness or redundance of rules without state capacity to enforce them.

Mr Al Saif (H-Yem.) cited existing water law, yet expressed concern that even though regulation is in place, it is not enforced:

Ex. 5.32   *In Yemen there are laws to regulate water usage and management under law no. 33/ 2002 and its ratification no. 12/ 2010 and related decisions. [Yet] The laws that are concerned with water are not implemented.*

His point was expanded by Ms Karman (H-Yem.), who opined that the regulation of groundwater drilling and extraction was 'modest', and like Mr Al Saif expressed frustration that they were 'rendered useless' by lack of enforcement:

Ex. 5.33   *Laws should be passed to regulate well drilling and prevent random drilling that causes damages to the groundwater. In general, Yemen's legislative structure in this regard is still very modest. What I know is that there is a law no. 33/2002 pertaining*

> *to water, but the problem always remains in weak law enforcement. The importance of laws lies in the fact that they provide legal cover for solving problems, but when not implemented, they are rendered useless. ... There should be combined efforts by the government and local civil society, as this will contribute to establishing firm rules for a fair and peaceful water distribution in the future.*

Here, she also suggests that there is scope for government and civil society to work together more effectively, indicating a perceived problem with enterprise nesting.

Mr Al Hassan (M-Yem.) discussed the impact of laws that are not directly related to water, but nonetheless negatively impact it. He highlighted inconsistency between water conditions and property law, pointing to it as a source of conflict between government departments:

Ex. 5.34   *The construction and urban planning laws are the most important laws affecting water resources. These laws do not recognise that there are artesian wells and that there is pollution. Therefore, constructions are erected in any area without any considerations. It allows building in each area, so the citizen applies to get a licence and this creates a conflict between the water institutions and the housing office. ... Constructing new roads in the water basins tempts people to buy lands there and build. ... There's random well-drilling, and there's no strict rules to stop it. Unfortunately, the water board is marginalised in the sense of other services. ... Random drilling operations are continuing and there are no strict penalties to stop this attack.*

Here, Mr Al Hassan firstly suggests that the action of an individual causes conflict between two third party institutions. Using the word "attack", he painted an adversarial picture of the relationship between citizens, in which the unregulated extraction is an offensive practice that needs to be defended against.

Moh. Hadid (M-Yem.) expressed satisfaction with the regulations in place, though he too lamented their lack of coordination and integration between agencies:

Ex. 5.35   *Actually, in terms of the availability of policies, I can tell you we have some policies already on the ground. We have some policies. We have an authority in Yemen called NWRA – National Water Resources Authority in Yemen. ... But as I told you, it needs like, integrated government. Strong security; I mean, forces; and also it can't implement things alone. This is the point. There is some respect still there, but also, due to the you know always unrest situation or conflict situation, a lot of deterioration of people and breaking rules and policies have been. Because there is no control.*

Regulation applicability was also raised at the grassroots level. Mr Assaf (G-Yem.) discussed the issue with added emphasis on power disparity, saying that regulations only advantaged 'the strong':

Ex. 5.36   *In general, the laws and the regulations will be useful if they are activated and followed by the citizen, as well as the official bodies themselves. Laws and regulations are often useful when the state exists and assumes its responsibilities, whether in the water board*

> *or anywhere. While in the time of war and the absence of the state or its inability to do its duty to the citizen, only the strong will benefit from these laws and the weak will be deprived and become unable even to get a drop of water and face the difficulties in getting water.*

While he did not expand on why this is the case, his comments display a power imbalance between those who have legal recourse, and those who do not.

Beyond incongruence, a further theme that crosscut Yemeni participants' perspectives was a lack of enforcement of laws, even if they exist.

5.3.2   Compliance and accountability

Where rules and regulations are in place, participants raised concerns about water sharers' compliance and accountability. Compliance here means to act in accordance with the rules and/or the monitoring of those actions, while accountability refers to the justification of behaviour under the rules.

Sen. Hanson-Young (H-Aus.) said problems with compliance arose when people saw others failing to adhere with regulations:

Ex. 5.37   *People see 4 Corners reporting that upstream there's been water theft, ... [so for] the next door neighbour who's trying to do the right thing, it's just like, ugh, why bother? And then it becomes a free for all. If the guy next door isn't doing the right thing, and is ripping off taxpayers, stealing all the floodplain water, which leaves the farm next door bone dry, you know, why should anyone play by the rules?*

From the perspective of what he called the 'Fourth Estate',[47] Mr Besser (M-Aus.) said that "insufficient scrutiny" by the media had allowed impunity to grow in the Murray-Darling/Barka:

Ex. 5.38   *The controversy thus far had been confined effectively to what the parliament was telling the people was controversial, which was water buybacks. ... And so for me, that's a kind of classic thing where there has been an area in the body politic which has been effectively neglected by the press, and left to fester. And it's weird, I mean it's kind of contradictory to say that there had been all this coverage and yet no coverage, but the fact is everyone on the inside knew there were no functioning water meters in the part of the basin that I examined. Now I was shocked to learn that, and I think our viewers were shocked to learn that.*

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[47] As stated by Hirst (2013) 'The Fourth Estate describes the journalists' role in representing the interests of "the people" in relation to the business and political elites who claim to be doing things in our names'.

Mr Butler (H-Aus.) explained the importance of accountability, explaining that he thought the 2019 SA Murray-Darling Basin Royal Commission was a worthwhile endeavour for either uncovering wrongdoing or offering reassurance:

Ex. 5.39   *People often say to me … 'What's the Royal Commission going to do?' And I think at a very basic level, what it does is it provides a baseline in terms of the allegations of things that have been done shouldn't have been done. If that's the case, then that gets exposed and people are held to account. If it hasn't happened, then people can be reassured that nothing untoward has happened.*

It is arguable that the Royal Commission and Mr Besser's water theft reporting could be viewed as mechanisms of accountability both for and to water sharers in the Murray-Darling/Barka, actioned at a high level through public institutions.[48] However, accountability between users at a community level was seen to be lacking.

Mr Taylor (G-Aus.) said Mr Besser's reporting had "just scratched the surface" of the issue of water theft.

Ex. 5.40   *It's rampant. I think that it undermines the credibility of everything until they fix it. When I say it's rampant, I mean there are a few well known culprits. … We had this strange situation where the people who are lobbying longest and loudest against environmental water, some of them are the ones who are actually removing that water from the system. … People in town know who is doing this, but it's like there is this silence, this code. Nobody dobs anybody else in. It's a mindset thing.*

However, Mr Whittaker (G-Aus.) said that instead of promoting accountability which he supported, unbalanced media reporting on water theft generated damaging stereotypes and fostered abuse and division:

Ex. 5.41   *I thought it was disgusting. … If someone's out there flogging [stealing] water, go for [reprimand] him. [But] The show was so blatantly trying to put a broad blanket over cotton irrigation, the whole Murray–Darling Basin Plan, because some bloke in a pub thought someone was flogging water at Bourke. … [But] I've never flogged water; I've got blokes [auditors] check it all the time. But, you know, I've got my kids are getting abused because their parents are cotton growers. And the response is, 'Oh well, collateral damage, bad luck, and you can fuck off.' You know? I'm done. I've put up with this too long.*

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[48] The media in general could be considered an accountability mechanism, but it is particularly true of this case since Mr Besser's report was published by the publicly owned Australian Broadcasting Corporation (ABC).

In Yemen, participants at all influence levels frequently complained of the complete absence of accountability. Little public monitoring was evident, and despair at a lack of water-sharing accountability was prevalent despite having regulation in place.

At a high-level, Moh. Nader (H-Yem.) described extreme incidences of conflation between water and non-water-related offences:

Ex. 5.42   *When armed conflicts occur, the police and the judiciary register, but [when] there is a public incident in which many people are sacrificed … the dispute over water and these incidents was recorded in police records as criminal incidents because they lead to murder, so documented statistics about conflicts due to water scarcity are few. That means if we go back to the police records, it's hard for us to determine whether these conflicts are water-related or not.*

Expanding on his earlier comments on conflict regarding "random well drilling" (Ex. 5.34), Mr Al Hassan (M-Yem.) said that well drillers were exploiting "legal and legislation gaps", and that there were no "deterrent penalties" for overextraction (Ex. 4.25).

Moh. Hadid (M-Yem.) said there were "no reliable authorities in place" in Yemen to police water compliance:

Ex. 5.43   *They don't care about… they are actually using the income or taxes of the resources of the government to fuel the battle. They are not allocating the resources either to people for their normal salary, or to do something for water. Imagine! This is the thing. So, there is no trust on local authorities.*

In saying "they don't care", Moh. Hadid makes the issue personal rather than simply transactional, implying that the policing of water extraction would constitute active support for Yemeni citizens. A similar sentiment was conveyed my Mr Assaf (G-Yem.) who said that they had a "duty to the citizen":

Ex. 5.44   *While in the time of war and the absence of the state or its inability to do its duty to the citizen, only the strong will benefit from these laws and the weak will be deprived and become unable even to get a drop of water and face the difficulties in getting water.*

The desperate picture painted by Mr Assaf suggests a lack of extraction compliance combined with a complete absence of law enforcement had resulted in a survival-of-the-fittest scenario.

Yet Mr Bashar (G-Yem.), also at the grassroots, put greater onus on user compliance, saying that there was a need to raise public awareness of the "proper use" of water:

Ex. 5.45   *Because some citizens, whether at well sites or in the city, use water for illegal matters such as watering qat and farms, as well as building or tampering with [the distribution network/wells].*

5.3.3   Predictability or flexibility

A tension emerged between participants' need for predictability in their operating environment, and regulation that was flexible enough to facilitate adaptability to change. Determining what constitutes an appropriate level of policy rigidity emerged as a source of tension.

Mr Kelly (H-Aus.) said that "agreed policy frameworks" allowed people to know how a prevailing water sharing situation will be handled:

Ex. 5.46   *Rules, governance frameworks and all that are so important because they can either stop you achieving what you need to achieve or enable you to at least have the chance of achieving what you need to achieve.*

Yet, Mr Kelly also presented an apparent paradox in water policy. In a single discussion point, he insisted that clear rules are essential to provide water users with predictability, while also asserting that water governance rules need to be flexible enough to adapt to changing circumstances. He said while rules offer "really important" frameworks, there was a danger in "slavishly" adhering to rules developed in or for changing water contexts:

Ex. 5.47   *They'll be developed at a certain time for a certain set of circumstances and experiences. We hadn't had a millennium drought before, so some of the rules which were quite good; fine rules; we had to change because they just didn't apply to that [unprecedented] scenario. And so people being adaptive around those, bringing other frameworks into place – things like the Murray-Darling Basin Agreement – that's really important to have, and it's that feeling of equity and taking some of the politics out of it; which lobby group happens to be the most powerful at the time. Because actually if you've got an agreed framework in place, 'This is how it rolls out', they might be able to influence around the edges, but basically it goes through [the rules hold].*

Clarity and rigidity are not the same thing, and as such Mr Kelly's dual arguments are not necessarily mutually exclusive. It is possible to be clear that rules are subject to change, and that it should take that into account in planning. But this is easily misinterpreted, and for a water sharer hungry for predictability, it is easy to conflate predictability with static, unchanging rules. This was demonstrated by several participants.

Mr Hall (M-Aus.), for example, said that despite his constituents' complaints about "red tape", regulation is necessary because it provides people with predictability. The onus for flexibility, he argued, falls on business rather than regulators:

Ex. 5.48   *I mean, everyone talks about red tape, and that's what comes with government regulation is red tape. And it's very difficult for a regulation or legislation to be nimble enough or flexible enough to allow for nuances and changes. The need for adaptability and evolution and everything is what needs to happen within the businesses. They need to continue to develop and become more efficient in what they do. But having some surety about the delivery of water allows them to.*

Mr Whittaker (G-Aus.) was exasperated at the insecurity of changing plans, describing the frustration of persisting through negotiations, only for the resulting agreement to be disregarded shortly after:

Ex. 5.49   *The frustration is, we did a water sharing plan, you know? We did it over three years – all the stakeholders, 52 meetings – we came up with a water sharing plan. We had a millennial drought [and] it worked really well I would argue, and I think most people with any sort of rational common sense would argue. Irrigators were out of water for five years. The environment was in trouble, the towns were starting to run out of water. But it was the worst drought in whatever, so everyone was hitting the wall at the same time. … It was agreed upon by everyone.*

But then within six months it was in the media; they wanted more water for the marshes. And you say, 'We gave them 15%!' The whole idea of doing that was so that we didn't have the fight for at least another 10 years. … We do a water sharing plan, agree to it for 10 years, but six months later we're in the media getting walloped again. And so there's no goodwill at all between the stakeholders, like, none.

Where Mr Whittaker focused on the interpersonal aspects of predictability, Mr Collins (G-Aus.) also spoke about its importance for facilitating long-term financial investment:

Ex. 5.50   *People pay a lot to get it [water security], because that's what it's all about. If you've got the security of supply, you can build; you can invest around it. Whether that be with your family [farm] or whether that be with a corporation – same thing.*

It's a limited resource, so the closer you get to it, the closer you get to that end, then up goes your tension.

For Mr Collins, the balance between predictability brought by a rigid plan and the flexibility needed to adapt to prevailing conditions was not only about changes in access to water. Adaptability, he said, is also a question of how the regulatory system accounts for investment capacity:

Ex. 5.51   *I think the number one thing is not being adaptive. And the hassle with that is how do you make it adaptive? What are your triggers for change of a rule, or the way you would implement a rule? And then who makes the decision? The one size fits all is a terrible thing because they are not. They're all individual systems. And the people are all individual systems as well. You've got people there, [growing] almonds who represent money from an organisation that has got 36 billion [dollars] behind it is going to be different, able to or have a different view and be able to call on resources*

> *very differently to the person who's a husband-and-wife team or just on a small farm*
> *but his rights need to be protected exactly the same. If you're going to make a change*
> *about a rule, if you're going to make it adaptive which is what I'm saying is the biggest*
> *impediment, how do you make rules that can uniformly be fair because there's [always]*
> *somebody on the edge.*

Yemeni participants likewise complained of the difficulties presented by unpredictability in water access. However, participants showed little faith in regulatory frameworks to provide supply predictability. Mr Al Saif (H-Yem.) suggested this left Yemenis scrounging for alternatives to sure up water access:

Ex. 5.52   *There are many challenges such as looking for water resources, trying to find solutions*
            to find alternatives for the available water rationalisations, trying to adapt to the
            current situation of water scarcity.

Moh. Hadid (M-Yem.) focused on the need to be adaptable, cautioning that water commands respect because it is both a source of life and a source of destruction. He used the malleability of water itself as inspiration for adaptability:

Ex. 5.53   *Water is difficult and easy at the same time. ... Water will adapt with the environment*
            around. ... If you put it in a narrow place, it will adapt to that narrow place or if you
            put it in an open area it will cover that area. ... How to deal with water? It must be
            watched or respected as well. .... This is a kind of briefing about how I look to water. As
            I told you I consider it as like, I got inspired by water. ... When you can deal with proper
            quantities, it is life for people, for villages or something. But when exceeded the limits,
            it destroys everything. This is the thing. That is my life. I would like to be like water -
            adapting to the situation where I am, bringing happiness and life to people. And also if
            someone deals with me [in a way that is] not well respected, also it floods.

Ms Fakhoury (M-Yem.) was more tangible in her approach, but nonetheless focused on the need for user flexibility. She pointed to a successful water supply project to demonstrate the benefits of flexible funding:

Ex. 5.54   *The governor came in, and he and the people were amazed that you know, even WHO[49]*
            hasn't done anything, yet we were quick responding. ... OCHA[50], they have really high
            conditions for their partners ... and so that completely excludes any local initiatives.
            They end up working with the big guys, and that's not really impactful. I'm not saying
            they don't have ... good projects in Yemen. But I think there's room for great
            improvements. I think there isn't such a flexible funding system, and it there should be.

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[49] World Health Organisation.
[50] UN Office for the Coordination of Humanitarian Affairs.

In making the argument for flexible funding, Ms Fakhoury advocates for greater agility through local initiatives, but emphasises that they that they must be empowered by their operating environment.

Mr Al Hassan (M-Yem.) discussed resource accumulation that occurs when families are subjected to supply variability:

Ex. 5.55   *When there is a scarcity in water, the number of subscribers increase. Also, each family begins to store water in more quantities than it needs, and this leads to increase the pressure on the water board due to the irregularity of water*

Mr Sultan Faysal (G-Yem.), the owner of a water-dependent small business in Ta'iz, said that most people have shown and continue to show a great deal of adaptability, though it is not in endless supply:

Ex. 5.56   *Until now, most of the citizens show a lot of patience, flexibility, and adaptation to water scarcity cases, but this may not prolong for the coming years, which foreshadows tragic humanitarian situations that may happen unless the matter is solved as soon as possible.*

People's capacity to adapt, he argued, has limits.

5.4   Functionality: what water should do?

One of the most prevalent points of disagreement between participants was differing views on what water should do. Perceptions of zero-sum competition between various water functionalities was a frequently emerging theme in both country contexts. Typically, the result was a complex web of aligned interests, discordant positions, and seemingly contradictory politics.

5.4.1   The threat of industry

In many instances, the real or perceived threat of competitive industry was common. Sometimes competition was perceived between rival industries; sometimes as a threat posed by a dominant industry to fragile domestic water supplies; in some instances, as a threat to non-consumptive commercial functions, such as tourism; as a threat to non-consumptive, non-income-generating social wellbeing and cultural functions; and at other times between industry and environmental outcomes.

Ms Maywald (M-Aus.) said that prioritising water between different water users was difficult and caused significant disagreement:

Ex. 5.57   *There was also [division] between industries where things like intensive animal farming weren't restricted and yet irrigators were restricted. And so you had to develop a whole range of priority allocation, I guess, priorities. And not everyone agreed with the decisions that you made. That I made. That we made.*

There's a lot of anger. And there's a lot of mistrust.

Prior to his investigations, Mr Besser (M-Aus.) expected to find geopolitical conflict in the Murray-Darling/Barka but instead witnessed animosity between water-sharing industries:

Ex. 5.58   *I had thought - very much mistakenly - that the conflict was going to be between inner city greenies and the big irrigators. And there is that conflict. But the deeper more important in-a-sense conflict was between their farming cousins downstream and between agricultural economic sectors. Graziers – the country's wool growers who used to be the most important engine room in the country – were irate, absolutely irate, with people who are growing fibre; growing cotton. And I found that remarkable. I sat down with a grazier, … a very wealthy man. And he hated irrigators with such a passion, and considered them so dangerous for the sustainability of Australia's inland, that he had switched allegiances from the National Party to the Greens.[51] And we're talking about a guy who wears elastic-sided boots and RM pants,[52] … and a big hat. It was remarkable, I just could not believe it. … And this is someone who had dyed-in-the-wool [rigid beliefs]; a kind of heartland person.*

On a larger public scale, Mr Butler's (H-Aus.) election on a platform of opposing coal seam gas extraction also represented a significant political shift.[53] He vehemently opposed profitability-based proposals to use groundwater for energy generation rather than agriculture:

Ex. 5.59   *I find that sort of concept offensive. We shouldn't be pinning decisions just on the economic benefits of any water – even the crappy water that comes out of coal seams. Economic benefits are just one part of the puzzle. It's important in those agriculture-dependent economies like Wee Waa and Bourke and Bree [Brewarrina] who need agriculture and have relied on irrigated agriculture to be able to be profitable in good years. That's an important part of those economies and I don't see it going away. … I think that, yes, the economic benefits of water and the way people benefit from water is a factor, but it's only one of many factors that we've got to consider.*

Cr Irving (G-Aus.) described the difficulty in prioritising "fairness" between jobs, production and human consumption where users share a single water source:

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[51] A switch from the conservative right to the progressive left of Australian political theatre.

[52] 'RM' refers to Australian clothing brand R.M. Williams – marketed as 'built for the men and women of the rugged, unforgiving Australian outback' and carrying strong connotations of rural lifestyle (R.M. Williams, 2021).

[53] Mr Butler was elected to the predominantly rural and traditionally conservative electorate of Barwon in the New South Wales Legislative Assembly in 2019 A member of the Shooters, Fishers and Farmers Party, his election unseated the NSW National Party which had until then held the seat since 1950. Two other participants in the study – Ms Maywald and Cr Irving – described voter disenchantment with the Nationals amongst the electorate around the issue of coal seam gas exploration in the Murray-Darling Basin and its potential effect on groundwater.

Ex. 5.60   *It will depend on the context of the person affected, or the family or the business, as to what factors you would consider. So, say if you lived in Cobar and you worked at the mine, the fairness there would be keeping your job at the mine. But in Warren, the factors will be different. Like the fact would be well, we don't even have access to domestic water – what we use to shower in. … So what's fair depends on your situation and what perspective you're coming from. I personally, I think if you're having to truck water in for domestic water use, then I think it's not fair to keep the mines going. But [if] there's people going to lose their job at the mine, that's not fair either. But they have water to shower in. Just the priorities of where the water goes.*

Cr Irving's dilemma was presented as a personal one due to her role in local government. However, the issue of perspective she discussed was also raised by Yemeni participants.

Mr Abadi (M-Yem.) in his earlier framing of water as "essential for the continuation of life and the presence of services" (Ex. 4.40), said that water "is important for the agricultural and industrial sectors" (Ex. 4.46). Yet at the same time, he was aghast at the "negative repercussions" of competition for water between domestic, industrial, and agricultural sectors:

Ex. 5.61   *They are a basis for disruption of the life system, the eruption of wars, conflicts and violence.*

Among Yemeni participants who commented on the threat of industry, most focused on the perceived dominant use of groundwater resources for agriculture that put other water functions at risk. Such instances included Ms Karman (H-Yem.) (Ex. 5.14), Mr Ghanem (M-Yem.) (Ex. 5.21), Mr Al Hassan (M-Yem.) (Ex. 5.22), Ms Fakhoury (M-Yem.) (Ex. 5.23), and Mr Assaf (G-Yem.) (Ex. 5.25). The sole exception to this was Mr Al Hassan (M-Yem), who instead criticised the uncontrolled groundwater extraction by property developers (Ex. 5.34).

In a variation of the typical industry threat narrative seen across both basin contexts, Mr McLaughlan (M-Aus.) merged industrial and geographical factors, highlighting that since water-sharing industries are often established around the hydrological conditions of a particular region, the two are intermingled, giving rise to blurred identities and associated potential conflict:

Ex. 5.62   *There was no doubt that the dairy guys for instance were very pissed off over [SA independent Senator Nick] Xenophon and the Greens putting their livelihoods at risk. If you talk to the Greens, they'll say 'we're doing this for the [South Australian] irrigators and the environment'. But I think the irrigators are starting to well and truly understand that if in fact New South Wales or Victoria walk away, we're going to be the big losers. Big, big losers. So Sarah Hanson-Young [SA Greens Senator], the way she's sending emails all over the place about how they'd saved the state, well, mate, what you've done is put a gun to someone's head.*

5.4.2 Non-consumptive water differences

Participants' discussion of non-consumptive water needs presented a unique set of tensions, despite and sometimes due to being lumped into a single pool. One such example was the common but incorrect assumption that cultural flows are akin to environmental water. Mr Woods (M-Aus.) had raised the issue with the peak body for irrigated agriculture in Australia: [54]

> Ex. 5.63   *I spoke to them about cultural flows and Aboriginal water a few years ago and presented what we're wanting to get out of the Basin Plan and water entitlement into the future. They actually wrote a policy document that's on their website and, yes, 'Happy to have Aboriginal water in the sector', this and that, and then you get to the last little paragraph, and it says, 'As long as the water doesn't come out of the irrigation or consumptive pool, it's, they're happy.' So, they'll put it into the environmental bucket.*

The difference, he explained, centres on ownership and control of the water, as stated in the Echuca Declaration[55] (MLDRIN, 2009):

> Ex. 5.64   *[Environmental water] it's not a cultural flow because we're not in control, fully in control and ownership of that water being delivered. And we're having shared benefits where they choose assets that they want to deliver. And what we want in the landscape out there is to enhance our cultural values.*

Environmental water, on the other hand, is owned by the federal government which Mr Woods said carries an unwelcome distinction from other water users:

> Ex. 5.65   *We just see ourselves as another water user and other player in the water sector and just want to be treated the same. We're not different. We have the same rights as everyone else in the water sector. The only thing we don't have is entitlements currently in our name or available.*

The Murray-Darling Basin Plan, which is itself silent on the matter of cultural flows, effectively delegates the matter of cultural flows to state governments, stipulating that state water allocation plans should be prepared with 'regard to social, spiritual and cultural matters relevant to Indigenous people' (Water Act 2007 (Cth) No 137 (Austl.)). An example of this is the SA Water Allocation Plan of 2019, which lists as an objective or outcome 'To promote awareness and respect for Aboriginal cultural values, perspectives and worldview of water and its critical importance to the

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[54] The National Irrigators Council's 'Cultural Flows' policy was not available from its website at the time of enquiry, nor supplied in response to email and phone requests.

[55] Specifically, the Echuca Declaration defines *cultural flows* as 'water entitlements that are legally and beneficially owned by the Indigenous Nations of a sufficient and adequate quantity and quality to improve the spiritual, cultural, environmental, social and economic conditions of those Indigenous Nations. This is our inherent right' (MLDRIN, 2009, p. 2)

health of nations cultural waters and cultural living landscape' (South Australian Murray-Darling Basin Natural Resources Management Board, 2019, p. 9). Yet, while these plans express support, they do not make cultural flows available.

Mr Butler (H-Aus.) acknowledged the significance of cultural flows for First Nations People, and felt obliged to advocate for and continue to learn about cultural flows and their distinction from other water allocations:

Ex. 5.66   *[Governments] have got an obligation to ... Aboriginal communities all along the river who have a significant attachment to the river. Like the Barkindji [First Nation of the lower Barka, or Darling River] who, you know, the river is a big part of their history; a big part of their spiritual way of life. And it took NBAN [Northern Basin Aboriginal Nations] and [its Chairperson] Fred Hooper to explain to me what cultural water was - I thought, I figured it was an allocation. It's nothing like that.*

Other non-consumptive water purposes were also conflated with environmental water. Mr Taylor (G-Aus.) described how government water buybacks had wrongly given the impression that water to sustain the river system was only for the environment, masking their benefit to other non-consumptive and in some cases income generating purposes:

Ex. 5.67   *I think it's a really misleading term, because the environment is [just] one of the beneficiaries. Essentially, [buybacks are] about river health and sustaining the asset. So I think [calling it environmental water] understates the value of that water.*

But slowly, but surely, you have to get the message out there that there are all sorts of benefits for the community coming from this water, that certain sectors don't want talked about. Tourism is the most obvious.

Conflict between proponents of different non-consumptive water purposes was not discussed by Yemeni participants.

5.4.3   Complex allegiances

Conflict between riparian actors in the Murray-Darling/Barka was often discussed as a dichotomous dispute, though exactly who fell on either side differed between participant accounts.

According to Cr Irving (G-Aus.) graziers tend to align with the environmental movement behind a common objective of keeping water in the river:

Ex. 5.68   *The Macquarie Marsh graziers claim it's for environmental purposes, but obviously it's for their business as well because they run cattle there and they've gotta make money. But they're aligned with environmental groups because that worked for them. They had a saying about ducks and cattle... happy ducks, happy cattle? [Laughs] I don't think*

that was it.[56] But it was that the Marsh graziers were aligned with the environmental groups to promote looking after the Marshes.

Mr Whittaker (G-Aus.), himself a cotton irrigator, said graziers and the environmental movement were "in bed together" though viewed the alignment as disingenuous:

Ex. 5.69   *If I could use the environment for my cause I would, you know. If I want to fatten 1000 herd of cattle, no one feels sorry for me. If I stand there in the dry river bed or a cow bogged in mud or a dead duck or whatever then I'll use the environment for my cause. But I just... when I debate with people, and you look below the surface, there's a lot of people who use the environment. I mean, I'm not saying people don't care about the environment – the environmentalists do. ... [But] Why do they put 1000 head of cattle in the wetland in the middle summer and flog it to death [destroy it]? ... We see the fight not against the environmentalists, but against the graziers who are using the environmentalists as their tool.*

Though Mr Whittaker said the "the big-guy-little-guy" argument was an "easy target" against cotton, Sen. Hanson-Young (H-Aus.) said that beyond farming choices, she and small-business agriculture were "in this together" against corporate dominance:

Ex. 5.70   *I think it suits the corporate users to keep that [inter-sectorial conflict] dynamic going. But I think ultimately, actually, that's not the way it is. I think ultimately it is the really big corporate users – when I say corporate users, I mean big agribusiness; I mean big private; those irrigators who have big private storages; where the big money is in the system. ... They're the ones that really would prefer to keep the status quo in terms of the conversation about environment versus agriculture versus cultural flows. But actually, I think it's quite clear that critical human need, those kind of smaller family farms, environment, and cultural flows, are actually all in this together. I think it's us versus the big corporate water users.*

Participants in both contexts acknowledged that basin conflict was a complex non-binary issue, particularly those concentrated in the high-influence categories including Mr Glyde (Ex. 5.1), Mr Butler (H-Aus.) (Ex. 5.9), and Moh. Nader (H-Yem.) (Ex. 4.33). Rather, basin conflict over water functionality presented as a complex web of allegiances fostered behind common goals and in defiance of politics-as-usual.

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[56] Mr Butler's (H-Aus.) rendition of the saying was "'fat ducks, fat cattle": the idea that if the marshes are healthy, then everything's a lot better'.

5.5 Hydrogeography: where the water goes

5.5.1 Upstream-downstream conflict

Among the most common points of conflict raised by participants in the study was that perceived between water sharers across geo-spatial divides. For Australians, complaints typically centred on upstream riparians perceived to be capturing excess water and with it the bulk of hydropolitical power, while those downstream were largely at their mercy.

At the downstream end of the Murray-Darling/Barka, Mr McLaughlan (M-Aus.) saw the states upstream of SA as powerful hydro-hegemons, though for different reasons. He resented what he perceived to be Queensland's opportunistic construction of storages on the basin headwaters:

Ex. 5.71   *They were building dams fucking everywhere! And you just go 'Jesus, guys!' It's always been a bit like that, you know. So Queensland, they've got no reason to pull out [of the agreement] I don't reckon. But New South Wales and Victoria, they're bloody fractious, they really are. Because the politics of water is bloody huge in New South Wales.*

Upstream Queensland, he argued, had little reason to change the status quo while trans-border agreements were favourable to the state. Despite protracted dispute between New South Wales and Victoria, the two states maintained enough upstream hegemony to walk away from an agreement that wasn't in their self-interest.

Sen. Hanson-Young (H-Aus.) noted that compared to the upstream states, any hydro-hegemony SA does hold hinges on the city of Adelaide's reliance on the Murray for drinking water:

Ex. 5.72   *South Australia has very little say over the management of the system and as a South Australian senator, it's very difficult to participate in that debate when most of the water and most of the money is controlled upstream. I mean, the power imbalance is huge. And the only reason we have any say is because of Adelaide's water supply. And so when people are arguing that Adelaide should turn on the desal [desalination] plant, that Adelaide should get its own water security off [elsewhere than] the Murray, that will signal death for the rest of the system from the environmental flow perspective.*

Also in Adelaide, Mr Hall (M-Aus.) said that industry collegiality did not transcend cross-border tensions:

Ex. 5.73   *No one gives a toss about you at the bottom, you know? We're the canary really.*[57]

For everyone else, it's more academic. Like even the guys up in the Riverland in South Australia. They've got a number of locks. The Authority can manage the flows. But once

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[57] Short for 'the canary in the coalmine', taken to mean an early indicator of danger or failure.

it gets below Lock One, you just get what's left. So that's a concern. And a concern is a bit about the behaviour under pressure, the collegiate behaviour – or lack thereof – of some of the upstream water users.

Being "the canary" was likewise claimed by fellow South Australian Sen. Hanson-Young (H-Aus.).

Yet, trans-border water sharing was not the only theatre of spatial hydropolitics participants observed. In NSW, Mr Murphey (H-Aus.) described the prevalence of upstream-downstream conflict *internal* to the state:

Ex. 5.74   *We've got these two warring parties: the southern irrigators saying 'The northern people are taking too much water and there's not enough getting down to us', and the northern people saying 'The southern people are misrepresenting us because we're not taking as much water.' ... So within the state, there's contention between the north and south because they're connected by the Barwon-Darling system.*

Similarly, Ms Maywald (M-Aus.) said that intra-state upstream-downstream sharing tensions were also occurring in SA, and that she understood why upstream-downstream rifts occurred, considering the suffering encountered and the want of sharers to reduce it:

Ex. 5.75   *Upstream of Lock One, many people have no regard for downstream of Lock One. Similar to upstream of the South Australian border, many have no regard for below or beyond the South Australian border. So, irrigators in the Riverland [upstream within South Australia], for example, shared the view of their upstream counterparts that the [downstream] Lakes weren't important. ... Everyone [who] sits in the river system, you can tell where they're from by the way they view water. Generally speaking, they'll look upstream with envy and downstream with disdain. And that's also evident within the state.*

I don't see that as anything other than looking out for their interests in a very tough environment. You have irrigation communities that are hurting badly and are wanting to find ways to reduce that hurt, and they look downstream and see what they perceive as waste. And they see upstream users as taking more than they should be taking. So, whichever environment you're in, you're going to have those competitive tensions between industries and communities.

Mr Collins (G-Aus.) recounted the splintering of industry groups into upstream-downstream divisions between neighbouring towns:

Ex. 5.76   *Farmers react by making irrigation associations and doing all these things, to try and have a voice; a unified voice that can go forward. [Yet] They conflict like crazy even within irrigation associations, because the people on the lower reaches want more water and say 'It's our water!' I'll give you an example. In 2002 when the Millennium Drought was biting in hard – real hard. ... Every shire sent along a person because they're all worried about their water. Cowra, Forbes, Condo [Condobolin], Parkes as*

> *well. And Lake Cargelligo – the big towns.*[58] *... They all came to that as a cohesive group. And it wasn't long before someone described it as 'Our river', and it was like you put a bomb amongst them because all of a sudden, they just went 'Pfft' [onomatopoeic vaporising sound]; separated from this cohesive little group to individuals fighting for themselves. It was hard not to laugh. ... 'Surely it's our river!' And everyone else says 'Whose?' They're not interested in downstream.*

Mr Conti (G-Aus.) said he understood the "survival" tactics of upstream riparians, even though it was at his own cost:

Ex. 5.77   *During the drought, I drove up through Griffith and down to Finley [both upstream in mid-south New South Wales]. I could not believe the amount of water over there. I mean, nothing against them – they're good operators. The boys in Griffith put their heads together, and that's survival.*

As Yemen does not typically have overland flowing rivers, it stands to reason that upstream-downstream flow dynamics were not discussed by Yemeni participants.

5.5.2   The urban-rural variant

For Yemeni participants, spatial aspects of water-sharing conflict emerged primarily in the form of urban-rural divides. Despite the flow of underground water not being observable to the naked eye, it was widely understood that groundwater is nonetheless drawn from a common pool and that one person's rate of extraction may affect another's.

Mr Al Saif (H-Yem.) described disparity between urban and rural connectivity to the public water network:

Ex. 5.78   *In the urban areas, the local water board is responsible for water distribution in many areas but it does not cover the whole city. While, in rural areas, we still use the old resources.*

Moh. Nader (H-Yem.) agreed, though suggested that the spatial structure of supply infrastructure nonetheless put urban users at a water-access disadvantage. With urban centres supplied from wells located outside the cities, heavily populated areas are heavily impacted by agricultural extraction:

Ex. 5.79   *In areas that did not have access to services, citizens are able to dig private wells and distribute water in their own way. [But] in the area of Taiz city, there is a high population density and scarcity of water. Most of the population's production is*

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[58] For context, 'big towns' here are relative to rural NSW, but are likely considered small towns by general standards. In the 2016 census, Lake Cargelligo had a population of 1,479 people. Parkes, the largest town listed, had 9,964 people.

agricultural, so the problem of water is known in this area. There is a problem to get water in the city. There were medical wells that were used to irrigate crops, so two villages fought with each other: the whole of one village against the other, so the government forces intervened to resolve the conflict and it was clear. The problem with water and these problems [with fighting] have been going on for two years – the problems in Taiz started two years before the war, as I said, and the government had to intervene to resolve armed conflicts. There is a problem in this place of actual scarcity…. We don't have a neighbour's rivers or fresh water.

This impact was also seen in Ta'iz by Mr Al Hassan (M-Yem.), who in his work with the Water Board felt that existing problems with water supplies were further strained by population growth and movement from other water-scarce regions. Asked what he saw as the main impediments for fair and peaceful water sharing, he replied:

Ex. 5.80   *Densely populated areas and displacement from areas where there is a water scarcity to areas where water is available. For example, Taiz had water scarcity before the war, and this has had a negative impact here because of the growing population. There are people who are living in remote areas while the city has limited water resources. As well as the unregulated, random construction, we have to deliver the service even if the area is far from the scope of the organisation. Due to displacement, some have to live in schools or other areas, so we had to get water to them.*

Mr Al Najar (M-Yem.) was aggrieved at local divisions in and between communities and regions that share groundwater resources, sometimes with physically violent outcomes:

Ex. 5.81   *The challenges are many and varied, the most prominent of which is, of course, the challenge of life and survival on earth through access to water. In addition to the problems and challenges that water scarcity and the conflict over its sources may cause is the community division, whether at the level of the governorate, the city, the village, or even the neighbourhood itself, and what can happen as a result of this division and conflict, bringing things to the point of armed conflicts which results in dozens of victims, and a state of permanent discord that threatens the security and safety of society.*

Moh. Hadid (M-Yem.) was distressed by the problems he encountered in his own high-density neighbourhood Sana'a, comparing his experience with the better-functioning public network in another city:

Ex. 5.82   *I decided for example to install a plastic or metal tank near to my house, while this was not welcomed by my neighbours! They put some tanks for them, but for me they say no! … In Old Sana'a city or in some neighbourhoods there are only narrow roads or paths between houses, for example, not more than two metres or one metre between house to house. So, imagine your neighbour needs to store more water and bought a plastic or galvanised tank and put it in the area between your house and their house. This causes a lot of problems. We have problems using water in the same building…. A lot of consequences. While the opposite for example in Aden – the authorities are still*

working well and there is plenty of water and it is well supported. So, they are pumping water on a daily basis to houses. So you don't have such kind of issues between inhabitants, with the buildings or neighbourhoods.

As someone who supervises rural wells that supply densely populated centres, Mr Bashar (G-Yem.) said that water shortages resulting from urban-rural sharing "creates many challenges for us":

Ex. 5.83   *The city's residents do not understand the causes of water shortage and do not understand the difficulties we face in trying to provide well water from the countryside. Also, convincing people who own land under which wells are located to permit [alternative] drilling. We face some objections to these interventions, as well as [challenges like] the long distance of wells from the city. The network connections should not be expanded to new areas unless you can increase the city's water sources!*

Australian participants did not discuss urban-rural dynamics as frequently as their Yemeni counterparts, yet the issue was not absent from the Murray-Darling/Barka. Where in Yemen it was cities that were under pressure from rural powerholders, in Australia it was cities that were seen to hold political advantage.

Ms Maywald (M-Aus.) recalled contention between urban users and rural users whose water access differs on account of location-based restrictions:

Ex. 5.84   *Placing restrictions in the city versus on the much more regulated irrigation activity was challenging because the communities in Adelaide saw water restrictions, as you know: which days you could water, how many hours you could water, or the hours in which you could water, and things that you could use your water for. Whereas the irrigation sector had a restriction put on the amount of water that they could take through their entitlements. ... You have the people in the country who are sitting on 2% allocation, looking down on Adelaide where people are still allowed to water their gardens for a couple of hours. How is that fair? There was always the city-country divide when it came to the fairness in allocation of water.*

This point was echoed and expanded on by her fellow South Australian Mr Kelly (H-Aus.), who explained that this small source of bargaining power hinges on empathy, and specifically empathy that comes from the common identity that upstream and downstream water users (comparable with urban-rural users) share:

Ex. 5.85   *People come to a [negotiating] table representing their jurisdiction, of course but most sensible people at the end of the day don't want people in Adelaide not to be able to drink water. And that's quite a mobilising force, because we talk about South Australia, New South Wales, Victoria, but really we're all Australians at the end of the day and you've got a commonwealth government that is for all Australians. You can't have a city – a big Canberra, big Wagga, a big whatever, running out of water. So that is quite a mobilising force even if you're having to hurt your own [local] population. So*

Victorian irrigators having to give up water for Adelaide people to have a drink: most governments will go "Yes, that sucks, but people have to be able to drink.'

While a common unifying identity may offer some degree of bargaining power to downstream riparians, it nonetheless relies on the goodwill of upstream water sharers.

Mr Taylor (G-Aus.) saw the urban-rural divide playing out politically, in a manner almost detached from the flow of water itself:

Ex. 5.86   *There's a polarisation of views. Which again, I think stems from a lot of ignorance in our politicians, who see it as a battle between green interests and production. It doesn't have to be. You can have both. But you see to your average punter in a big city, it makes a lot of sense, because Nationals represent farmers, and the water is about farmers. So that's the core of the problem. There is a perception that because somebody is a National Party member and comes from the land, that they will know what's needed. It couldn't be further from the truth, unfortunately.*

5.6   Timing: when should we have water?

5.6.1   Urgency of water needs: now vs later

Recalling section 4.3.3 on sustainability, the timing of water access is a crucial consideration in critical human water needs, though one that is often given secondary importance to functionality. Participant discussions of sustainability as the need to satisfy present water requirements as without jeopardising future needs discussed across all influence levels. In the Murray-Darling/Barka, this included Mr Collins (G-Aus.) (Ex. 4.13), Sen. Hanson-Young (H-Aus.) (Ex. 4.21; Ex. 4.37), Mr Glyde (H-Aus.) (Ex. 4.27), Mr Besser (M-Aus.) (Ex. 4.38; Ex. 5.58), and Mr Taylor (G-Aus.) (ex. Ex. 5.67).

In addition, Mr Murphey (H-Aus.) suggested that recognition of needs over time rather than only in the present was becoming normalised. He indicated that peak industry bodies were increasingly factoring basin sustainability into corporate responsibility considerations and decision-making:

Ex. 5.87   *They're taking much more of an 'Okay, well we do actually need a sustainable Basin, but for our corn or for our oranges or for our whatever [approach]. If we don't have a sustainable Basin, then actually we're shooting ourselves in the foot.' Now, a conservationist and an irrigator might have a different view on what sustainable is within the Basin, but there is much more agreement of 'No, no, this needs to be managed.' Yes, the environment needs to be in a certain level of health, whatever your bar is, but a recognition that there is a bar. Whereas if you go back a bit perhaps there wasn't a recognition that there was a bar.*

Here, Mr Murphey highlights that the dispute is becoming less about a need to consider the future or not, but between approaches of how to approach doing so. In this progression, the urgency of satisfaction of needs over time thus morphs from a coarse binary question of now versus later to incorporate more complex considerations of prioritisation.

A notable point of difference between Australian and Yemeni participants was shown in the subtext of the aspirations expressed. Like the Australians, Yemeni participants cited in section 4.3.3 conceptualised needs satisfaction in terms of urgency. Mr Abadi (M-Yem.) (Ex. 4.40; Ex. 4.46), Mr Ahmed (G-Yem.) (Ex. 4.41) and Mr Faysal (Ex. 5.56) discussed the continuation of water needs over time, while Mr Al Saif (H-Yem.) reflected on human destiny as a function of water access (Ex. 4.39). In both basin contexts, future water needs were viewed as a looming threat. However, present status affected how that future threat would be approached. In the Murray-Darling/Barka, participants across all influence categories discussed sustainability in terms of *satisfied* needs, be it realised or at least conceivable, which require defending. For participants in Jibal as-Sarawat, while satisfied needs were sometimes remembered or conceived, present needs were expressed across all influence levels as chronically *unsatisfied* with future need thus expressed as remedial.

In addition to participants already quoted in previous sections, Ms Karman (H-Yem.) discussed what fair water-sharing would look like "in the future". Persistently high water prices, she said, needed to improve:

Ex. 5.88   *By my estimation, the problem will worsen dramatically in the coming years unless effective solutions are provided.*

There should be combined efforts by the government and local civil society, as this will contribute to establishing firm rules for a fair and peaceful water distribution in the future.

Mr Ghanem (M-Yem.) said that satisfying needs into the future seemed unachievable under current conditions, and may deteriorate further:

Ex. 5.89   *With this continuing state of water scarcity, the war, and the state's completely absent in its role, the task seems difficult to achieve a fair and peaceful distribution of water.*

The biggest obstacle seems to be the continuation of the conflict and the unstable environment that will lead to a further threat to the deterioration of basic services in the Yemeni society.

At the grassroots, Mr Ahmed (G-Yem.) recalled the pre-war context when even though water supplies were not constant, they were at least predictable which offered some security:

Ex. 5.90   *The suffering of Taiz with water continues from the pre-war period, but before the war*
            there was a state water project that came every two weeks and was considered a
            rescue. But since the beginning of the war in 2015, the water system has completely
            stopped [in] the city. The most important factors are the chaos, carelessness by the
            concerned authority.

            There will never be a solution to the water problem until the war stops.

Likewise, Mr Assaf (G-Yem.) remembered a better, more predictable time for water access:

Ex. 5.91   *We used to get water periodically and regularly through those main networks of the*
            water institutions and weekly at a reasonable price while currently we only get the
            public water every four weeks, and sometimes we have to buy water from the water
            trucks at a high price.

5.7   Chapter conclusion

This chapter presented emergent themes from IPA in which participants perceived conflict within themselves, among their local communities and more broadly within water basins when water is scarce. Areas of dispute that emerged across the Murray-Darling/Barka and Jibal as-Sarawat contexts were clustered into five superordinate nodes.

Firstly, the matter of who is responsible for management of water sharing arrangements was observed as an issue across all levels of societal influence in both basin contexts. As per their understandings of governance mandates, participants in high level influence roles saw responsibility for fair management of scarce waters as either the role of the state or a combination of state and individual responsibility. Towards the grassroots, attribution of responsibility was more fractured between participants who benefitted from the status quo and those who saw benefit to themselves, others, or the future in terms of systemic or behavioural change. Where people benefitted from the status quo, responsibility was largely attributed to government. Where the existing system was seen to disproportionately benefit others, responsibility for fair management was attributed to both the state and individuals. This tension materialised as disputes over whether individual people or entities should show self-restraint in extraction, whether the governing authorities should allocate or licence an effective sharing arrangement, or both.

Secondly, a difficult paradox emerged between the need for predictability which offers security and rest, and the desire for flexibility to facilitate and enable adaptation to change. This was seen primarily in the Murray-Darling/Barka, where regulation and compliance functionality is far stronger than in Jibal as-Sarawat. The paradox emerged at all levels of influence, with high-

influence participants struggling to implement regulation that facilitated both stability and adaptability; and grassroots participants willing to adapt to change but also desperate for predictability and security.

Functionality of water was the third emergent node of conflict. While all sharers recognised water's essential value for satisfying physiological human need, opinions differed significantly around prioritising its use for industrial production, as well as perceptions of how that may threaten human consumption needs and community wellbeing; non-consumptive water benefits such as enabling tourism and environmental outcomes; and as a cross-cutting issue, the need to sustain satisfaction of water requirements into the future. A highly divisive issue, the functionality of water saw participants and those in their communities forming complex allegiances that formed behind common interests in defiance of traditional political affiliations.

Fourthly, the spatial distribution of water as it flows or is diverted was the subject of disputes in both basin contexts. However, surface water in Australia and groundwater in Yemen presented different sharing dynamics. Easily observable surface flows created perceptions of unfair resource accumulation in the Murray-Darling/Barka, with upstream-downstream disputes including both trans-border and intra-state tensions. In Jibal as-Sarawat, divisions over spatial distribution of groundwater water were focused primarily on access disparity between rural and urban communities, with services less strained outside the cities.

Lastly, the incorporation of time into considerations of water needs emerged frequently, with participants in both basin contexts expressing future requirements for water as a need in the present. Differences between basin contexts centred on the status of current water needs, with Australian participants defending known satisfaction of present needs into the future, while Yemeni participants aspired to the attainment water needs satisfaction.

The nodes of conflict presented in this chapter were clustered through the IPA coding process according to the hydropolitical and peace and conflict studies approach to conflict as a perceived clashing of values that is not in itself a negative phenomenon (see section 2.9). As discussed by participants in their everyday language, points of contention were at times interwoven with positions taken on the matter, as well as projections of how the conflict might play out. However, the focus of this chapter has been the points of contention themselves. What participants saw as barriers to working through these conflicts constructively for fair and peaceful water sharing is discussed in the next chapter.

6 Boundaries other than borders

6.1 Chapter introduction

This chapter is concerned with the issues participants viewed as barriers to fair and peaceful water sharing. Building on the previous chapter, the participants discuss why particular nodes of conflict relating to water scarcity are difficult to work through constructively and the chapter identifies obstacles that emerged through the IPA process that stand in the way of participants addressing contentious issues. In doing so, this chapter directly addresses a key component of the thesis research question.

As the chapter title conveys, the 'transboundary' in TWI is here broadened from its usual focus on interstate borders. Be it a boundary, a barrier, a privilege, or a gap, the issues dealt with in this chapter represent 'an inability or insufficiency in our conceptual and practice frameworks that weaken our capacity to sustain a desired process' (Lederach, 1999, p. 29). Where in Chapter 5 comparison between participant perspectives illuminated points of contention, comparison in this chapter serves to identify the many and varied obstacles seen to stand in the way of water scarcity conflict transformation.

Six IPA clusters emerged as superordinate themes. Firstly, in Section 6.2, barriers to participation are seen in a lack of equitable voice and acknowledgement in water sharing arrangements, as well as discrimination on gender and race grounds. Secondly, Section 6.3 identifies economic barriers associated with price inflation during water scarcity, which disadvantages water sharers already facing reduced adaptation capacity due to lack of liquid capital. Thirdly, resistance to change presents in Section 6.4 as fixed mindsets, along with participant critiques of incentives designed to overcome resistance. In Section 06.5, the fourth and most frequently discussed barrier to fair and peaceful water sharing emerges in the difficulty of disseminating, receiving, and understanding complex water basin information. Fifthly, in Section 6.6, participants describe breakdown of social relations in the form of violence and intimidation; shielding; difficulties in burden sharing; perceptions of greed; lack of proximity between water stakeholders; and trust deficits. Lastly in Section 6.7, participants reflect on recourses for water-sharing justice, discussing the adequacy of courts of law; the emergence of community justice mechanisms; and the claiming of water rights.

Conclusions to the chapter are offered in section 6.8.

6.2   Participation

6.2.1   Voice and acknowledgement

Participants from both basin contexts complained of lack of acknowledgement and opportunity to participate in debate over water sharing agreements, despite their attempts to do so.

For participants in the Murray-Darling/Barka, a lack of opportunity to participate was raised as a point of contention across all influence levels. In some instances, basin actors who spoke the loudest or were willing to agitate were begrudged as having an unfair advantage.

Himself the subject of lobbying as a politician, Mr Butler (H-Aus.) said that while it is not inherently bad to listen to the voices of lobbyists, this cannot come at the expense of equitable community participation in water sharing negotiations:

Ex. 6.1   *There's been lobbyists, for example, who successfully lobbied [his predecessor] Kevin Humphreys to change water rules within the Barwon-Darling water sharing plan. And people have spoken to me and said, 'Well, you know, that's terrible, how can that happen? That person, the lobbyist, is a bad person.' And I say, well, the lobbyist's job is to lobby. That's their job, to try and change government's direction or opinion or decision. So you can't be cranky at a lobbyist for lobbying. But government on the other hand, and a local member and a minister, has an obligation to everyone, not just an industry or not just one part of one part of the system.*

Ms Maywald (M-Aus.) said being heard is central to "fairness" which is itself more important than comfort:

Ex. 6.2   *Fairness is about making sure that everyone has the opportunity be heard, and then putting in place a process that people understand even if they don't like it.*

Mr Woods (M-Aus.) recalled negotiations on basin reform with the MDBA which he felt had excluded First Nations perspectives, even after significant effort had been put into consultations. He expressed his frustrations at the disregard cultural values and traditional knowledge shown by pursuing water extraction savings by building "concrete structures across country":

Ex. 6.3   *A lot of that was around Aboriginal values and owning the landscape. They'd done a whole socio-cultural report and everything. They'd done all this work but then the Authority [MDBA] didn't take it into consideration when making their recommendation. That was part of the reason why [northern basin counterparts] Fred Hooper and NBAN were so vocal in the disallowance motion: because they just weren't listened to. … The Authority and CSIRO* [59] *come up with this sustainable diversion limit*

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[59] The Commonwealth Scientific and Industrial Research Organisation (CSIRO) – an Australian public research institution.

mechanism.[60] That itself didn't take any consideration of cultural values or the impacts. … In some cases, reconfiguring landscape to put in [hydraulic] regulators to give water across the flood plain when there's less water in the river. We don't want to see concrete structures on country. We want to see it as natural as possible. But what are the impacts to cultural values by having these projects get up?... They tried to follow the rules, but when they come to that decision making … they just didn't take in the best science that was available, which was some of the original science that was around.

However, Mr Woods also put forward the alternative he would like to see:

Ex. 6.4   *I'd like to see more increased participation in decision-making; management. So environmental advisory groups, but then further up the chain inside departments where they're making key policy and decisions on Aboriginal Water. Because all water that comes across country is going to impact Aboriginal people, so we need to be across all aspects of decision making, not just environmental but consumptive use, infrastructure, that type of activity. We need to be there, having our input, so everyone else at the table understands what we're doing and where we're heading.*

Mr Besser (M-Aus.) said farmers were "relieved" to have someone listen to them and amplify their voice after they had long felt unheard:

Ex. 6.5   *They'd written miles of submissions and they'd talked on local radio; to local journalists. But to have a big national program, a big loud voice, sit down with them and really listen. … It was that they would be listened to by someone or something with some power to do something about it.*

Yet Mr Whittaker (G-Aus.) felt that unbalanced amplification in the media gave a minority of stakeholders a dominant voice:

Ex. 6.6   *You know you've got eight graziers that have more say in the management of water in this valley than 600 irrigators because they get all the media. And the government agencies are too scared to step up to them, so they dictate the state of play. As an irrigator I've had enough, you know?*

According to Mr Taylor (G-Aus.), many people did not know how to make their voices heard in Basin Plan consultations, which were "badly managed":

Ex. 6.7   *It was the classic swirly whirl: who screamed loudest and had the most powerful lobbyist in [Canberra] held sway to a large extent. But there was a silent majority sitting out there not being heard, and not knowing how to be heard. I am talking about the fishing community; the recreational users. Just the whole mob of people and sectors who were left out of the mix. So what we were trying to is give them a voice in that process.*

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[60] Sustainable Diversion Limits (SDLs) refers to a systematic capping of water extraction from the Murray-Darling/Barka Basin, as legislated in the MDBP.

A significant part of the problem, Mr Collins (G-Aus.) observed, was that the issues in question during negotiations are not communicated to stakeholders effectively:

Ex. 6.8   *Because people will scream and carry on as though 'How come I didn't get asked' and you go, 'Well you were asked.' And they don't think they're asked. They either haven't got time to participate in a survey or to really listen when it was coming or have a representative that really represented them.*

At the downstream end of the basin, Mr Conti (G-Aus.) felt the only chance his community had of being heard was if they had a loud voice in the parliament:

Ex. 6.9   *We're at the end of the line. Unless the government sticks up for us, nothing's gonna change.*

Like their Australian counterparts, Yemeni participants also complained that their voices were not heard by those with the power to make decisions. In this context, the issue of acknowledgement was predominantly raised by the mid-level influence participants.

Moh. Hadid (M-Yem.), himself a water expert, said the issue in Yemen was a lack of "proper resources or capacity":

Ex. 6.10   *Water experts feel that they are isolated and no one hears their voices. No one [sees] the importance; they don't feel that they have the proper attention. It is accumulative.*

Water experts, people working in water, or water authorities within the government – their voices are not heard, or their concerns are not taken by the political, by the top leaders.

Recalling the successes of Yemen's 2013-2014 National Dialogue,[61] Ms Fakhoury was frustrated that failure to include more than the loudest voices in negotiations that followed had seen these gains reversed:

Ex. 6.11   *In the National Dialogue, everybody was included in the talks. And then suddenly you tell everybody 'No no no, you're not allowed to be here. Of course they're gonna fight! And they did. They picked up arms against their own allies. ... It's because they felt that they're excluded.*

Here, Ms Fakhoury saw it as obvious that if the voices of aggrieved people are not acknowledged, they will look to other sometimes extreme means of being heard.

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[61] Yemen's National Dialogue was a 2013-2014 transitional justice and reconciliation conference, convened in the wake of the 2011 uprisings that unseated the government of long-term President Ali Abdullah Saleh. 'Water and the environment' was an agenda item at the conference (Gaston, 2014).

6.2.2   Representation and discrimination

Two participants, one from each basin context and both representing the mid-level influence group, raised issues of discrimination that impacted water-sharing arrangements in terms of race, gender, and strength.

Mr Woods (M-Aus.) suggested that policy aiming to address economic problems faced by rural communities in times of drought has a race problem:

Ex. 6.12   *Say there's no water in the river at Bourke; Aboriginal people are not employed; or they're relying on welfare: that data hasn't been looked at; how we make that connection. We know it's happening. … but it seems to be focused on the white economic outcomes.*

Pointing to a severe lack of gender diversity in peace talks, Ms Fakhoury (M-Yem.) questioned how negotiators could ever expect to have a sustainable water sharing arrangement when only the "men with guns" were invited to participate in water negotiations:

Ex. 6.13   *We told everybody 'If you're going to invite them, they have to bring the women or not come at all.' Because if you're only bringing the men with the guns, you're not reflecting the society. That's why the water issues and everything; the outbreaks of cholera and diphtheria and all these things are happening because nobody's talking about them. And, and these things are causing other conflicts. They're causing suffering, and nobody's speaking about transitional justice. … Everything is gender-blind. Nobody is speaking. And we're not calling for gender equality here. We're speaking about reflecting the society's suffering into the negotiations*

In two instances, Yemeni participants suggested that desperation led to a survival of the fittest scenario.

6.3   Economic boundaries

6.3.1   Access to capital

For some participants, economic barriers kept them locked out of existing water sharing arrangements. Participants who discussed economic barriers were all from the grassroots or mid-level influence groups.

Recalling section 5.5.2 on divisions between rural and urban water access in Jibal as-Sarawat, most of the Yemeni population accesses groundwater from wells drilled outside urban areas. Thus, the control of land influences the ability to drill for water.

Mr Farraj (G-Yem.) said that land ownership gave people power and control over water resources:

Ex. 6.14   *The control for water has been since long time a privilege for the family who owns the largest area of land. A lot of problems happen because of this system. And many people are denied access to water for only domestic consumption because they do not own agricultural land. I think water can be better managed by distributing it on the basis of the need to drink and the use in the household firstly, then the rest could be used for agriculture.*

He does not specify whether the control of land and the water below it should be owned, be it publicly or privately, but focuses on a need to prioritise domestic water use above agricultural use. It is also notable that, in saying "the rest", Mr Farraj thinks there is enough water to continue pursuing agricultural production, even as a second priority.

Mr Farraj's observation on land ownership and its impact on water access was also cited in Australia. Mr Conti (G-Aus.) offered an example of where local land was valued for the water licence attached to it:

Ex. 6.15   *The land down on the left near the ferry was just bought by big operators from the Northern Territory, for the water licence.*

While Mr Farraj and Mr Conti focused on land assets and their facilitation of water access in both basin contexts, the reverse effect was also cited, identifying a positive feedback loop between land ownership and water control.

In Australia, where water is tradable separate to land, Ms Maywald (M-Aus.) spoke of the potential for water access to increase land value and more generally access to capital:

Ex. 6.16   *Whoever's got water can be more profitable. The value of their land asset is higher because it's more productive. Their ability to access more resource, more technology, more of everything is higher because they've got more turnover going on in their property. Compared to the person who doesn't have water, their ability to produce is compromised. The value of their land because it's not as productive is compromised. ... We can't have a situation where one part of the river is highly profitable and people can make a stack of money, and then further down the river, people are going to the wall and being foreclosed on because they can't turn a profit.*

In Mr Collins' (G-Aus.) experience, the asset liquidity accessible to large agricultural entities gives them a significant advantage in the ability to adapt to water variability. He recounted an instance

when his large corporate employer was better able to adapt to prevailing climatic conditions than smaller operators:

Ex. 6.17   *I'd said 'Why do we own this water [entitlement]?' Because at that stage we hadn't had water [allocations] since 2001 and we were unlikely to get any more. We were paying big money to own it – the standing fees were quite high because that's how they run the dams and the structures. 'Why do we own this water that we're having trouble with, when there's a big opportunity to trade it when it's available, because of our level of investment?' ... We were able to go and make good money when the water was available – grow rapidly really quick, and back to small again in response to what the environment was doing. ... But not everybody can invest that way. Need a bit more stability in a family farm, perhaps.*

Despite the huge difference in context, Mr Faysal (G-Yem.) likewise complained that market conditions created investment opportunities for those who could afford it, while disadvantaging those without access to capital:

Ex. 6.18   *Currently, in light of the war and the siege on the city, the process of distributing water is determined according to the market demand that drives private capital investment in mobile water tanks in the city of Taiz to provide water for the population. Which is certainly, despite its great ability to keep up with the market requirements and quickly, unsatisfactory for the citizen who suffers from the high prices and delays in the seasons of drought and the absence of rain.*

In the experience of participants, access to capital gave water sharers significant advantages in water sharing arrangements. This included productivity, but notably also regarded an operator's climatic adaptation capacity. Conversely, those with fewer assets and limited liquidity were hamstrung in their capacity to changing environmental conditions.

6.3.2   The water market: trading and prices

Both the Murray-Darling/Barka and Jibal as-Sarawat are contexts which combine the provision of public water services with market-based water trading arrangements. Though the market mechanisms in place are vastly different, water trading and commodification that resulted in inequitable water pricing were frequently cited as barriers to water access in both contexts:

Mr Butler (H-Aus.) recounted what he saw as the morally problematic exploitation of water trading rules for corporate gain in western NSW:

Ex. 6.19   *Water New South Wales denies this ever happened, but we're certain it did: there was expiring licences in the Murrumbidgee that were sold to a company near Menindee, it's*

> *no longer there, it's Webster [62]. They bought expiring licences in the Murrumbidgee.*
> *They transferred the licences from the Murrumbidgee up to Menindee where the*
> *carryover rules are different. And then that gave the licenses a new lease on life and*
> *they sell them back into the Murrumbidgee. $2 million profit on a book transfer and an*
> *unnatural trade of water and that's the sort of thing that we're saying, 'Well that's not*
> *right, morally, that's not right. That's essentially gaming the rules.'*

The practice which Mr Butler referred to, in which a single entity owns multiple property assets in different locations within the basin, enables the trade of water licences between properties according to its maximum utility at a given time and location. The practice is legal in Australia, but combining this with carryover entitlements means that a mechanism designed to reduce excessive water storage is exploited to maximise the profitability of water entitlements.[63]

Introducing further complexity to upstream-downstream sharing-dynamics, the practice of combining carryover allowances with market trading of water licences in the Murray-Darling/Barka was becoming more frequent, according to Ms Maywald (M-Aus.):

Ex. 6.20   *You'll have people who are growing grapes in South Australia and people who also*
> *have holdings in Victoria. … It's becoming more and more and more frequent now,*
> *because of water trade, and because of the benefits of different types of products and*
> *rules associated with carryover in particular. So we're now seeing that there's a lot of*
> *water [licences] being purchased for the purposes of getting the best advantage over*
> *carryover rules in the state that has the most generous rules associated with that. For*
> *example, a South Australian irrigator can purchase temporary NSW or Victoria water*
> *allocation at the end of the year to be held upstream, and then transferred for use in*
> *South Australia under the carryover rules of Victoria and New South Wales.*

Mr Woods (M-Aus.) said that First Nations groups would participate in the water market if they were able, but a market-based system did not facilitate cultural flows without significant purchasing power:

Ex. 6.21   *We are sort of locked out at the moment. If we haven't got the money to purchase water*
> *on the open market, that sort of hinders us there.*

> *If we had money to go out and purchase on the open market, like the water users*
> *currently can, then we'd play in that field as well. … We just see ourselves as another*
> *water user and other player in the water sector and just want to be treated the same.*

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[62] The NSW Department of Primary Industries – Water and the company Mr Butler referred to was investigated by the NSW Independent Commission Against Corruption (ICAC) over alleged corruption around environmental water buybacks (ICAC, 2020)(ICAC, 2020).

[63] "Carryover" refers to rules designed to help 'water users to manage water availability risk' by allowing 'water allocated to an entitlement in one year to be used in a subsequent year or years, requiring its owner to use or trade the water in the year it is allocated' (ACCC, 2021, p. 21).

> *We're not different. We have the same rights as everyone else in the water sector. The only thing we don't have is entitlements in our name or available.*

This differs from the situation of "water users", since cultural flow entitlements are not solely focused on economic outcomes.

The commodification of water, Mr Collins (G-Aus.) said, encourages market investment ahead of subsistence. He discussed a predicament in which a farmer competes with high-wealth investors:

Ex. 6.22   *He wants to bid against [competitors] for water, because water's a commodity. We've made it into a system as it's totally trade-able, therefore it's the highest price [that wins]. Once you get the highest price, [the return on] nuts will win every time. And who can afford nuts? Superannuation or equity funds. People who are looking for a completely different way of looking at it [motivation for farming], rather than necessarily feeding their family first.*

Reliance on market forces to determine water prices, he said, means that in times of scarcity, water becomes accessible only to those who can afford the resultant price inflation:

Ex. 6.23   *There's always going to be conflict, [amongst] the states and the Federals. But there has to be, because otherwise you'll have somebody take more than their fair share. So how do you determine fair? Which is what the plans are trying to do. Once again, they come out and put an economic value on it. They just say 'It's worth this amount of money and that's set by the market' – how much someone else is willing to pay. So it's an availability thing. When it becomes scarce, then the prices start going up. And paid by the people who can afford to do it.*

According to Cr Davies (M-Aus.), the opportunism of water trading had long-term negative impacts on rural communities. While he understood the reasons for farmers to sell their entitlements in times of drought, he felt that permanent water sales towards environmental water holdings represented a lost opportunity in good flow years:

Ex. 6.24   *There's been a lot of water that's been sold in this valley, and it was sold for pretty logical reasons. When the first offers were made, it had been a very dry period. There was no allocation, and farmers were wondering, you know, 'What's the point in hanging onto water if I'm not even getting it delivered to me?' So they were selling their water; others were trading it for infrastructure, on a very profitable basis. But they lost their water permanently, and now we find that this valley has pretty much halved its water [allocated to farming] entirely.*

The opportunity cost to this valley … is just on three billion dollars. So the economics of all that water going into the Marshes [downstream] – the biggest carp breeding area and probably the biggest wild pig producing [two non-native environmental pests] area in Australia, makes no bloody sense at all.

Mr Conti (G-Aus.) used very strong language to express his frustration following an attempt to participate in the market, stating that he would rather see no financial benefit at all than be coerced into trading at unfair prices:

Ex. 6.25   *The government said 'It's all business'. We've lost quite a bit – no one's got any faith in the system anymore. The Government told us we could have three years' carry-over that we'd left in the river. [But then] one meeting, came in and said 'Trade it, use it, or lose it.' We'd paid $400 per megalitre; then it was $14 once that happened. We got caught out by temporary traders, the little shits! On the last day of trading, the guys in Victoria reneged on their purchase price. Well, it [the water] can stay in the river! Fuck the Victorians.*

Price barriers to water access were likewise raised by Yemeni participants. Ms Fakhoury (M-Yem.) said that price barriers to water access were related to both scarcity of water itself, and scarcity of diesel needed to extract it from great depths. She recounted a specific instance of desperation among water sharers:

Ex. 6.26   *Providing or buying water was high. So what was happening is those who do have the control over the water were selling it for a very high amount. And it caused a lot of tension in the area. And they were not fighting completely, but there was a there was a big dispute between them – it was nine villages between them. And you can imagine how much suffering was there.*

I saw ... the women, you know, fighting for the water and trying to get water from a very dirty well; a contaminated well. It was really heartbreaking. When I called them to ask them what the solution was, the only solution they had is to buy "waiyit mai" which is big water trucks. And that's really costly, especially in this area.

So too thought Moh. Hadid (M-Yem.), who framed water scarcity as a result of the dire economic situation and was aghast at the level of price inflation:

Ex. 6.27   *The situation, it is not normal in Yemen. Sometimes we've got a stable situation, but [at the moment] we've got severe shortage of fuel, which caused the high cost of water. It is sometimes double. Instead of 20, it becomes like 40 US dollars per truck. We don't have the other means for life. ... We are coping because we have no option.*

As a public servant, Mr Abadi (M-Yem.) said water scarcity due to inflation affected "everybody" amid a context where even those with jobs were not receiving their salaries:

Ex. 6.28   *The repercussions of the water crisis do not stop at certain borders or recognize the differences of income or work. Let's take this season as a model to indicate the magnitude of the problem, which impacted everyone, especially after the interruption of the water network of the Water Board in the province. The city was affected by the siege imposed by Houthis militia who have control on many wells that provide water to the city. The water prices have been risen dramatically and the price of the truck has*

exceeded 15,000 Yemeni Riyals, which is more than the capacity of both the employee and the average citizen. I do not think that anyone is satisfied with that.

In both basin contexts, and primarily (though not entirely) in the view of lower influence participants, market-based price barriers in times of water scarcity were widely recognised as unnecessary, human-induced barriers to water access. In Australia, unfair trading mechanisms were seen as culpable for water-sharing disparity between basin stakeholders, while in the relatively unregulated Yemeni market, situations of armed conflict and economic downturn were seen as predominant drivers of water price barriers.

6.4   Resistance to change

6.4.1   Unwillingness to cooperate

Participants frequently showed frustration at the seeming inability to effect social change needed to adapt to prevailing conditions against staunch resistance by the different stakeholders to cooperate with each other.

Mr Whittaker (G-Aus.) saw consensus-building among water sharers in the Murray-Darling/Barka as futile, where inter-industry discussions struggle to progress past social identities that present as fixed positions. Asked if he had experienced any instances where water scarcity had contributed to a more cooperative environment, Mr Whittaker replied:

Ex. 6.29   *You're pushing your luck. Not really. You know, we sit at meetings and if the irrigators support something, then the graziers and environmental groups will vote against it even if they don't understand it. There's just such a mental philosophy there: if you're for something, they're against it.*

Similarly, Mr Collins (G-Aus.) said that many basin stakeholders from both ends of the political spectrum were cemented in their positions based on identity group interests, sometimes engrained over generations of protracted conflict. As such, fierce resistance to change was commonly observed in the community:

Ex. 6.30   *The majority of people don't know [what they're talking about]! And it's really hard to talk to them, particularly when they've got a 'My grandfather this' or 'I heard' or a reaction to a partial bit of the news. It's terrible in Australia. Well, we're like everybody. We've got a proportion of us who want to believe "that fact" and don't like change. A lot of them would vote One Nation or Conservative, and a lot of them vote far out on the*

left too. Who have a position and want to defend the position. Why? Don't know. But they do.

The hardest thing, if I can quote [from] Hillston, is an understanding of what's been the changes, and getting people to open their mind to hear it if they come from a vested interest.

Sen. Hanson-Young (H-Aus.) was earlier quoted saying it was "big agribusiness" who had an interest in keeping the "status quo" (Ex. 5.70), thus placing the blame on a key stakeholder resisting change because.

According to Mr Glyde (H-Aus.), change is a long-term process closely related to building trust, which itself requires the acknowledgement of pain, before partnerships can be rebuilt:

Ex. 6.31   *I hadn't appreciated the scar tissue of change, of actually agreeing to make the change is long-lived, and that I reckon it'll probably take a generation for people to stop bailing me up at every meeting I go to and saying, what you did back there was wrong, that that was just unfair, you got the wrong… You didn't listen to us, you used the wrong analysis, you used the wrong model. It's really hard to let that go, and you've got to allow at any public meeting about half an hour for not just our previous wrongs, in their view, but for water reforms and buybacks and takeaways from the 90s all through the 00s. They have to talk about that. In some ways, you've got to wait for those people to leave the field, I think, before you can begin to build the partnerships. And we go to meetings now where we're slowly starting to see younger farmers, women, come in and start to say, look, we've got to just put this behind us, we've got to get on with this, we've got to deal with this new reality, whereas I think that lack of trust that comes from being badly burnt by the decision to establish what is a lower level of water allocation and in some ways establish a level of water allocation that's still from the environmental side is just not adequate to protect the environment. I think it will take us a long while to overcome that trust deficit.*

Here, Mr Glyde points out that resistance to change, as well as working through that change over time, is very much centred on the quality of relationships in the sector, suggesting the need for relationship transformation as part of transforming the conflict.

While speaking in the hypothetical, Mr Al Najar (M-Yem.) raised a similar perspective on the need for peaceful dialogue, seeing the potential in greater education and "awareness" to work through

Ex. 6.32   *Society's interaction in such situations varies from one region to another. I think the most important reason for such disputes is [lack of] awareness, since where there is awareness and an increasing proportion of education, you find that solutions are predominantly civil and peaceful interactions. … The work to increase and intensify awareness among people will guarantee changing their ways of dealing with problems, imbalances, and shifting from conflict to dialogue and understanding, in order to fulfill what satisfies everyone.*

Translated here as 'awareness', Mr Al Najar here used the Arabic 'وعي' ('*wa'aey*'), which carries the dual meaning of 'consciousness'. In that sense, it bears similarity to Freire's *conscientização*, or critical consciousness, a process of personal and social transformation that is the basis for Lederach's theories of conflict transformation (as discussed in Chapter 7).

Ms Fakhoury (M-Yem.) saw water itself as an incentive for peace, describing its ability to lure people to the negotiating table. She described the process she implemented upon hearing about inter-community fighting over scarce water by pointing out the benefits of cooperation:

Ex. 6.33   *When I heard from this from one of our volunteers, I asked him to send some engineers just to evaluate what's going on; how can we intervene, is it possible or not, and how much will it cost. And so what we did at the end is we managed to rehabilitate the whole water station. And we managed to sign a kind of agreement of trust between the villagers. And, we formed like a, like a council to supervise just so that nobody, you know [could exploit the process]. I wanted free access to the water for the woman and children. I don't want them to, you know, control it. So that was really the most important step. I told them we'll fix it. But before we fix it, we have to agree that we're not going to fight. And so it was a good incentive for them. And we fixed it. We fixed it and now it's been two years; it's working for 10,000 people there.*

Here, Ms Fakhoury secured resources to improve the water supplies in order to encourage cooperation between community members for mutual gain.

6.4.2   Incentives

Attempts to influence the behaviour of basin stakeholders through incentives was discussed by several participants. In most instances raised, incentive endeavours had secondary effects beyond their primary aim that presented as a barrier to fair water sharing. However, in other instances, access barriers were overcome through the use of incentives. In all cases, both the positive and negative aspects of incentive use were closely related to concepts of business and social adaptability.

Mr Taylor (G-Aus.) was "hopeful for the future" if financial incentives could be used to reduce transmission and evaporation losses, which he felt could save "30% to 40%" more water:

Ex. 6.34   *It immediately changes the game altogether. These people can't bleeding complain about water being brought for the environment, if they're given financial incentive to reduce their water losses. It's huge. It's the sleeper out there, which will make a big difference, if we reinvigorate the investment in that area.*

However, Mr Conti (G-Aus.) was sceptical about trying to make people "conform" through incentives. Instead, he felt "understanding" through proximity is the key to behaviour change:

Ex. 6.35   *Unless you understand the land, you can't make everyone conform. It's the big incentives – that's the problem!*

Recalling his earlier comments on investor-driven crop choices (Ex. 6.17), Mr Collins (G-Aus.) identified an underlying non-financial influence that influences crop choices. For small-scale farms with minimal liquidity, water variability and insecurity can incentivise short-term annual crop choices such as cotton, rather than long term investment crops that are more vulnerable to water supply fluctuations over several years:

Ex. 6.36   *The hassle is the investment around it that you build; all the things [crops] that require an amazing amount of investment. Superannuation crops, like almonds or walnuts or any of these things that use a whack [large amount] of water, more than any other crop per hectare. An orchard's a classic example where you're putting a lot of money in and you want it to stay there for 25 years so you do that with security. But where you've got highly variable, then you've got to go for the annual crops; somehow build security which could either be by licensing your water in the right way and storing it in a dam. … So you can build security by spending money on owning an asset which is owning water and therefore build your business around that and invest accordingly. Because you can't have the tree die because [if it dies] it's all over. It's about securing your water supply, yes.*

Here, Mr Collins' comments counter the argument that high water-use crop choices are nonsensical in arid climates and must therefore be fuelled by greed or carelessness (see section 6.6.3). His example illustrates that, when viewed over a multi-year timeframe, irrigated cotton farming is *incentivised* by extreme variability in river flows. The implication is significant, as it reveals an opportunity to shift debates over policy towards adaptability, rather than allocation.

Following her earlier comments on problematic qat cultivation (Ex. 5.23), Ms Fakhoury (M-Yem.) said that she was starting to see change in attitudes:

Ex. 6.37   *But I think recently we had some breakthroughs in awareness. People have changed, yeah, people have completely changed the land and started planting coffee.*

Noting that she had said qat "is like gold" (Ex. 5.23), she qualified that this change was not for economic reasons, but due to changes in the way water extraction is understood:

Ex. 6.38   *Economically? No. It brings them a lot of money, but I think the lack of fuel, and the water irrigation that it needs - because it needs a lot of water - I think this is really causing an issue.*

6.5   The information problem

6.5.1   Knowledge transfer

Across both country contexts and at all levels of influence, participants cited difficulties with knowledge transfer as major barriers to fair and peaceful water sharing. While the exact nature of these difficulties varied with context, participants in every influence category across both basin contexts complained of shortcomings in the dissemination, attainment, or understanding of water sharing information.

Ms. Maywald (M-Aus.) maintained that knowledge transfer is crucial for inclusive progress. She distinguished between access to information and understanding, highlighting the social divisions and opportunities to "blame someone else" that arise when understanding is not fostered through "interaction between communities":

Ex. 6.39   *Having a knowledge transfer and a water literacy, as the Inspector General referred to in his report, is really important. And I found the best way to take people forward on the journey is to give them not only information but understanding. And when you've got understanding, you've got different discussions that you can have with communities. For example, I recently met with a group of irrigators from Deniliquin down here at the Lower Lakes, and met with them over dinner, and we had a really great in-depth conversation and they've now gone back to the Commonwealth Environmental Water holder and said if we want Karlene to come up here to Deniliquin, we just need to sit down for three or four days and just talk these issues through, so we have a better understanding of what's happening. And I think that's interaction between communities, and a greater understanding of the reasons why it's different in different jurisdictions will go a long way to creating the opportunity for change. You're not going to get that if most people think they can blame someone else. ... It's more than disseminating information because there's plenty of information out there. But is it knowledge at that stage? No. How do you translate that information and an amazing amount of it, I mean, because there is an incredible amount of information out there, there's an incredible number of reports, investigations, Royal commissions. Where do you find, and how do you get; how do you build the capacity within communities to take that information and turn it into knowledge and an understanding? And at this stage that's the missing link, in my view, that we're not doing that at all well.*

For Mr Butler (H-Aus.), meanwhile, the key to effective knowledge transfer is the "transparent" and "timely" sharing of information. These, he said, are essential for achieving sustainability and certainty in the Murray-Darling/Barka:

Ex. 6.40   *I know the word sustainable is easy to say, but sustainable, and some certainty around water, and this is this comes back to the transparency of information because when there's not transparency and there's not timely information, then that provides uncertainty.*

Mr Murphey (H-Aus.) was aware of the "information vacuum" that needed to be addressed and identified specific gaps and challenges relating to understanding and transparency:

Ex. 6.41   *It [information] is hard to find. There's no single point of truth. Our web presence could be greatly improved - it's pretty basic. We have a lot of information on what a water sharing plan is and what's in it, but not much on how we would do a water allocation in any given Valley and why it might be zero in one year and 50% the next year. So I think there's an information vacuum. There's even, I think, a vacuum at the technical level and the basic level. Or entry level if you like to call it that.*

        I think the challenge is working with the Commonwealth so that we're both on this; [so] we [NSW] do it in a coordinated way.

He explained that part of the challenge, from the perspective of the information holder, was difficulty in communicating complex systems in accessible ways, "using products that people can understand":

Ex. 6.42   *So rather than a 50 page technical document, the entry level stuff might be some conceptual models that people can watch. So yeah, 'Here's the bucket; here's how we allocate this bit and this bit and this bit.' I don't know – I'm not a comms expert. But we've started working with our comms team on how we might kick that off.*

At the community level, Cr Irving (G-Aus.) emphasised the importance of clear, accessible communication between government and water sharers. Asked what would be important for fair and peaceful water sharing, she replied:

Ex. 6.43   *Two-way dialogue, and people knowing they're being heard in those forums – because they're public forums. And the opportunity to speak. When some of the government personnel speak, they don't necessarily speak in terms of layman's language, or in a way that's understandable by people in the communities, even though they work with water. The government employees need to be able to speak in a way that's understood. Not just with all this terminology, that might be irrelevant to some people in their mind's eye. So yeah, it's really important – effective communication.*

        People come away very cynical. And they're fearful because they feel that they're doing the consultation but the consultation isn't consultation, really - they're just ticking a box.

Mr Taylor (G-Aus.) was critical of communication from government departments like Mr Murphey's, complaining that current levels of transparency about policy decisions were not sufficient and left users unaware of what to expect:

Ex. 6.44   *We certainly need more transparency in terms of water allocation and entitlement and measuring and monitoring who is taking what. That's got to be real-time stuff. You have just got to be able to show people. The organisations that are responsible for these flows are terrible at communication. ... At the regional or at the catchment level. So this little committee that will sit in judgement or make a decision, leading up to each irrigation season to decide who gets how much water – they make those decisions and they don't tell anyone, apart from the people that actually operate the gate on the dam. It should be part of the weather report on the radio station. The ABC [radio] every morning should say, 'This much water is being discharged from Burrendong Dam. ... There's 300 megs going out today.' Then they should say '15% of that is environmental flow; this is for domestic use; and the rest is for cropping or farming.' Instantly you demystify it.*

In Yemen, Mr Bashar (G-Yem.) commented similarly about the need for better communications with his proposal to broadcast water distribution information to ease social tensions heightened by uncertainty:

Ex. 6.45   *A schedule or distribution plan should be set up daily or weekly and with the knowledge of the director of the [water] institution. These schedules shall be announced on radio stations in order to inform the citizens of when water will reach their area in order to prevent tensions among citizens.*

This was a theme echoed by Ms Fakhoury (M-Yem.), who emphasised the importance of communication in terms not only of 'what' is being communicated, but also 'how'. She suggested that a message of "togetherness" was essential to rebuild trust and facilitate information flow:

Ex. 6.46   *The communication is very important. The messages that you use is the most important. Because we try to be not provocative, because in Yemen, everybody... you know, we have mistrust now, and social fabric of the community has been completely disrupted. That's my long, most concern. People are very sensitive to who you are, who you're affiliated to: 'Are you with the Saudis? Are you with the Houthis? Are you with this group?' So if they really feel that you're very neutral, and your message is for the people, this is very important.*

While most discussion of information-sharing focussed on the shortcomings of governance systems, information for surety was not the only difficulty with knowledge sharing raised. Mr Woods (M-Aus.), following his earlier expression of regret that cultural values were "disappearing in the landscape" (Ex. 4.15), illustrated a pedagogical barrier faced by First Nations people when water is scarce. Building on his earlier comments about cultural breakdown, he lamented the disappearance of generational knowledge transfer without water in the river:

Ex. 6.47   *The knowledge transfer from the elders to the younger generation can't happen because they can't go back to those sites on the river where there were waterholes and*

> *there were stories attached to that. No one wants to go and see them – no water there – and talk about a waterhole or a story when there's no water.*

Recalling his earlier comments in Ex. 4.34, Moh. Nader (H-Yem.) discussed information breakdown stemming from political division:

Ex. 6.48   *There are many confusions regarding access to information, which has become anecdotal, in addition to many other things. So now our ability as a group working on water and our ability as an institution has also declined.*

Across influence levels in both basin contexts, participants' understood well that information flow was both needed and challenging, despite its frequent lacking. On this basis, improvements in knowledge transfer, and in particular how complex concepts are communicated in accessible ways, hold significant potential for the breaking down of barriers to fair and peaceful water sharing.

6.5.2   Water literacy

Where knowledge transfer focuses on action, water literacy relates to the ability to communicate and understand information accurately and effectively about how water systems work and are managed. This applies to information as it is both offered and received, with participants across all influence levels in both basin contexts struggling with communication around water sharing challenges.

Mr Glyde (H-Aus.) said that conveying complex hydrological concepts through an accessible medium to a wide audience with diverse needs and knowledge emerged as a particularly difficult challenge:

Ex. 6.49   *Ever since water was allocated, has led to really, really complex water law. And over the top of that the complexity of how ecosystems and rural economies work, we're tasked with you saying, okay, what's the fairest way to divide up amongst all the users of the water that means that we'll be able to continue to have those uses continue? They'll continue to exist, that we won't completely stuff the environment, we won't completely ruin the economic future of towns and industries in the basin, that means that that trust with that complexity means that all of our solutions are so hideously hard to explain to the community that I think that that probably, right at the moment, feels like our biggest challenge.*

Sen. Hanson-Young (H-Aus.) said it was easy to "lose people" as soon as the conversation got overly technical:

Ex. 6.50   *We've always been in a constant battle of reminding people what the science says while also being able to deal with the issues of clear communication to the community who,*

you know, once you start talking about figures and gigalitres and, you know, caps and DSLs and SDLs, you just lose people. A big part of my challenge has had to be to remind people why we wanted a nationally managed river system in the first place. And it was to save the river and it was to guarantee that South Australia wouldn't be cut off the system.

Upstream in NSW, water literacy was Mr Murphey's (H-Aus.) most laboured topic. He discussed at length both the ability of water users to understand the Murray-Darling/Barka catchment system, and the importance for practitioners to discuss it in a manner understandable for non-experts. Asked what his biggest challenges were in this regard, Mr Murphey replied:

Ex. 6.51　　*Community expectations around water availability, and with that is an area I've started working on which is also trying to improve water literacy in the community … [to] improve water literacy at the, let's call it the broad public level. Also [to] improve water literacy at the irrigator stakeholder level. … They're the kind of shorter-term challenges.*

He described why poor water literacy among basin stakeholders can be a barrier to fair water sharing, and as well as how it might be improved:

Ex. 6.52　　*The Murray's particularly contentious. There's this perception that all this water's being wasted and sent down to South Australia. So the Murray's my team's highest priority at the moment for water literacy. We've had a workshop with Murray Irrigation Limited, [which] is probably our biggest customer … So we had a Zoom meeting with those guys and said, 'What do you want to see?' Their focus, being irrigators, was on our water allocation statements and getting more information in there. The Murray's really complex, but they want to know: how does the releases from the Snowy [hydroelectricity and irrigation scheme] interact with our allocations in the Murray? How's the water divvied up between Victoria, South Australia and New South Wales? When New South Wales gets it, how's it divvied up between the different levels of security, like the different products, irrigation products? So, a lot of work to do, because … at the moment we just publish regular allocation statements.*

They also said yes, there's definitely a need for what I call the entry level literacy, which is just a basic understanding of how rivers work, and the fact that irrigation water's stored in the dam and released to irrigators; and the fact we have to divvy that up between states if it's a cross-border river; or different categories of licence if it's within a New South Wales river. And even differences between the north and the south.

It's a massive task, improving water literacy.

Mr Butler (H-Aus.) suggested that how people respond to water scarcity is related to their understanding of the catchment and its management:

Ex. 6.53　　*It hinges on their water literacy, you know, how well they understand water. … The Darling's an ephemeral system: if you're just purely in drought, then that's a problem.*

> *The New South Wales Government, constantly through the election and even since the election, it's only probably in the last couple of months they've started to acknowledge that there's some issues with water management. ... You asked how people respond, I said depends on the water literacy. People who understand that it's an ephemeral system and understand that we're in a drought now, they go 'Well yeah we understand drought's a factor'. What drove people absolutely nuts, though, is when government wouldn't acknowledge that management of water was also an issue.*

Mr Hall (M-Aus.) observed that upstream stakeholders have less need to understand the impacts downstream compared with the reverse:

Ex. 6.54   *The further up the system you go, the less people are aware of – and this is my opinion – of the extent of the system and shared... [nature of it]. People up in the upper reaches of the Murray don't think 'Without water it's going to...'. Whereas people down at Wellington [near the end of the Murray river] are very aware that water's come from somewhere, because it isn't falling in South Australia. There's lot of people on the lower lakes who have a very good understanding about the system, because it's of interest to them.*

A similar observation was expressed by Mr Kelly (H-Aus.), who claimed that levels of water literacy are by necessity much higher at the downstream end of the basin, indicative of riparians' vulnerability to upstream activity.

Ex. 6.55   *Everyone [in South Australia] knows the Murray. Phillip Glyde from the MDBA – he goes around the country ... and people [upstream] ask him what he does, and they go 'Oh okay, that's interesting'. And [then] he goes to Adelaide and he says what he does, and there goes the next 20 minutes in questioning about 'How many gigalitres here? What's the supply there?' He just gets grilled by anyone and everyone because of the level of water literacy. It's way higher [than upstream]. Not even comparable.*

In this sense, Mr Kelly indicated that water literacy is a tool used to cope with water scarcity, whereby knowledge is used to better manage and counter risk and vulnerability. It was quite evident that, in general, participants further downstream had a higher water literacy than their upstream counterparts. Rather than avoiding vulnerability, here downstream water sharers embrace water literacy as a strategy to build resilience.

While a strong advocate for local water literacy, Mr Whittaker (G-Aus.) cautioned that overestimating basin-awareness can lead to assumptions and misinformation. He pointed out that water literacy was not just a top-down exercise, but that much of his time was spent repeatedly explaining basin concepts to a fast turnover of officials:

Ex. 6.56   *Whereas 30 years ago people did a bit of ground-truthing at the bottom, that doesn't happen anymore. So [today] everyone's ground-truthing is to do a week's reading on*

the internet and you're on top of it. … It might work for marketing shoes or something, [but] I'm pretty sure with natural resource management it's bloody complicated.

That was my frustration on the Environmental Flows Reference Group. Every six months we had new people, new environmentalists, new bureaucrats, and they had no idea of the system. We'd have a two day meeting, the first day and a half was explaining to people how it works. 'This is the dam; you can only release this much water; if you release more than that…'. And they say stupid stuff and after a while you go… I don't need this. It is really frustrating. Because this is what you do [profession]; this is your house, your home, your livelihood. So you just put a bit of a wall up.

Mr Murphey (H-Aus.) said that the pedagogical challenge of water literacy was a key challenge:

Ex. 6.57   *Just increasing the understanding of people in the community how the resource is shared, but also increasing the understanding of why you need to make decisions to restrict access. … demonstrating that because of that [a particular decision], we still have healthy fish populations, for example, in the Murray-Darling Basin. Well, we did. That level of influence, like cause and effect, if you like, is important as well.*

Despite a very different water-sharing scenario, Mr Bashar (G-Yem), put forward a contextually equivalent perspective:

Ex. 6.58   *We require intensive awareness of the use of water by citizens and subscribers. We need people without technical knowledge of water or water sources to stop drilling wells because this causes wells that everyone relies on to dry up, which is disastrous.*

Mr Al Najar (M-Yem.) suggested that there is a strong link between water literacy and cooperation between sharing parties for mutual benefit:

Ex. 6.59   *Societies' interactions vary from one region to another. I think the most important cause of disputes is [lack of] awareness. Since where there is awareness, and an increasing proportion of education, you find that solutions are a predominantly civil and peaceful interaction, either by submission to what the state decides, or by civil cooperatives that are formed by various parties who conduct such issues impartially and for the benefit of all. Conversely, in areas where illiteracy is high and chaotic behaviours are present, situations go to disputes, leading to armed conflicts, which are then linked to the rooted problem of revenge in Yemen which prevents faster solutions to problems, prolongs conflict, and increases the number of victims and affected people.*

Although not explicitly stated, Mr Najar here implies that water literacy may counter the "revenge" narrative, suggesting an inverse relationship between understanding and blame attribution, and the consequent potential for water literacy to contribute to conflict transformation.

Mr Bashar (G-Yem.) found the gap between technical complexity and general public knowledge of water resources frustrating:

Ex. 6.60 *Water shortage creates many challenges for us. The city's residents do not understand the causes of water shortage and do not understand the difficulties we face in trying to provide well water from the countryside.*

Thus, understanding water sharing complexity presented as a barrier to fair and peaceful management of scarce waters in both basin contexts and at all influence levels.

6.5.3   Assumptions and silos

Frequently, hydrological complexity and the difficulties of communicating it gave rise to assumptions. So too participants complained that the many stakeholders involved in scarce water management struggled to present basin systems holistically, perpetuating an imbalance of views by focusing on specialist areas of expertise.

As a legal document, the MDBP does not itself explain the modelling and assumptions that underpin it. In Mr Butler's (H-Aus.) experience, this makes the plan appear absurd and clandestine. He recalled driving over the Darling River at Wilcannia with a colleague:

Ex. 6.61 *We're driving across and he said, 'You see that Roy?' I said, 'What Bill?' He pointed down, like over the side of the bridge, and said 'See that?' I said 'What?' He said, 'There's 90 megalitres a day flowing under that bridge.' I said, 'What do you mean Bill? The bloody rivers dry! It's been dry for years!' And he said 'No. In the underpinning assumptions for the Murray Darling Basin Plan, every decision that's made upstream and downstream assumes that there's 90 megalitres a day under this bridge.' And I said, 'Bullshit, Bill, how can you prove that?' And he said 'No, it came up in a meeting.' He then sought clarification and got clarification that that is the case: that every day including the days when there'd be no water going under that bridge, [the plan] assumed that there was 90 megs a day going under there. And this is what I mean about management. You know, we talk about drought – yeah, drought's a factor, but certainly the way that the Plan assumes water works is also a problem.*

Mr Kelly (H-Aus.) suggested that a lot of research conducted in the basin was "flawed" because its scope was too narrow:

Ex. 6.62 *A lot of the stuff is based on flawed assumptions because they might be a fresh water ecologist, but they have no idea about the socio-economic considerations. Okay, that would be marginally better for this fish species, but you actually would have destroyed a town or a city in doing it. They want to consider it, [but] they won't even know that's a problem so... I'm not having a go at them, it's just outside their area of expertise. So they don't see the whole picture.*

For Mr Woods (M-Aus.), debate based on poor communication and siloed agendas and was a recurring barrier to fair water sharing:

Ex. 6.63   *I think a lot of the angst against the basin plan is just that pure miscommunication that's come out, and then people's own agenda or line of sight that they want out of the basin plan, without taking the blinkers off and looking at the system as a whole. … It's just so frustrating that we look at the landscape as holistic and we don't break it down, but these other groups, stakeholder groups, they only see their little patch, or you talk to MIA Water from Griffith and they're only worried about their service delivery area, not worried about what's downstream or upstream. So, that's another hindrance.*

Cr Davies (M-Aus.) was exasperated at what he perceived to be a lack of "reasoned" water balance determination, on account of political cowardice:

Ex. 6.64   *No dickhead has got the balls in this bloody country to look at it, or even to get someone who understands a marsh to have a look at the situation and bring back a reasoned determination of it. No one's ever done that. They rely on this bloody Richard Kingsford who goes out there and, clearly, he's so conflicted by the virtue of the fact that all his grant funding is based on his research out there.*

Also directing his complaints towards Prof. Kingsford,[64] Mr Whittaker (G-Aus.) reproached governing bureaucracy, media and academia for chasing publicity at the expense of accurate and balanced information:

Ex. 6.65   *The problem is politics; bureaucrats I guess and which are driven by the media. And I think that's the unfortunate thing with this process: the facts come over very poor and very poor lasting most of them.*

You've got bureaucrats, modellers, government agencies, politicians that are all reading up their information on the Marshes from researchers that are perhaps dodgy, flawed, liars. I mean, it's for a cause, you know? Like… Richard Kingsford, Dr Richard Kingsford, the bird man – presents all this information which is just totally incorrect. And does his monthly bloody bashing of the irrigators in the Sydney papers or whatever. And, you know, we've approached him and said, you know that's wrong. [But] It doesn't matter, it suits the cause.

While Australian participants complained of too many specialists causing confusion, Yemeni participants complained that experts with on-the-ground understanding were not being listened to. Ms Fakhoury (M-Yem.) said that while Yemen's water problems were well known in a general sense, the realities of complex water challenges on the ground did not receive enough nuanced expert attention:

Ex. 6.66   *People speak about the water and how it has been destroyed in Yemen, but nobody's really focusing on what's going on the ground. And we need experts who can really help*

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[64] Professor Richard Kingsford is a river ecologist and conservation biologist at the University of New South Wales (UNSW, 2021).

us to understand how to manage it, how to do; what are the projects that, you know, could really impact.

Recalling his earlier comments, Moh. Hadid (M-Yem.), himself a water engineer, complained that the problem was not a lack of expertise but that water experts were being sidelined by authorities (Ex. 6.9). Similarly, water law expert Mr Al Saif (H-Yem.) was frustrated that the laws he advises on are not implemented (Ex. 5.13; Ex. 5.32).

6.6   Relational boundaries

6.6.1   Intimidation and direct violence

Recalling Chapter 2 (Section 2.5), physical violence or the threat of it can be viewed as relationship breakdown in the extreme. From his position as a high-level decision-maker, Mr Glyde (H-Aus.) made a clear distinction between justifiable anger and violence, saying he felt respected and welcome in communities despite the presence of conflict:

Ex. 6.67   *I think there's a long-running practice in the way in which governments and civil society behave that is within the rule of law and professional respect, would be how I'd say it. I get to go to a lot of meetings where there are a lot of angry people, and justifiably angry people, in the sense that you go to a town in Queensland that's near Cubbie Station – Dirranbandi – it's had this real boom and bust. And we've come along, or collectively the Commonwealth's come along, recovered water and really adversely affected businesses in that town. You go along to a public meeting there and you're dealing with people who have lost livelihoods and things like that – a lot of angry people – and I'm always surprised how Australians, even though they've got that simmering anger and they can express it, it doesn't turn into violence or I never feel as though I'm not welcome in the town. Or even though they fundamentally disagree with what I might be saying, there's still a degree, I think, of respect for... I'd probably say a bit of an understanding that we are in a difficult role, almost like we're the referee, the umpire, and we listen to all sides, and so we're never, ever going to come up with a position all sides are going to support.*

He did, however, refer to the 2014 shooting of a NSW environmental officer,[65] but said such incidents were isolated and rare:

Ex. 6.68   *There was a guy, a New South Wales National Parks and Wildlife Service officer, who was responsible for ensuring land clearing vegetation in New South Wales, who was*

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[65] The incident referred to was the 2014 shooting of Mr Glen Turner, a Compliance Officer with the NSW Office of Environment and Heritage. The incident centred on a dispute over land clearing and was not specifically related to water scarcity. However, it was nonetheless related to public monitoring and compliance of farming activity in a context of highly contentious and disputed legislation (Hoerr & Dole, 2016).

shot, killed, by an angry farmer not so long ago, and some of the risk assessments that are done in this place before we go, they're always bringing that up. But I personally don't feel threatened, I feel as though Australian values, the whole society doesn't resort to that sort of violence. It's that incident, it's really quite rare that sort of thing happens.

In his role managing water allocations in NSW, Mr Murphy (H-Aus.) revealed that he had been the subject of personal abuse following his team's enaction of water restrictions:

Ex. 6.69   *It was so contentious that one of the peak bodies gave out my mobile number and I was getting smashed by phone calls. Yeah. And they're quite angry people and... anyway, yeah you just deal with it. That's why I said it was quite stressful. That's where I was getting texts saying 'You bastard! My husband's... I'm picking up the pieces of my husband on the floor'. That's what she said. [And] The other dude that rang me up and said there'd be a suicide note with my name on it. Yeah, people emailing us saying you're incompetent because you wouldn't give them access to water: 'We've always had access to water; now you're stopping us, you incompetent bastards'. Yeah, it's pretty full on.*

Recalling section 5.4.1, Mr McLaughlan (M-Aus.) used graphically violent to describe the effect of Sen. Hanson-Young's political agenda, suggesting she had in effect "put a gun to someone's head" (Ex. 5.62).

Asked how people tend to interact when they share a scarce water source, Mr Whittaker (G-Aus.) replied:

Ex. 6.70   *They don't – they hate each other. You can't expect anyone not to.*

He continued from his earlier description of abuse levelled against his family, recounting an episode of intimidation directed towards local government representatives:

Ex. 6.71   *It's a disgrace. ... You had Marsh graziers come and abuse Council members in Warren, like Brett, the Toyota dealer. They come and rip up their account and abused him because he was a councillor that voted to support the reduction in the buyback. You know, two or three graziers out there threatening bloody council members.*

As a member on that council, Cr Irving (G-Aus.) described the same incident as boycotting, arising from a desperation to be heard:

Ex. 6.72   *Some councillors are very vocal against that: they want to support the irrigators who've had water taken back off them from the government with the buyback scheme or whatever. And so what happens is the Marsh graziers themselves might just withdraw their business from a councillor's business in town. That's how hard it gets. But that happens in small communities. If they perceive a councillor making a wrong decision, and that councillor owns a business in Warren, the people if they're not happy, they'll end up taking their business away from that councillor's business. That's how personal it gets. That's how strong people feel about the issues. ... It's not common, like*

> *it just happens when people become a quite desperate in their attempt to be heard, I guess, by the Council. And they think that maybe they'll be heard by doing that.*

In Yemen, Mr Ahmed (G-Yem.) explicitly associated 'violence and bullying' as the use of power over another to obtain water in desperate situations:

Ex. 6.73   *Yes, water scarcity is a major cause of violence. It is not so far: the war that took place between the village of Qarada and Al-Marzeh in Sabr, which claimed the lives of more than seven people due to a dispute over a water source.[66] Water scarcity also causes panic and greed among wells' owners, which leads them to raise the prices that citizens cannot afford, making violence or bullying are the only way to get water. The absence of the state authority on the general situation in the city and its inability to arrange and develop water price procedures makes everyone who has a power or a weapon to use it to get water.*

Other instances of physical violence in relation to scarce water resources were already cited by Yemeni participants include Ms Fakhoury (M-Yem.) (Ex. 4.70), and Mr Abadi (M-Yem.) (Ex. 5.61). In these instances, participants discussed violence as both stemming from scarce water sharing, and as an obstacle to attaining water.

6.6.2   Sharing the burden

Three grassroots participants – two in the Murray-Darling/Barka and one in Jibal as-Sarawat – identified the difficulty of sharing not just water resources but also the burden of suffering.

In the context of discussing long-term government over-allocation of extraction licences from the river, Mr Whittaker (G-Aus) cautioned that some policies present as solutions but instead just serve to 'move the hurt' around:

Ex. 6.74   *[The] System's over allocated, over committed. So, what we do is we take water from stakeholder and give it to the other stakeholder or in the case of the Murray-Darling we buy water from productive users and give it to the environment. How does that fix an over allocated system? It doesn't. All it does is move the hurt from one stakeholder to the other stakeholder.*

The time for negotiations, he suggested, was not in the midst of a drought when emotions run high, but in a wet period when people are under less pressure:

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[66] This is a reference to a well-known dispute at Sabr Mountain near Ta'iz, which is commonly presented as an association of water scarcity and violence.

Ex. 6.75   *Open the dam [for greater use] when it's full and we're not under such social and economic pressure, like [we are] in a drought. It's always pretty emotional in a drought to try and sort things out.*

Where most participant perspectives offered throughout the study were about the fair and peaceful distribution of water, Mr Collins (G-Aus.) spoke about the flipside. As well as distributing water fairly, he pointed out that the state is likewise tasked with equitably distributing suffering in times of drought:

Ex. 6.76   *They were looking at restrictions and trying to work out how we were going to share the pain, if you like. It's quite easy to work out how you share benefits, but how do you share pain around?*

Mr Faraj (G-Yem.) was exasperated at a lack of empathy between water sharers which "interrupts the social ties":

Ex. 6.77   *Surely, there is a lot of conflict and sometimes it is escalated to direct fighting which interrupts the social ties. There is always a belief of one of the parties that the other one only cares about their own needs and vice versa. Some neighbours exchange accusations of greed, excessive water consumption and non-compliance with each one's allotted time.*

Here, Mr Faraj points to the perception that to not care about the needs of others is sometimes perceived as selfishness. Indeed, 'greed' was a common accusation levelled by participants against other water sharers.

6.6.3   Greed

Discussions of greed were dominated by the lower influence groups and emerged across both basin contexts. In the Murray-Darling/Barka, references to greed were associated with large upstream storages or the use of water for irrigation which was viewed as excessive for the context and undertaken at the expense of other water sharers.

At the lower reaches of the Murray River, Mr Lee (G-Aus.) was dismissive of upstream irrigators who he felt did not engage genuinely with people downstream:

Ex. 6.78   *It seems like the further you go upstream it becomes more like a, just a theoretical exercise rather than a, you know, a lifeblood type thing. But… well, I get the impression, that they're just fucking greedy.*

Upstream, Cr Davies (M-Aus.) said that particular instances of problematic regulation upstream gave rise to unwarranted stereotypes that the irrigation industry in general was 'greedy':

Ex. 6.79   *Well, you know, a lot of people say... Yes, there have been really silly things that have happened in the Murray-Darling Basin. We've got to, and, you know, I admit all of this. Cubbie Station is just the most outrageous bit of legislation that ever, anyone's ever come up with. These guys can pull as much water as Sydney Harbour. You know, they've got a, almost, they've got onsite storage, I think it's capable of about 430000 megs. That's appalling. That's more water than we use in this valley in a full year. Yes, that is just appalling. And the obvious logic, well, for my thoughts on that, is that so much of that would've gone into beneficial flooding, you know, across hundreds of thousands of hectares downstream. None of that happens anymore. And, and that gives people the right to say the greedy cotton growers are taking our water, and they bloody are. You know, when you've got a, a property like that that can take that much water out of the system, one property, that's bullshit.*

Mr Whittaker (G-Aus.) presented a similar perspective, emphasising that the greedy cotton grower stereotype was an unfair presentation:

Ex. 6.80   *It's a tough job and I think, you know, we keep reading about all these filthy rich cotton growers. But I don't know where they are. You know I think in the Macquarie Valley you've got two corporates and the rest are family farms. I don't think they're rolling in money; they don't jump in a helicopter and head to the coast. Whether there's a few big corporates up north that people focus on or whatever but, you know, we get on well with the other farmers. And you know it's just in this environmental group with a few graziers that seem to unravel the whole show.*

Asked how people interact when multiple parties share a common scarce water resource, Mr Collins (G-Aus) said that people's behaviour was 'fine' insofar as the burden was limited to other people:

Ex. 6.81   *Nimby is the word.* [67] *... It's 'Not in my back yard. When you come and touch me, I will agree with a lot of things until it impacts on my life or I perceive it as a benefit to somebody else.'*

In Yemen, Mr Faysal (G-Yem.) suggested that conflicts that may have once centred on water scarcity fall back to politics, ideology, and greed:

Ex. 6.82   *If what is meant by disputes and conflict in general during the history and globally, then it is certainly an unambiguous reason for the most intense of conflicts. But at the local and current levels, I believe that even if they previously represented a cause of disputes, they have fallen back due to the conflicts based on the motive for obtaining political and military gains and the ideological influence and the increase of wealth and income.*

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[67] The term 'nimby' is an acronym for 'not in my back yard', referring to a person who objects to an unpleasant development that impacts on them or their surrounds without consistent concern for similar impacts elsewhere or on other people.

Mr Malik (G-Yem.), from his position as a water truck driver, said he witnessed "greed and aggressiveness" associated with private monopolisation of water sources:

Ex. 6.83   *Some people behave with greed and aggressiveness when they share a source of water, and you get many problems and disagreements because some parties get water and others do not get it, or get a very little quantity. ... The monopoly of the stations' owners is just one of the reasons in the absence of regulations and laws. Laws are useful to control the manipulation and greed of anyone who increases water prices.*

In earlier comments, Yemenis at the grassroots associated greed with other behavioural traits. Mr Ahmed (G-Yem.) referred to "panic and greed" which leads to raised prices (Ex. 6.73). Mr Farraj said that "neighbours exchange accusations of greed" around consumption and non-compliance (Ex. 6.77).

The only participant from a high influence category in either basin context to raise the matter of greed was Sen. Hanson-Young (H-Aus.). Continuing her earlier point about the dominance of 'big agribusiness' (Ex. 5.70), she suggested that large-scale upstream water storage was a significant source of anger:

Ex. 6.84   *The other thing that really upsets people of course when you think about that kind of level of greed and prioritisation of kind of private and corporate profit over community and environmental access to water is obviously Cubby Station is like a, you know, is a lightning bolt for that conversation. Even though it's not even at the point you know where it used to be, but it's still in I'm sure you would have seen it you know, heard this in your conversations. People still banging on about Cubby Station. But there are many, many other cotton farms in that St. George and down to the NSW border region that are harvesting water in huge amounts and irrigating in huge amounts of from private storage ages, some of which are funded by the public taxpayer actually but they're still private, in the heat of summer. And anytime I've, you know, I took a trip up there a couple of summers ago and just people were so angry at seeing the photos and the footage of just, you know, acres and acres and acres as far as the eye could see of lush cotton growing in the middle of a drought when the farm next door had nothing. So that's what so it's not just about upstream-downstream, environment versus farmer. It is really about the big and greedy versus everybody else.*

Talking about 'photos' and 'footage' as the cause of anger downstream, she draws attention to the influence of communication and optics on perceptions of upstream activity in lieu of geographical proximity.

6.6.4 Proximity

A lack of proximity to the challenges faced by different basin stakeholders emerged as a common barrier to fair and peaceful water sharing arrangements. Most often, it was physical proximity to water scarcity that was raised as lacking.

Mr Glyde (H-Aus.) acknowledged that his own experience of water scarcity was primarily vocational, and that this differed from people who experience water scarcity first-hand and with whom he empathised:

Ex. 6.85   *I see myself as not as natural resources on-the-ground management, but more someone who gets involved from the Commonwealth's limited perspective. ... I see that my relationship with water or my view about water is trying to balance all of these fiercely competing interests in a fair and equitable way.*

       I don't tend to personally experience scarcity of water. The worst effect of personal experience would be [limited to] not being able to grow grass in my garden during the Millennium Drought. At a personal level and in terms of friends and family, that'd be the only impact. Not like the scarcity in other parts of the world where it's such a crucial part of life you can't get by without it.

Mr Besser (M-Aus.) discussed the effect of physical proximity to water scarcity on culture, contrasting his own city-based lifestyle with those who experience "turning on the tap and no water coming out, literally":

Ex. 6.86   *It's another culture, and it's like any time you do any kind of regional reporting ... there are cultural norms that don't exist where you are, and you become cognisant of those cultural differences. Not that they're so vast between here [Sydney] and Broken Hill, for example, but there are some, and certainly relationship to water and the land is a key one.*

Relationship with the land was demonstrated by Mr Kelly (H-Aus.) who, though now occupying public office, felt his agricultural upbringing gave him a grounded personal understanding of the challenges of managing natural resources:

Ex. 6.87   *You have an appreciation and understanding of what policy decisions made might actually mean to an individual farmer. You've lived that and you've seen government make policy decisions and how it affects. It gives you I guess a practical understanding when you're doing policy things ... probably a bit more of a handle on that. And it probably just gives you some pragmatism. You deal with droughts, you deal with hailstorms, fires, whatever, so it gives you a different context to work in.*

This was echoed by Mr Butler (H-Aus.), who personally identified with the hardship of raising a family in water-scarce contexts:

Ex. 6.88   *I've got three kids – as a parent, the idea that the water that you're washing your kids in, is causing them discomfort or causing them harm, that's not a nice place to be. My [hometown] Mendooran was the first town in New South Wales to go to level five water restrictions back in early '19, or no, late '18. ... It was pretty significant stuff. And I guess that really does unsettle the community when [it's] something that's so vital to their existence, like water. It really drives it home how it is in such short supply when you're told that you can't water anything; you can't wash anything; wash your car or anything like that. And basically, you're having these really short showers and on a hot a hot summer's day you're not able to run your swampy[68] – that was a particularly rough time and I know in my community, my own community that rattled a lot of people to think that they could go that close to running out of water.*

Indeed, all high-level decision-makers who discussed physical proximity readily acknowledged the first-hand challenges of water scarcity, whether experienced first-hand or vicariously. However, acknowledgement of understanding was largely one directional, with grassroots scarce water sharers looking towards decision-makers as distant or faceless.

Mr Whittaker (G-Aus.) complained of a lack of lived experience among decision makers of issues affecting farmers. Contemporary water bureaucrats, he said, were very 'top-down' without the on-the-ground experience of years past:

Ex. 6.89   *I think it's unfortunate that the water debate has lost any sense of practicality. It's evolved like even when we did the water sharing plan 10 years ago there was people there that understood the system. Now the decision makers are probably two tiers away from anyone that understands the system. ... It doesn't seem to be people that have been putting some time in on the ground. Everyone we talk to and everyone we meet is very well educated and quite clever and well-spoken, but they've started here [gestures "high"] and never done, you know... they're Sydney or Canberra people .... You've got the Director General for water or the Assistant Director General is someone appointed, who was a teacher in South Australia or a bloody dentist somewhere. ... You're getting these people appointed to these things [positions] that know nothing about water. If it takes me 30 years to understand the Macquarie, I'm pretty sure you can't understand it in a week.*

Mr Taylor (G-Aus.), having worked previously in public policy, recounted how he only started to witness animosity in conflict around water scarcity when he moved from the city to a rural New South Wales town:

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[68] A 'Swampy' refers to a household cooling unit that uses water evaporation to cool a flow of air – a common form of air conditioning in the dry climates of rural Australia.

Ex. 6.90   *That was my first encounter with the really nasty side of water. When you are working in a big building in town here [Canberra] as a policy officer, you just don't see the real stuff.*

So you have got the sort of ivory tower thing happening. People sitting not so much in [mid-basin] Dubbo and close to the action, but in Sydney and in Canberra, making policy determinations that are not really in tune with the social implications they are creating. I think that's really a fundamental problem.

Amid numerous stories of failed consultations, Mr Collins (G-Aus.) discussed a significantly more positive experience when a particular consultant showed a thorough level of understanding gained through physical proximity with a focus on listening:

Ex. 6.91   *One is to ask really honestly – that's the consensus bit. And that means having really, really good understanding – not just hydrology, which is the physical movement of the water, but the social stuff – whoever's going to make the rules. When they failed was when they claimed to be running on the three things [triple bottom line] here. They said they'd be doing socio-economic [consultation] and they didn't. State government didn't do it properly and the Federal government haven't done it properly. Except for the guy who came and… Dr somebody… he was the man that did the research; he was the man that did the report and he was the man that came and told us about it. It's a win, that's a great thing. … He came out and I spend a day with him the next day and seemed to be connecting on a whole lot of stuff; he was asking questions as well as telling. He got rid of the crap and put it in the context of what was there – it wasn't just saying 'I think', or 'I heard' or something. He was quoting real people and knew what it meant there. He knew about the plumbers; he knew about the tyre changers; he knew about the chemist shop and he had the numbers.*

Beyond geographical proximity, Mr Murphey (H-Aus) was frustrated at a lack of collaboration between water researchers and practitioners, which represented both a missed opportunity for improved practice and a barrier to effective research grounded in evidence:

Ex. 6.92   *Researchers do some really neat work and they'll publish it in a journal. But it never kind of… what am I trying to say… if you're doing research and you're publishing in journals, then keep in touch with those managing water on the ground because you might have some recommendations in there, or provide a lot of evidence that we can use to help us in our decision making.*

I'm all for evidence-based decision making. And the more accessible that evidence is, the better. And, and just to add: one of the other challenges in working in water is increasing the amount of evidence-based decision making and establishing a strong relationship between research bodies and government agencies. It has been a bit tenuous in the past because, again, I don't mean to be offensive here, but, we'll put a reform out there – that won't only get stones thrown at you by irrigators and environmental groups, but you'll often get academics throwing stones at you. And you just think, how about how about you come and give us a hand instead of… it's so easy to sit on the sidelines and say 'You should have done it this way. And my research says

> *it could have been done this way'. Yep. Great. Thank you. How about you get in the*
> *room with us, give us a call, and we'd be happy to work with you.*

For Mr Conti (G-Aus.), the environmental movement was detached from impacts of water scarcity on livelihoods:

Ex. 6.93   *The greenies need to take people's livelihoods into account. They need to get amongst*
             the people.

There was no discussion of proximity among the Australian middle-influence category, which is consistent with these participants' vertical mobility, readily moving between the grassroots and decision-makers.

Among Yemeni participants, a more consistent physical proximity to water scarcity was evident across all influence categories.

From within the government, Moh. Nader (H-Yem.) described the breakdown of relationships across government departments and between workers and employers under the water ministry portfolio, which in turn affect the provision of services:

Ex. 6.94   *The majority of citizens have left because of the circumstances, and others have*
             resigned from government to work with international organizations that provide
             higher incomes and therefore we have fewer employees. ... Some facilities have also
             been subjected to military bombardment and others have been destroyed by the clashes
             and we cannot reach them because they are located in unsafe areas, so the war has
             generated major problems.

Ms Karman (H-Yem.), consistent with her prior comments on the responsibilities of state authorities, said that the government's absence was an "obstacle" that could be countered by better collaboration between government and local communities:

Ex. 6.95   *The absence of the government's role in managing water issue is the source of all*
             obstacles. The government, through local authorities, is able to ensure a fair
             distribution of water resources. Such issue is very critical, and therefore should be
             approached with a great deal of concern and seriousness.

             There should be combined efforts by the government and local civil society, as this will
             contribute to establishing firm rules for a fair and peaceful water distribution in the
             future.

Ms Fakhoury (M-Yem.) said if she could manage to work at the coalface of water scarcity, the government in exile had no excuse:

Ex. 6.96   *We don't really have a government. We have three! Three governments. But none of*
             them are you know, doing their jobs, especially the internationally recognised

> *government that have millions and millions and millions of [dollars], just sleeping in the hotels and not doing anything - not doing their job. They keep saying that 'Oh we can't do anything.' I keep telling them that here I am, just one person, you know, and a few donors who are, you know, trying to chip in, and we have been managing massive, massive projects in Yemen. ... We have a clear conscience. We're persevering. We're doing what we can in our capability.*

She continued, describing the impact and challenges of women's solidarity networks working to build relationships vertically across influence levels:

Ex. 6.97   *This women's solidarity network, we are working with the people on the ground. This has helped us to divert [deliver] messages from the people ... And we reflect on their actual needs and recommendations. ... We participate in the UPR,[69] and now in the CEDAW,[70] in UN Security Council briefings and consultations. And so all of this has really helped; the international community they have really started to; the international community is very supportive. Our issue is mainly with the government really doesn't want us; won't cooperate with us.*

6.6.5   Trust

The matter of trust was raised by participants across all influence levels in both basin contexts. For many participants, trust related to faith in governance systems to manage water fairly and peacefully. Mr Glyde (H-Aus.) offered a window into the scale of the issue, unpacking trust into sub-components of reliability, accountability, and integrity:

Ex. 6.98   *For me, it all starts with trust. Going back to that question of complexity, that this is a public resource that governments over the years have handed out to various users and decreed that certain things should happen. And I think the [supposed] nature of water being that people upstream are always wasting it, the people downstream are always whinging bastards, there's just a fundamental lack of trust, but the theory is governments are meant to not be susceptible. They're meant to be professional, thoughtful, honest, driven by evidence and analysis, I guess that's how... if they believe that we, the MDBA, can't be trusted, then it all falls apart, doesn't it? What evidence you have, what science you might bring to bear, what judgement you might bring to bear, that trust, I think, is what has eroded over time. Unless we can continue to be trusted, we will continue to move slowly, to continue to have conflict within the community about how the water's being used. There'll always be a level of conflict because that's the nature of water, but you can deal with it if you can trust the institutions that are making decisions about your life or the life of the river.*

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[69] The Universal Periodic Review of UN Member States' human rights records by the UN Human Rights Council.
[70] The UN Human Rights Council Committee on the Elimination of Discrimination against Women (CEDAW).

Mr Butler (H-Aus.) said that his party's push for a Royal Commission into water sharing arrangements was due to pervasive mistrust between stakeholders throughout the Murray-Darling/Barka. In doing so, Mr Butler implied that the pervasive mistrust is due to a lack of accountability among water sharers:

Ex. 6.99   *One of the things I tapped into very early was the lack of trust in state and federal governments around water. And that's, that's a feeling that you get no matter which side of the which side of the argument you coming from whether you, you know, up the river involved in irrigation, or whether you're down the river and not involved in irrigation, that trust in government's a huge issue. And that's why we've always sort of circled back to looking for a federal Royal Commission.*

He later suggested that transparency is an antidote to uncertainty:

Ex. 6.100   *If I never tell you anything, you're probably not going to trust me very much. But if I constantly open the books, if you like, and keep providing you with information, and provide you [with data] ... I will always push people towards that kind of certain response rather than saying, 'Well, we're not sure if something's wrong or not; and maybe it is, maybe it isn't'. Because that just continues the uncertainty, which is the enemy of trust.*

Mr Taylor (G-Aus.) felt that the community was being asked to carry a burden of trust unnecessarily:

Ex. 6.101   *Where the system is falling down, particularly New South Wales, is the lack of monitoring. The fact that people are allowed to measure the amount of water they are taking on trust, I am sorry, in today's world, that's ridiculous. The technology should allow real time monitoring of how much water each licence holder is taking. You should be able to sit somewhere in Dubbo and know how much water is going on to every property. That's been resisted, that move.*

He went on to say that while water theft may not be pervasive, people look at "a few well-known culprits" and question why they should bother keeping their commitment to the rules:

Ex. 6.102   *There are lots of other people who sort of look at the big boys and sort of go, well if it's alright for them, it's all right for us. We won't be taking the same sort of volumes, but we will take it nonetheless.*

Sen. Hanson-Young (H-Aus.) empathised with such feelings of dejectedness when relying on others to behave appropriately in Ex. 5.72.

For Mr Ghanem, (M-Yem.), this issue presented as a lack of "solidarity" between water sharers:

Ex. 6.103   *This, reflects a small picture of what people may reach when there is a scarcity of water and the absence of awareness and solidarity among people, and its effects are continuing until today. All in all, water is the most important component of people's*

lives, the main factor for their survival to conduct of their affairs, and it is in this sense that disputes and conflicts over its sources are established.

Mr Hall (M-Aus.) said that his members were putting their own wellbeing on the line in trusting the MDBA's competency:

Ex. 6.104   *From a technical point of view, they work as well as they can within their confines to deliver the solutions. Like to deliver water. I think they probably have learned, particularly with some of the higher flow years of late, they have learned more about how to manage the lake system. But I, on a personal comment. I'm not convinced that, whilst they know more about how to do it, I don't know that they know enough about how to manage it in low flow times to, to be able to trust them, that everything will be alright.*

Likewise, Mr Al Hassan (M-Yem.) said that people's trust hinged on the "performance" of the water board:

Ex. 6.105   *The challenges have a negative impact on the water board since people complain about its performance and affect their trust in the water board because it is responsible authority for providing water. When there is a scarcity in water, the number of subscribers increase. Also, each family begins to store water in more quantities than it needs, and this leads to increase the pressure on the water board due to the irregularity of water. Hence, it affects the distribution of water among the population.*

In leaning on the ability of public water services to perform as expected, both Mr Hall's and Mr Hassan's account focused on a reliability aspect of trust.

For Mr Conti (G-Aus), the government had not shown themselves to be reliable:

Ex. 6.106   *When the drought was over, instead of going in to bat for us, the government let us go. There's a big trust issue against the government and Victorians.*

The link between abandonment and a lack of trust is reminiscent of Moh. Hadid's (M-Yem.) who complained that "there is no trust on local authorities" who "don't care" (Ex. 5.43). On the flipside, Ms Fakhoury (M-Yem.) found it difficult to convince international donors to place trust in local organisations:

Ex. 6.107   *There's a trust problem. And I think the local; the international NGOs think that the locals don't have enough capacity, they won't be able to manage, something like this. I'm not sure there's quite a few, few issues, but maybe it's a capacity building thing that they keep saying that they don't have that. And the other thing is the priorities. Like, the FAO like to work with the government, through the government, and the government - they don't like initiatives like us a lot. They, you know, they prefer to do it through their own ways. That's one thing. The other thing is that you see, like the OCHA, they have really high conditions for their partners, so that you have to have*

> *like 200-300,000 [dollar] accounts or something... annual budget I mean. And so that completely excludes any local initiatives.*

However, Ms Fakhoury (M-Yem.) said trust could be built through a reliable show of integrity, forged from close proximity during times of hardship:

Ex. 6.108   *it's an accumulative trust that has been built over a good reputation. But when I was in Yemen, first of all, I've lived with wars so I know exactly what they've been through. I've lived there 60[?] years.... maybe two and a half years into the war, but it was in a when it was at its worst. So all of the terrifying bombings and the street fighting in Ta'iz. So I've been through Ta'iz, the siege, and parts of my house was also, you know, hit by one of the bombs. And so I know exactly what they've been through. And at that time, I didn't just sit down and watch. I was, you know, working day and night.*

Empathy, she said, was a powerful trust-building tool:

Ex. 6.109   *If they really feel that you're very neutral, and your message is for the people, this is very important. This is the first point. It's like a confidence-building measurements, just like when they do the peace agreements. You have to put, first of all have empathy and gain their trust. And that can only be made or achieved when you really have a consistent message of togetherness and the benefit for all.*

Thus, trust deficits emerged from participant interviews as profound barriers to fair and peaceful water sharing. Yet, with many participants offering reasoning for their suspicions, these barriers simultaneously represent a significant opportunity for dialogue and relationship building. Such opportunities are further unpacked in Chapter 7 (Section 7.3).

6.7   Rights and justice

6.7.1   Water rights

As discussed in Section 2.7.4, the existence of human rights, including the right to water, is justified on the basis of 'some overriding value' Clapham (2015, p. 13). As such, 'The vocabulary of human rights is … the story of struggles concerning injustice, inhumanity, and better government' (p. 20). Analysis of participants' discussion of water rights reveals a variety of ways in which they see these rights and the values that underpin their claims.

Mr Kelly's (H-Aus.) held the view that strong governance structures were necessary for sustainability. This view, he said, was reinforced by comparing Australian and US approaches to water rights[71]:

Ex. 6.110   *Is all based on having a sound democratic government, a lot of the broader governance frameworks that we have in place in Australia, and the rights. You look at America where the way some of their water rights system is set up: I mean, how they're ever going to get sustainable management with some of those 'Because I was here in 1720 or whatever it was, I can take however much water I want', and 'You came in 20 years after me so I get to take water before you get to take water' – how you can end up with some really good robust sustainable water sharing rules when you've got that as your basic rights? It's hard.*

In referring to a 'rights system' that is 'set up', Mr Kelly implies that the water rights he is referring to are not universal and inalienable.[72]

Ms Maywald (M-Aus.) conveyed the tension she saw arising from landholder-based approaches to water rights:

Ex. 6.111   *There's quite significant tension between landholders in the Adelaide Hills who think they should be able to put a dam anywhere and don't see it as a problem – [arguing that] the rain falls on their property so it should be theirs and available to them.*

Mr Hall (M-Aus.) said that upstream of Lock One on the lower Murray River, riparians tend to conflate a right to water with ownership:

Ex. 6.112   *Back when it was all running on half the population it probably all worked. But now it's not and become less of a common resource. You go upstream, you know 'it's our right to this water that fell on our land'. People upstream will traditionally have seen it as, well, the water lands on their place, it's theirs. The water flowing past them, well, that's obviously theirs [even though it may not be].*

Mr McLaughlan (M-Aus.) was cautious of the impact of emotion on water sharing debates. He associated a lack of water literacy with lack of reason, and suggested that some rights claims stemmed from what he perceived to be excessive emotion:

Ex. 6.113   *People aren't educated. And sort of looking at it practically rather than looking at it emotionally because that emotion is a real risk for us, for South Australia. Because New South Wales will get emotional too. If New South Wales get emotional and walk away, we're screwed. People just don't... I don't think they understand. They think*

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[71] Australia does have Basic Landholder Rights, among others.

[72] 'Inalienable' (also unalienable) borrows here from the language of the American Declaration of Independence (Jefferson, 1776).

> *that we've got certain rights. Yes, [through] some of the agreements we've been able to sign, we have got some rights. But if they [NSW] walk away from those agreements because they can see their own communities dying, withering, and whatever else, well, we've just got to be realistic that that could happen, too.*

From his experience of inter-state politics and aligning closely with Clapham (2015, p. 13), Mr McLaughlan (M-Aus.) felt that South Australians were naïve to claim "God-given" water rights rather than focus on the values that political arrangements were protecting:

Ex. 6.114   *I can never imagine New South Wales and Victoria voting to change the constitution to remove their control of the river. So we've just got to try and get the best thing out of it that we can. You know, you'll find that South Australians think they've got a God-given right. Well I wish it was, but it isn't. You've got to sometimes understand what you're dealing with.*

As with Australian participants, Yemeni participants used the language of 'rights' unprompted.

Speaking in English and well versed in the language of human rights, Ms Fakhoury (M-Yem.) spoke of her women's water group speaking up in defence of water access:

Ex. 6.115   *The warring parties, actually, of course, they don't want us because we're speaking for justice, human rights, things like that. Of course they don't want us. So, but we still see that he [the UN Special Envoy] has a role on pressuring them.*

Other Yemeni participants discussed rights in Arabic, using the noun 'حق' (*'huq'*), meaning a just due. Mr Abadi (M-Yem.) related an individual's right to water to fairness:

Ex. 6.116   *The weak role of those in authority in strengthening obligations to protect an individual's right to have a fair distribution of water.*

Mr Faraj (G-Yem.) had a more social focus, suggesting that the right to water was universal. He used the Arabic term 'حق عام' (*'huq* a'alam'), translated here as 'public right' but also meaning 'common right', or 'universal right':

Ex. 6.117   *Firstly, these sources must be perceived as a public right, and the circle of beneficiaries should be expanded as much as possible. Secondly, individuals should feel responsible for water and the need of others for it during their consumption. Thirdly, the distribution of quotas based on the number of individuals, not families or homes as it is currently happening.*

In Ms Alawadi's (G-Yem.) view, the right to water is a prerequisite for justice:

Ex. 6.118   *As I said, this requires understanding between people, once everyone is understanding towards others, fair water distribution will follow automatically;*

> *whereas as long as people use force and attack each other's rights there will be no justice.*

In an "understanding between people", Ms Alawadi points to a shared sense of commonality. Clapham (2015, p. 19) posits that a 'sense of solidarity amongst those who believe they are the victims of a human rights violation can transcend class, gender, and other distinctions', and was seen in participant accounts of local level water interactions both in the claiming of water rights and beyond.

6.7.2   Ineffective courts of law

Participants from the mid-level influence category in both basin contexts referred to litigation in courts of law as a familiar path of recourse to justice. However, in each instance, the option was discussed as ineffective.

Mr Al Najar (M-Yem.) had faith in a hypothetical judiciary, but without a "strong presence of the state" offered it only as a hope for the future:

Ex. 6.119   *The existence of societal justice, that is directly connected to the judicial justice and the impartiality of the judiciary and its ability to firmly solve these problems, leading to have effective judicial decisions.*

Building on his earlier comments about a "legal and legislation gap" around the issue of drilling and over-extraction (Ex. 4.25), Mr Al Hassan's (M-Yem.), himself a lawyer, was frustrated at the inefficiency of the courts to deal with conflict:

Ex. 6.120   *Everyone is exchanging accusations then we have to resort to the court which takes long time till the water is drained. … When there is water scarcity the other party tries to get the largest amount of water for themselves. For example, I wanted to connect water to my office, [but] even though I am at the water board my neighbour refused that I use the water pipe, fearing that it will decrease water in his house.*

In contrast to Yemeni participants who complained about the absence of a functioning legal system, Mr Besser (M-Aus.) had been threatened with litigation in response to his reporting on alleged water theft in the Murray-Darling/Barka [73]:

Ex. 6.121   *It's a job filled with hurley-burley. It's a high-conflict job, journalism. You know, serious journalism. It's hand-to-hand combat [hyperbole] all the time if you do it properly. And it should be. And these people kick and fight back, and they're entitled*

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[73] Defamation law in Australia falls under the jurisdiction of the states and territories. Mr Besser referred to both "Phillip St" – a legal district in Sydney NSW; and the impact of defamation laws on journalists "around Australia".

> *to. And sometimes it's unpleasant - I've been sued more times than I can count, and there were threats of litigation in this project. [An irrigator, name redacted] sent us numerous letters threatening a defamation writ. [Federal Minister for Water] Barnaby Joyce got up in the House [74] and declared we were being sued and the program was wrong. ... We don't have many threats of violence – it's not often a problem. But the big problem is we have very, very draconian defamation laws.*

Ms Fakhoury (M-Yem.) lamented the reversal of progress she felt had been made in the National Dialogue transitional justice forum:

Ex. 6.122   *Why the water issues and everything; the outbreaks of cholera, and diphtheria and all these things are happening, is because nobody's talking about them. And, and these things are causing other conflicts. They're causing suffering they're causing and nobody's speaking about transitional justice. Now for now, we told them, okay, we're not going to speak about this so that we don't pressure them. But everything is gender blind. Nobody is speaking. We're not calling for gender participation or equality here. We're speaking about reflecting the society's suffering into the negotiations. This is where the decisions are being made, and it reflects everybody. We want to speak about the salaries of the people haven't been paid for three years. We want to speak about the siege in Ta'iz where people, 2 million people are suffering. All this is not reflected in these negotiations. They only speak about their own power sharing how it's gonna be. And then they disagree and then they leave.*

6.7.3   Social solidarity

In the display or withdrawal of solidarity, which Habermas (1990, p. 244) argues is the 'reverse side' of justice, participants offered a window into expectations of social needs satisfaction at a community level. Mr Kelly (H-Aus.) for example invoked a concept of egalitarianism, suggesting that solidarity as expressed over "a beer" with a competing water sharer after difficult negotiations coveys a mutual acceptance of fair process:

Ex. 6.123   *My naïve hope would be that if people are actually going to die as a result of not having water that people would go 'Someone should give you water'; 'Someone will give you a bath'; 'I'll give you enough at least so people can have a drink'.*

It's not the Australian way to shaft. Play hard, but yes have a beer at the end and enjoy that beer at the end.

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[74] The House of Representatives of the Australian Federal Parliament

To similar effect, Mr Whittaker (G-Aus) said that while he hoped water sharers in the "pretty independent" Macquarie Valley would be able to work out their differences to the a point of "sharing a beer", it was unlikely to be soon:

Ex. 6.124   *I would argue that the Macquarie system's a pretty independent system. So if we sort ourselves out we should be right. Maybe there's hope for the next generation. [But] I'm not sure I'll be sharing a beer with them. No there is good... I played footy with guys from down there, and there is good guys down there. But there's just a few that have just really done the whole thing an injustice. And there's probably a couple of irrigators that have done the same. I'm not saying we're all squeaky clean. But this never-ending bucket of water that seems to get diverted away to fatten cattle does my head in a bit.*

In a similar vein, "footy" [75] with downstream graziers who were "good guys" represents social acceptance. However, the inference is conversely that this would not occur with people who had perpetuated "injustice".

Mr Collins (G-Aus.) spoke about the self-organisation of local associations. He recalled working on a local water sharers committee set up to debate proposed government buybacks of water from licence holders, recalling it to be a difficult but effective conflict management process:

Ex. 6.125   *The one around Hillston we debated for long and hard. ... And we worked really, really hard looking for the right information, trying to understand it. We actually had to make a rule about how do you take water off people. So there was a lot about that and there was a lot of work and people came in to help us from all sorts of places: the Natural Resource Commission from New South Wales, there was... I'm just trying to remember. There was a big, there was a professional group that was employed to help try and negotiate it because there was a lot of unhappy people. Conflict. And the outcome was... Sure, there was a few bitter people. One guy, the other big grower, he took them to court after the decision because he believed it was wrong – the Land Environment Court – and didn't win, partly because he was the only one there.*

Ms Alawadi (G-Yem.) said that in the absence of justice in the system, people resort to the exertion of power through strength, leaving "the weak" behind:

Ex. 6.126   *Of course I'm not happy with how water is distributed at the moment, because some get more than others. No – there's no justice in the current system.*

There is fighting and people exchange blows, every person takes as much water as his strength will allow, and the weak are left with nothing. There must be justice and

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[75] "Footy" refers to community football.

> *understanding within society itself, then this [equitable distribution] would follow*
> *automatically.*

Here, Ms Alawadi associated justice with empathy and social solidarity.

6.8   Chapter conclusions

This chapter has compiled the emergent IPA themes regarding participants' perceived barriers to fair and peaceful water sharing. These barriers emerged under the umbrellas of six superordinate themes.

Firstly, barriers to participation in water sharing arrangements were identified. A lack of voice and acknowledgement was seen as a key obstacle, resulting in most instances from power imbalance. In both basin contexts, this was seen to materialise as a lack of inclusion or genuine representation in water sharing consultations. In many instances exclusion was passive, with some voices drowned out by unbalanced amplification of others. Participation was seen in both Australia and Yemen as a matter of privilege, curtailed by discrimination on gender and race grounds. In other instances, active exclusion from water sharing arrangements meant that decision-making power was kept out of reach to some water sharers.

Secondly, economic disadvantage was seen to be an obstacle for fair water sharing. A lack of ready access to liquid capital was viewed to significantly disadvantage participants in their capacity for adaptation to prevailing hydrological conditions, with wealthy water sharers showing far greater ability to adapt to variable water flows. Market-based mechanisms were likewise seen as the source of inequitable barriers, with both demand-based price inflation and water trading schemes emerging as a source of water-sharing inequity favouring the wealthy. In Yemen, difficulty accessing water for domestic use was attributed to microeconomic water price inflation. In Australia, price inflation of traded water licences meant that small-scale agricultural water users with already minimal capacity to adapt were priced out of water markets during times of drought.

A third barrier presented in the form of resistance to change. Fixed mindsets were seen as prohibitive to progress and adaptation, with participants describing other water sharers as locked into positions. In some cases, positions were said to have been cemented over generations, while in other instances positions were preconceived on the assumption of adversariness. Though hypothetical financial incentives were thought to hold potential for overcoming resistance, those that had been implemented were not viewed positively due to their secondary effects. Non-

financial incentives were also identified, including the lure of water supply security in exchange for behavioural change; and the notion that water-thirsty crop choices were incentivised by variable climate and an unpredictable policy environment.

The fourth emergent barrier was problems with information flow, raised by participants in all influence categories in both basin contexts. While high-level policymakers struggled to communicate with the public through the complexity of their policies, grassroots water sharers were hungry for accurate, timely information on expected water supplies. In Australia, water literacy was generally considered much higher at the downstream end of the basin by necessity, though this was not evident among participants, with upstream users also well-versed in basin hydrology. Hydrological assumptions that underpin sharing arrangements were not easily accessible or well communicated, leading to perceived lack of transparency.

Fifthly, divisions between individuals and communities took multiple forms. While in some instances Yemeni participants reported that physical violence emerged out of water scarcity conflict, the reverse was more often observed, by which physical violence in the community was seen as an obstacle to sourcing water. Participants not only described challenges in sharing water, but also the difficulties of sharing the pain of scarcity. Greed was a common accusation levelled against other water sharers, often in association with other unfavourable characteristics to complain about their perceived relative disadvantage. The issue of trust was raised across all influence categories in both basin contexts, with participants wary of exposing their water values to the mercy of other water sharers or governing institutions.

Lastly, participants from Yemen referred to difficulties with access to effective justice mechanisms. while in both contexts, participants frequently invoked the language of rights as important for the satisfaction of water needs.

The barriers to fair and peaceful water sharing as perceived by participants presented in this chapter are themselves best understood in concert with their underpinning relationships with water as described in Chapter 4, and the nodes of conflict identified in Chapter 5. Together, these components have offered insight into participants' own first-hand experiences of water scarcity and its impact. In Chapter 7, the themes that have been identified in relation to these first-hand accounts will be built on in synthesis with how they relate to water security and conflict theory. It will not offer a panacea for water scarcity conflict in either basin context, but instead situate the insights of participants alongside relevant literature to illuminate opportunities for the transformation of water scarcity conflict.

PART III: THE CONFLUENCE

"

I would rather address the question of how to enhance the capabilities of those involved to change the constraining rules of the game to lead to outcomes other than remorseless tragedies.

"

(Ostrom, 1990, p. 7)

7 Rethinking water scarcity interactions

7.1 Chapter introduction

Building on the data analysis presented in Part II, this chapter discusses the emergent themes identified in Chapters 4-6 in relation to relevant theories. Areas of synthesis between the research data and the literature reviewed in Chapter 2 are unpacked and expanded on, identifying ways in which the first-hand insights from the participants' interviews align or diverge from existing hydropolitical and PACS theories. Further insights from the intersection of the research data and literature are also introduced offering to broaden understandings of water scarcity conflict in both theory and practice, grounded in lived experience.

Firstly, Section 7.2 demonstrates the social nature of basic human water needs in addition to physiological significance. The criticality of water needs, and therefore how they are prioritised in relation to other needs as well as over time is examined. The section then discusses the role of water in individual and social identity construction, as well as its significant impact on social cohesion and wellbeing.

Secondly, Section 7.3 presents insights gained from the research data as to how water scarcity conflict may be approached constructively. A case is made for a more robust focus on notions of justice in water sharing arrangements, addressing apparent disparities between participants' expectations of water sharing arrangements and what such arrangements delivered in practice. In some instances, feelings of injustice were stated explicitly, while in others matters of injustice were raised using the language of rights, which the section unpacks further with regard to legal requirements and ethical imperatives. The section considers how water sharing arrangements may be enhanced by a greater focus on relationships among basin stakeholders, with a discussion of the centrality of trust and an emphasis on the benefits of improved communication of basin information. The section then deals with the difficulty of dealing with emergent complexity and paradox in water sharing arrangements.

Section 7.4 unpacks the interwoven themes of water sharer vulnerability, adaptability, and resilience in times of water scarcity. Participant accounts of constructive and destructive adaptation to water scarcity are discussed, and framings of resilience that fail to consider the unequal adaptive capacity of water sharers are critiqued. In reframing vulnerability to water scarcity as a potential enabler of responsive action rather than weakness, the thesis argues that community resilience may instead be strengthened by a focus on water-sharer critical agency and reflexive process.

Conclusions to the chapter are presented in Section 7.5.

7.2   Rethinking critical human water needs

7.2.1   Reframing water criticality

All participants in the study discussed water needs that they considered essential for life. While the exact terminology used in each instance differed across languages and cultures, each participant put forward some conceptualisation of a minimum requirement for water that can be endured as it becomes increasingly scarce. Even though none of the interview questions directly enquired about needs, the satisfaction or non-satisfaction of water needs considered critical were consistently raised in the context of answering questions on relationships with water, conflict associated with water scarcity, and the attainment of fair and peaceful outcomes for water sharers (see interview schedule in Appendix B).

Across water sharing contexts and social influence levels, the crux of what constitutes a critical human water need was consistently centred on its *non-negotiability*. Notably, however, participants' perceptions of water criticality were not limited to physiological requirements. Extending well beyond mere survival, many participants stated that the water needs they perceived to be critical also comprised water as an enabler of production and livelihoods; water as a crucial component of psycho-social wellbeing; water to facilitate understandings and continuation of culture and identity; and water for sustaining the ongoing satisfaction of needs over time. Respectively, such needs are socio-economic, the second psycho-social, the third cultural and psychosocial, and the fourth all-encompassing – each representing a social need for water which, in contrast to physical resources, are not scarce (Sandole, 2013, p. 24). This represents a notable departure from the dominance of quantitative metrics emphasised in minimum standards, international development goals, and various articles of water sharing legislation as identified in Chapter 2.

Indeed, the presentation of needs as *perceived* does not by epistemological nature align well with positivist-leaning metrics common in water sharing theory and practice. For example, Zeitoun et al.'s (2020, p. 124) call for 'the *least subjective* measure of what is 'fair" in negotiations demonstrates that sharing a resource 'essential for life' is undoubtedly simpler if measurable. So too Wolf (2007, p. 251) suggests that a historical tendency for states to negotiate over water 'needs' rather than water 'rights' is because water 'rights are not quantifiable and needs are'. Clearly, the relative simplicity of objective metrics to measure, validate, and test critical human water needs is alluring (Avruch & Mitchell, 2013, p. 6).

Yet only one study participant, Mr Kelly (H-Aus.), claimed that physiological water requirements took priority over other water needs, stating that "if people are dying of thirst because they don't have any water then it's all a moot point" (Ex. 4.5). Like Maslow's (1954) prioritisation of physiological survival needs as the 'most prepotent', this perspective reflects the simple and commonly held logic that without survival, other needs are irrelevant.

Of course, the necessity of water for physiological survival is obvious and unquestioned, and it is therefore tempting to assume they will be prioritised above other needs. However, as Galtung (1979) points out, one only needs to look as far as a hunger strike to realise that the utmost prioritisation of physiological needs is not intrinsic. It is an extreme illustration, but a helpful one for water stakeholders because it highlights the underlying *value* placed on human survival. For practical purposes, debate over whether human needs are biological, environmental, or otherwise derails the conversation from the crucial point of non-negotiability, regardless of subjectivity. Far more helpful is Burton's (1990) observation that, in practice, 'values' can and do *function* like objective 'needs'. 'Values' such as the 'ideas, habits, customs and beliefs that are characteristic of particular social communities' are often so deeply held that these perspectives, even if subject to change in the long-term, can be considered effectively non-negotiable (p. 37). Dignity, religious beliefs, and care for others are all examples of priorities that can take precedence over individual physiological needs satisfaction. This is an important concept for water stakeholders to grapple with, because it introduces dimensions of choice and ethics to water sharing that can be otherwise neglected.

Aside from Mr Kelly (H-Aus.), all other participants in both basin contexts and across all levels of societal influence said that either water needs beyond mere survival were also essential for life, or that exactly what should be considered a critical water need was difficult to determine. Ms Maywald (M-Aus.) reflection that "There comes a question on 'What is critical human needs?'", for example, demonstrated that water sharers across different geographies and functions will have different answers (see Ex. 4.2). Her comments summarised set the scene well for the data to follow, since participant perspectives on just what constitutes critical human water needs varied significantly across contexts and level of social influence.

In both the Murray-Darling/Barka and Jibal as-Sarawat, the ambiguity of what constitutes water criticality reflected mismatched expectations around needs satisfaction. This was hardly surprising, since participant perspectives on water needs prioritisation and satisfaction comprised highly complex, overlapping, and often clashing considerations of hydrology, agronomy, economics, health, communications, culture, identity, politics, and governance. As discussed in Chapter 2,

Fisher and Ury (1981/2011, p. 51) suggest that negotiations over such disputes are 'not *likely* to make much progress as long as one side believes that the fulfilment of their basic human needs is being threatened by the other' [emphasis added]. Going further, Burton argues the frustration of BHN for identity, participation, recognition, and security represent the source of all social conflict.

While not the primary focus of hydropolitical literature, the social aspect of water needs is not absent from the field. Zeitoun, Mirumachi, Warner, Kirkegaard, and Cascão (2020, p. 372) for instance identify the relational nature of water needs in discussing water scarcity is a social phenomenon.

> Because the effects of scarcity of water play out in society, … a strictly biophysical
> interpretation of any transboundary water arrangement will reveal less than half of
> the picture. … Water scarcity is a function of water need, in other words, whether
> that need be human, animal, or environmental. If there was no 'need' for water (in
> a desert, say), there would be no 'scarcity', in the social sense of the term (p. 372).

While viewing critical water needs as social needs is far more complex than the more easily measured physiological requirements for individual survival, water needs as the source of water scarcity are by nature relational and should be considered as such. The lived experience of study participants suggests that if physiological requirements are the only water needs seen to be non-negotiable, basin stakeholders risk perpetuating conflict by frustrating other, simultaneously critical water needs. On the contrary, water scarcity conflict analysis that takes non-negotiable social needs into account may offer space for envisaging creative, collaborative resolution and transformation processes in addition to interest based negotiation. Though undoubtedly daunting for many water stakeholders, acknowledging critical human water needs as social requirements opens significant opportunity to address water scarcity conflicts at their root.

7.2.2   Prioritisation of critical water needs

In questioning the prioritisation of physiological water needs, participants in this study also shed light on the difficulty of balancing and prioritising critical water needs over time. This presented in two forms: firstly, as the difference between *first* and *highest* priority water needs – the former a prerequisite to the satisfaction of the latter. The second form speaks to sustainability, which relates to the moderation of current needs for the future satisfaction of another. In both cases, needs are prioritised not only in comparison to other needs in the present, as per Maslow's hierarchy, but

with regard to the future needs satisfaction which instead relies on forecasting (R. J. Fisher, 1990; Gillwald, 1990; Lederer, 1980).

This practical balancing of present and future needs came to the fore in Chapter 4 (Section 4.2.1) with Ms Maywald's (M-Aus.) reference to Section 86A(1) of the Australian Water Act (Ex. 4.1). The difference between first and highest priorities played out hydraulically, whereby a minimum conveyance flow through basin rivers is required to enable extraction of water for other uses.[76] Thus, even if physiological water needs are considered the highest priority, conveyance flow is a prerequisite and therefore the first priority.

The sequencing of priorities across short and long-term timeframes was seen to present significant opportunity for misunderstandings. McConnel (2019) argues that legal interpretations of critical human water needs and conveyance water are in conflict with the objectives of the Australian Water Act, placing the latter in breach of international human rights obligations. Practically, several study participants highlighted how confusion in relation to water priorities can have potentially grave consequences. This was made clear in Mr Murphey's (H-Aus.) description of managing flow embargoes, in which he cited the desperation of farmers threatening self-harm as desperately needed water passed by their front door (Ex. 4.64). In a basin as geographically large as the Murray-Darling/Barka, the water released from upstream storages for downstream purposes can take weeks or even months to reach its downstream target. Balancing an acute and severe need for water with a need for water later, elsewhere, or for another purpose, was seen to be extremely difficult if not traumatising. Doing so without the clear and reassuring information was potentially disastrous.

Even if it is theoretically understood that a realist approach is short term and will likely frustrate future needs, research data that discussed their prioritisation over time demonstrated that the *known* satisfaction of urgent needs and the associated short-term pain relief it provides is difficult to balance with an unknown or ambiguous future needs scenario (Gillwald, 1990).

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[76] Conveyance flow is not unique to the Murray-Darling/Barka Basin, being a common hydraulic feature of river basins and water reticulation systems generally.

7.2.3 Water and identity

Water and social identity

Across both basin contexts and all influence levels, water emerged from the research data as an integral part of how many participants constructed their individual and social identities. As Wolf (2007, p. 253) writes, 'Throughout the world, local water issues revolve around core values, which often date back generations. Irrigators, indigenous populations, and environmentalists, for example, can see water as tied to their very ways of life'.

Participants from both basin contexts invoked group identification along multiple lines, including statehood and nationalism, rural or urban lifestyle, political affiliation, industry or profession, and occasionally even perceptions of good or evil. In many such instances, Lederach (1997, p. 43) writes, 'the local level is a microcosm of the bigger picture. The lines of identity conflict are often drawn right through local communities, splitting them into hostile groups'. 'Identity forms around ethnicity, religion, or regional geography rather than class, creating group divisions that penetrate society vertically through levels of societal influence' (p. 43).

Fractures in water-sharing communities around such lines, were frequently evident in the emergent research data. Moreover, community divisions and attempt to bridge them presented simultaneously as a tension between two outcomes. Mr Whittaker who said that people who share scarce water resources tend to 'hate each other' (Ex. 6.70), also shared a willingness to 'play footy' with downstream users who were 'good guys' (Ex. 6.124). Or as Mr Collins (G-Aus.) reflected in his interview, irrigators united by their common industry interests react to water scarcity 'by making irrigation associations; try and have a voice; a unified voice that can go forward. [Yet] They conflict [fight] like crazy even within irrigation associations' over hydro-geographical differences.

In many instances participants' association with a particular group was outwardly presented as apparently fixed or at least deeply engrained positions. These fixed positions, according to Fisher and Ury (2011, p. 24), are often rooted in 'concerns and fears' of loss. In his theory of BHN, Burton (1979, p. 73) calls this 'role defence', being the 'protection of needs once they have been acquired'. Such identification is common in most societies, writes Väyrynen (2001, p. 35), whereby some groups benefit from 'the maintenance of the *status quo* and, therefore, resist the demands of the needs satisfaction of other groups in society'.

Lederach (1997, p. 40), building on Fisher and Ury (1981/2011), points out that a tendency to lock in behind a position is especially characteristic of people with a leadership role, since 'they are under tremendous pressure to maintain a position of strength vis-à-vis their adversaries and their

own constituencies'. As such, relying on purely rational thinking of cost-benefit is in most cases unrealistic, particularly in long-term. According to Abu-Nimer (2013), conflict resolution mechanisms that seek to draw attention to commonalities through a rational approach are in practice very difficult if not prohibitively so, since it requires powerful entities – as well as their constituencies – to give up the power asymmetry that frames the conflict and their operating system more generally. This is a pertinent consideration for water governance structures, considering Lederach's (1997, p. 8) observation that

> It is often the failure of governing structures to address fundamental needs, provide space for participation in decisions, and ensure equitable distribution of resources and benefits that makes identification with a group so attractive and salient in a given setting.

Recognising the significant challenge of overcoming deep social fractures, several participants with high-level decision-making responsibilities looked to overcome this failure of governance by looking towards a common uniting identity to bridge the divisions in their water-sharing communities. Mr Kelly (H-Aus.) for instance associated the ability to 'have a beer' with other water sharers after negotiations (Ex. 6.123). While seemingly trivial on the surface, this 'may be seen as communicative behaviour symbolising social solidarity', and reflects a bid to unify all water sharers in the Murray-Darling/Barka under a common Australian egalitarian identity construction. (Cosper, 1979, p. 886). To similar effect, Moh. Nader (H-Yem.) said that despite the significant challenges faced by geopolitical division within Yemen, the government was trying to offer assistance 'when it comes to the management of city water as a whole; as a unified state' (Ex. 5.6).

There is danger, however, in the language of 'sameness' (Abu-Nimer, 2013). As Abu-Nimer (p. 182) argues, 'Injuries, victimhood, a sense of betrayal, distrust and many other emotions constitute an essential part of the participants' conflict identity' and should be engaged with and acknowledged in concert with a cost-benefit approach to conflict resolution (p. 182). Solidarity promoted as hydro-geographical homogeneity at the expense of accuracy was experienced by grassroots participants in particular as unhelpfully simplistic rather than unifying, failing to recognise that 'Cultural differences – as concrete norms and behaviours and as a "meaning system" through which parties view their worlds – obstruct parties from realising the common universal BHNs that they pursue' (Abu-Nimer, 2013, p. 176). Even if well-intentioned, attempts by high-level decision makers to paint their respective contexts with a broad brush of "it's all water" (Ex. 5.30), resulted in a loss of trust in water sharing arrangements, serving to exacerbate community divisions rather than bridge them.

Analysing the research data through a lens of identity recognition, what emerges are highly fractured communities who, while sharing common water needs, also identify with sub-basin identity groups as a means of protecting their water security. Complementing a rational cost-benefit approach with 'other aspects that affect the shaping and formation of the participants' conflict *identity*' may be necessary (Abu-Nimer, 2013, p. 180). Rather than approaching differences between identity groups within a water basin as a problem to be solved though assimilation, such tendencies – including fixed positions – can instead be approached as an expression of "Who is on our side and won't undermine our needs". This analysis suggests the possibility that a shift in focus towards a process of transforming relationships amid water scarcity conflict could offer a practical alternative to negotiation-centric hydropolitics.

Belonging

Yemeni and First Nations Australian participants described the need for *belonging*. The term as used here draws on Yunkaporta's (2019, p. 195) explanation that 'an Indigenous orientation, examining multiple interrelated variables situated in place and time' means 'finding a way to belong personally to that system'. As Barka Elder William 'Badger' Bates (2017) describes, attachment to the river is deeply interwoven with the sharing of knowledge across cultures and generations:

> When they take the water from a Barkandji person, they take our blood. They're killing us. It's not just us Barkandji people who are feeling it. It's the white people and other people too. How can I teach culture when they're taking our beloved Barka away? There's nothing to teach if there's no river. The river is everything. It's my life, my culture. You take the water away from us; we've got nothing.

This holds a close similarity to study participant Mr Woods' (M-Aus.) lament of lost intergenerational teaching that is fostered over water, and "a disconnect with the cultural values" brought about by water scarcity (Ex. 4.15). For Yemeni participants, belonging was less connected to a particular body of water, but nonetheless held deep spiritual connection

As with Yunkaporta's (2019, p. 195) 'way to belong', English struggles to conceptualise the Islamic concept of *rizq*. Translated in the data analysis as 'livelihood', the term emerged in description by Yemeni participants of the aspects of life negatively impacted by water scarcity (Ex. 4.69). As Hakim (2020) writes, 'It is quite difficult to encapsulate the meaning of *Rizq* in a single translation because *Rizq* is sustenance, provision, blessings and more'. The term carries intermeshed concepts of value, sustenance, morality, time, and destiny, all of which are tightly woven into Yemeni culture

and philosophy. Beyond material sustenance, Nevola (2015) states that for Yemenis, 'the notion of rizq' is constructed around questions of provision from God; how that relates to human labour, endeavour, and subsequently agency, moral value, and what is needed to live. In this way, Yemenis across all influence levels expressed an ontological water need that transcends material utility or exchange value. Such perspectives included Ms Karman's (H-Yem.) portrayal of water as "the secret of life"; water as "motivation for achievement and going on in life" as expressed by Mr Ghanem (M-Yem.) (Ex. 4.19); and Ms Alawadi's (G-Yem.) reflection on water as "the source of self-confidence" (Ex. 4.18). Spiritual connections with water can cut across all four of Burton's BHN (1990) for identity, participation, recognition, and security.

In this light, a reduction of essential water needs to Euro-centric positivism seems an oversimplification of what is a much more complex system. Yunkaporta (2019, p. 19) invites a closer engagement with process, rather than a one-way window:

> Any discussion of Indigenous Knowledge systems is always a polite acknowledgement of connection to the land rather than a true engagement. It is always about the *what*, and never about the *how*.

This was clearly demonstrated by Mr Woods' (M-Aus.), who said the implementation of sustainable diversion limit mechanisms did not take into account "the original science that was around" (Ex. 6.3) in the form of Aboriginal knowledge, even despite some consultation on the matter. Kosovac (2021) and Sultana (2004) separately argue that a focus on engineering solutions is structured around a discourse of masculine dominance, though this thesis posits that this argument can be expanded to colonial mindset. As Pascoe (2018, p. 4) argues citing L.T. Smith's (2012) analysis of imperialism, 'selectively filtered' scientific information through a colonial prism of superiority 'is more than an economic and military exercise; it's an act of ideology, the blatant confidence to see "others" as tools for the will of the European'. As with other social water needs for livelihoods and wellbeing, ontological water needs are acknowledged in human rights law but nonetheless rarely seen in water sharing agreements.

7.2.4   Water for livelihoods and wellbeing

In a further demonstration of sequential needs satisfaction, water for the facilitation of primary production was also considered by several participants to be critical. For some, this related to the production of essential subsistence goods. Mr Collins (G-Aus.) (Ex. 4.13), for instance, said that he enjoyed growing food and fibre because "both are critical". For others, such as Cr Davies (M-

Aus.) (Ex. 4.42) and Mr Abadi (M-Yem.) (Ex. 4.46), production was seen as facilitator of critical income generation for livelihoods.

However, it is helpful here to distinguish between the values attributed to that water. In the language of Smith (2015), the value attributed to water needed for goods production can be considered 'value in utility', while the value attributed to production for income generation can be considered 'value in exchange', since it is the income received in exchange for the produced good that is of primary interest. The distinction is important, because it reveals the possibility of satisfying those needs by alternative means.

Several participants linked livelihoods to wellbeing, and particularly mental health. In Ex. 4.57, Mr Kelly (H-Aus.) described drought as "insidious", explaining that the cumulative stress of water scarcity was made even more difficult by the unknown timeframes involved. In such instances, people facing water scarcity do not have an endless supply of energy and headspace required to cope with the emotional and in some cases physical discomfort of water scarcity for prolonged periods (Kahneman, 2011; van Breda, 2018). Such an experience was described by Murray-Darling/Barka grazier Rachel Strachan in a media interview reflecting on the slow onset and eventual break of drought:

> We still had water here, but the water was such poor water quality as well, and deteriorating. So, it's not like just losing it overnight – it's a slow thing. And that's where the build-up of stress and coping with it [comes from] – you don't notice it building until the relief comes (Corrigan, 2021).

Research participant Cr Davies (M-Aus.) described the desperate situation of substance abuse faced by members of his community in derogatory terms (Ex. 4.68). Yet notably, he showed empathy for them in clearly directing his anger towards the economic situation the decision makers whom he saw as responsible for it, rather than suffering community members themselves. In doing so, he emphasised that wellbeing as impacted by water for critical production was a dire social problem more than an individual responsibility. As has been established, the MDBP states in section 86A that CHWN include 'core human consumption requirements', but leaves 'core' undefined. Likewise, CHWN include provisions for industry requirements 'that a failure to meet would cause prohibitively high social, economic or national security costs', but stops short of defining a 'prohibitive cost' (Water Act 2007 (Cth) No 137 (Austl.), n.d.).[77] In this context, Cr

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[77] The Act states that '*consumptive use* means the use of water for private benefit consumptive purposes including irrigation, industry, urban and stock and domestic use.'

Davies specifically spoke of "the next one to die" which, it is argued here, surely constitutes a 'prohibitive' non-human consumption social cost and thus a critical human water need.

Other participants discussed wellbeing, and especially community wellbeing, as intrinsically linked to water in terms of its presence, rather than income generation. At the same time, participants indicated that the value of water extends beyond commodification for utility or exchange. In addition to these, water was in many instances valued by participants for its presence, without being consumed. Examples of this included multiple accounts of the effect that water's mere presence had on mental health (Ex. 4.63; Ex. 5.53).

On the flipside, the relief that comes when water flows again was seen to be palpable. As NSW grazier Rachel Strachan described,

> When the water come [sic] down the river, it was like you're walking 10 foot in the air. And the weight of that burden being lifted from your shoulders, it's like… I don't think people who have not experienced it really understand the relief. Like it's just phenomenal (Corrigan, 2021).

Recalling Chapter 2 (Section 2.8.1), the human right to safe drinking water is 'inextricably related to the right to the highest attainable standard of physical and mental health, as well as the right to life and human dignity' (UNHRC, 2010). Thus, the negative impact of water scarcity on mental health (as well as physical health, though this was less discussed) is arguably a contravention of the human right to water. As Lederach (2010, p. 70) writes, 'Community health may not exclusively nor primarily be found in the developmental measures used for comparative purposes (for example, economic status, education, levels of open violence) but rather correlates with the less tangible dynamics of how people and communities locate creative and proactive capacities for responding to the challenges they face'.

7.3   Transforming water stakeholder relationships

7.3.1   Water sharing with justice

Participants dealing with water scarcity in their day-to-day lives were hungry for water sharing arrangements that not only offered water itself, but justice. For some, this was stated explicitly, while for others it was implied through alternative language. Either way, basin stakeholders in this study pushing for systemic change to water sharing arrangements were in effect vying to amend

the underlying economic, cultural, social and political structures perceived as detrimental to their lives (Lederach, 1999, p. 31).

Structural violence was particularly 'indirect and insidious' in the Murray-Darling/Barka basin, where a perceived relative lack of direct violence as compared to Jibal as-Sarawat could be seen to mask institutional shortcomings. Several participants cited inequitable ability to participate in water sharing arrangements on grounds of disparate economic opportunity, race and historical oppression, and development precedent. On such occasions, interaction with 'social, cultural, and economic institutions' presented as a 'threat to the livelihood' of water sharers (Barash & Webel, 2018b, p. 8; Galtung, 1996, p. 198). Confusing divisions of governance responsibility, severe gaps in communication and information sharing, and incongruence between intra-basin water sharing arrangements, procedures and norms represented institutional 'rules of the game' that operate systemically to the benefit of certain persons and groups at the expense of others' – even though often unintentional (Bachrach & Baratz, 1970, p. 21).

In the Murray-Darling/Barka, the challenge of not knowing how to balance the competing demands of all stakeholders was observed to give way to lobbying pressures, top-down decision making, and over-idealisations in decision-making which did not appear to take all considerations into account, despite apparent efforts to consult on a wide range of views. These processes and dynamics were complicated by decentralised decision making across levels of government, between states and provinces, and even within local councils. Similar dynamics were observed in Jibal as-Sarawat, with the added dimension of intra-departmental hierarchy.

Disparity was evident between what participants expected from the development of water sharing arrangements and what was delivered by policy. This is an example of what Lederach (1999, p. 31) terms a 'justice gap' in peacebuilding endeavours, whereby most people involved in protracted conflicts expect that a process of negotiating an agreement will bring change to both the immediate threat and the structural violence that underpins it. Participants often perceived injustice when the MDBP and Yemeni water laws did not meet their expectations. Blame for this injustice was frequently attributed to other water stakeholders, with participants often perceiving decision makers and other water sharers to be motivated by nefarious intent (see examples in Ex. 5.70; Ex. 6.73; Ex. 6.78; Ex. 6.83). Unequal benefits derived by some water sharers through maintenance (let alone exploitation) of the status quo gave rise to assumptions and accusations of carelessness and greed.

However, points of contention around governance failure and perceptions of water-sharer self-interest often appeared to stem, at least in part, from invisibility, ignorance, and/or normalisation.

As Galtung (1985) argues, while judging others' motivations is an important and normal part of human interaction, assumptions of nefarious intent can also mask the characteristics of the structures in which people operate. As with Arendt's (2006) concept of 'the banality of evil', conditions of structural violence may see 'many people who behave as good citizens and who think of themselves as peace-loving people' 'do enormous amounts of harm to other human beings without ever intending to do so, just performing their regular duties as a job defined in the structure' (Barash & Webel, 2018b, p. 8; Galtung, 1985, p. 145).

Writing on just distribution of scarce resources, Sen (2009, p. 47) argues that to counter this invisibility of structural inequity:

> Intellectual probing is needed to identify deeds that are not intended to be injurious, but which have that effect; for example, horrors like terrible famines [or, in this case, droughts] can remain unchecked on the mistaken presumption that they cannot be averted without increasing the total availability [of the resource], which can be hard to organise rapidly.

As with Malthus' (1888) requirements for moral checks on resource usage to avert catastrophe, Sen here makes the point that resource sharers are not helpless. Or, at the very least, claims of helplessness should not be made while demand-side response options are excluded from the water scarcity discussion.

Yet, the defence of policy by casting water sharers as helpless is commonly seen in practice. Defending her government's water policy, for example, NSW Minister for Water Hon. Melinda Pavey MP argued:

> There has been more drought in the Darling and the Barka River pre-1950s before there was irrigation, than post-irrigation. It is a dry, dry, system. We've just experienced the worst drought on record in the northern basin. But no one wants to believe this fact; no one accepts this fact. But the evidence shows that even completely removing floodplain harvesting in the northern basin – it would only increase flows in the NSW River Murray by less than 1% on average. This is beyond our control – the fact that sometimes it doesn't rain and we have drought (Corrigan, 2021)

Minister Pavey's comments that drought should be expected in Australia are, on the surface, consistent with comments made by study participants that dealing with high water variability is an accepted part of farming in Australia (Ex. 4.59; Ex. 4.61). However, this argument also serves to

minimise the impact of demand-side water usage behaviour in favour of the status quo, casting water stakeholders as non-agential rather than catalysing mitigative action. In contrast, participants who accepted high rainfall variability were looking not for guaranteed water supplies, but certainty in policy. Mr Hall (M-Aus.), for instance, felt severe drought was "bad luck", but that the "uncertainty of the debate" and an unpredictable policy environment was detrimental to livelihoods of water sharers (Ex. 4.59). Importantly, it was the human-controlled elements of water scarcity that were perceived to cause the most harm.

The language of being completely at the mercy of rainfall and the need of individuals to adapt implies that there has been a disruption to an equilibrium, and that there is a point at which that restive state can be restored. So too, the casting of water stakeholders as helpless means that water sharers are left to respond to prevailing conditions out of their own abilities and resources. Yet as explained by participants in both basin contexts, not all water sharers have equal capacity to adapt. This is highly problematic, and as such the concepts of resilience as adaptation or agency are further unpacked in Section 7.3.6.

Moreover, a dissonance between the process and structure (Lederach, 1999) of water sharing arrangements was also revealed in analysis of participants' interviews, such as Mr Whittaker's frustration that "The whole idea of [agreeing to concessions] was so that we didn't have the fight for at least another 10 years" (Ex. 5.49). 'In the language of governments', writes Lederach (p. 33), agreements 'are referred to as an end-game scenario'. The MDBP in Australia and Yemen's water legislation provide crucial structure to water sharing interactions. Like others such as the SDGs, human rights law, and the Watercourses Convention, sharing agreements can provide water stakeholders with helpful baselines, progress markers, and guidance. However, they also run the risk of being seen as a culminating endpoint that will bring water conflict to an end. As Lederach (1999, p. 34) writes:

> When we think of a peace as a process we inevitably fall prey to critique that it is an endless dynamic that leads to no substantive outcome. When we envisage peace as a result we fall into the trap that it is an end-state, only to discover that it is neither an 'end' nor a 'state' and that if we treat it as such our desire to preserve or control it destroy its very essence (p. 34).

This is where the language of transformation can be preferable to resolution, encouraging stakeholders to instead think of sharing arrangements as an ongoing process in which 'something not desired is changing, taking new form' (Lederach, 1999, p. 33). It creates space to 'embrace the challenge to change that which tor[e] us apart' and instead build something better (p. 33).

Building on the accounts of participants in this study, this thesis argues that holding the duality of both process and structure can offer space for increased effectiveness of water sharing agreements. It is here suggested that hydropolitical analysis could benefit from applying a conflict transformation approach that emphasises an ongoing process of both structural and relationship change in order to support and foster water sharing with justice.

7.3.2 Clarifying water rights

Questions of water justice, water sharer motivations and basin stakeholder agency emerged from the research data in the discussion of rights. While a thorough philosophical debate on water rights is beyond the scope of this study, participants' claims on rights insofar as they pertained to water conflict were a mix of rights afforded by law, and human rights claimed as an ethical imperative.

Rights afforded by legality were only discussed by Australian participants. Mr McLaughlan (M-Aus.), for example, said that water rights were not 'God-given', but were rather a product of negotiated agreements and laws (Ex. 6.112). Such a perspective paints water rights as the provision of entitlements determined by the legislature. Recalling Section 2.8, this sits at odds with the development of the human right to water in international law, which is based on human need.

According to Sen (2009, p. 375), rights as legal entitlement can hold objective appeal whereby 'the presumed precision of legal rights is often contrasted with inescapable ambiguities in the ethical claims of human rights'. However, he argues, the latter can only be avoided if those not directly involved 'are exempted from any responsibility to try and do what they reasonably can to help' (p. 375). In a demonstration of this tension, Mr Butler (H-Aus.) explained he did not blame water sharing for exercising "a legally acquired right" (Ex. 5.19), while raising the question of whether it was "morally the right thing to do" (Ex. 5.10).

On the other hand, rights in terms of an ethical imperative were discussed by both Australian and Yemeni participants. Mr Faraj (G-Yem.), for instance, said that water "must be perceived as a public right" (Ex. 6.116). Others distinguished between the legal and ethical aspects of rights, such as Mr Woods (M-Aus.) in stating that Aboriginal People 'have the same rights as everyone else in the water sector', despite them not having legal entitlements under the MDBP (Ex. 6.20). Mr Collins (G-Aus.) too made a distinction, saying that small farmers' "rights need to be protected exactly the same" as those with economic advantage (Ex. 5.51). Human rights, writes Sen (2009, p. 357), are 'strong ethical pronouncements as to what *should* be done'. 'The ethical assertion is

about the critical importance of certain freedoms … and correspondingly about the need to accept some social obligations to promote or safeguard these freedoms' (p. 358).

In this sense, and in keeping with the development of international law, water rights may be seen as a protective mechanism for the satisfaction of needs (Gasper, 2005). The alignment of water rights and needs as two sides of the same coin are multiple. Firstly, Clapham (2015, p. 119) argues that there is a wide acceptance 'that there should be no prioritisation among different types of rights', since 'Different types of rights are seen to be mutually reinforcing'. By extension, if rights are taken to be protective mechanisms for needs, there should likewise be no prioritisation between needs. This reinforces from a different angle the argument for non-hierarchical needs frameworks of Burton and Galtung made in Section 7.2.1. Secondly, water rights viewed as not solely a legal guarantee but as an ethical and thus value-laden concept, carry a demand for acknowledgement and obligation for 'society, in one way or another, to support and promote these freedoms' (Sen, 2009, p. 357). The critical water needs discussed by participants in this study were similarly value-laden, and likewise carry an ethical imperative for satisfaction by society. Thus, these represent non-negotiable requirements as per a Burtonian needs-based approach to conflict resolution.

Moreover, the defence of rights is intertwined with active engagement (Sen, 2009). 'To prevent catastrophes caused by human negligence or callous obduracy, we need critical scrutiny, not just goodwill towards others'. It calls for a relationship-centric approach to water scarcity conflict that goes beyond negotiation, and particularly 'bargaining type negotiations (as opposed to problem-solving type of negotiations)', in which 'the choice of solution might depend on the relative power position of the adversaries rather than on what might be the most satisfactory solution to everyone involved' (Assefa, 1999, p. 38; R. Fisher & Ury, 2011). Far from being 'self-referential, like a mutual backslapping society', as Zeitoun and Warner (2006, p. 440) suggested, the recognition of critical water needs as social can be viewed as counter-hydro-hegemonic as a galvanising ethical imperative for responsive action.

As with the transformation of conflict, 'adjusting current arrangements to achieve full respect for human rights is a never-ending process' (Clapham, 2015, p. i). The reason for this, Clapham (p. i) says, is because 'the human rights project is not simply about implementing a set of obligations fixed in history; rather, the human rights project is about people standing up to injustice and showing solidarity in the face of oppression'. Thus, whether framed as the frustration of human water needs or the denial of water rights, the necessity of water access to facilitate human dignity and development beyond mere survival reinforces the argument that water scarcity conflict has a relational centre, and as an ongoing transformational process is 'inclusive of but not limited to

immediate solutions' (Lederach, 2003, p. 33). To understand the protractions of water scarcity conflict and why it 'poses 'such deep-rooted challenges to constructive change', in the words of Lederach (2005, p. 5), 'we must set our feet deeply into the geographies and realities of what destructive relationships produce, what legacies they leave, and what breaking their violent patterns will require.'

7.3.3   The relational epicentre of water scarcity conflict

This research highlighted deep social divisions that emerged when participants faced situations of water scarcity. Throughout the study, it became clear that many participants were aware of social divisions; that they were seeing others and/or others' actions as problematic; and that such situations needed to change. However, though participants were often clear on the obstacles to fair and peaceful water sharing, there was little convergence on how to address these challenges.

When asked what would be important for fair and peaceful water management into the future, many participants directed their focus towards the fostering of closer social relationships – consistent with Lederach's theories of conflict transformation which emphasise the importance of relationship transformation (Lederach, 1997, 2005, 2003, 2010). Ms Maywald's (M-Aus.) reply of "interaction between communities" (Ex. 6.39) and Ms Fakhoury's (M-Yem.) message of "togetherness", for example, spoke to the deep social divides that permeated their water-scarce communities, and what was needed to repair them.

The only participants who focused on quantitative solutions were in the high influence category. In each such instance, their response reflected their vocation or political policy position, such as Mr Glyde's (H-Aus.) and Moh. Nader's (H-Yem.) legislated mandates. This speaks more to the technical focus of water governance policy more than personal persuasions, as indicated by Mr Glyde's further reflections on the fundamentality of trust (Ex. 6.98). Rather, a technical focus amid conflict contexts likely reflects what Lederach (2005, p. 46) calls 'negotiation on the immediate content of disputes'. It is an understandable focus, since policy negotiated over highly tangible metrics 'provides a pragmatic handle for addressing the conflict', useful for the gradual building of trust and confidence (p. 46). Yet, 'peace through negotiation results in agreements created through "things" that can be quantified', obscuring the 'relational epicentre' that lies at the heart of social change (p. 46-47). As frequently observed in hydropolitics, a focus on quantifiable outcomes in negotiated water sharing agreements can imply that the conflict will have an endpoint, and this can serve to lock in inequitable power relationships (Zeitoun & Mirumachi, 2008). Though quantifiable water sharing outcomes are clearly important, the 'lines of division' cut through society by conflict

represent broken relationships, and such solutions 'tend to hide the reality that the conflict has not ended' (Lederach, 1999, p. 29).

In many instances, a lack of focus on strong social relationships in water sharing arrangements is not a matter of absence, but lack of emphasis. For example, all eight of Ostrom's (1990) CPR design principles are social in nature, despite not being explicitly framed in such terms. Along with the physical attributes of systems, the principles account for the differing 'cultural views of the world, and economic and political *relationships* [emphasis added] that exist in that setting' (Ostrom, 1990, p. 89). CPR design principles four, five and six on accountability and conflict resolution are by nature social, while principles one, three, and seven offer guidance for constructive social engagement. Principle one on clear boundary definition 'can be thought of as a first step in organising for collective action', determining not only *what* is being managed, but 'for whom' (p. 91). This feeds directly into principle three, which itself concerns collective choice and participation – an inherently social endeavour involving 'individuals who directly interact with one another and the physical world' (p. 93). It also concerns who is and is not 'external' to the system, and in that sense relates back to principle one on boundaries, emphasising that boundaries are not limited to physical divisions but also social relationships. In terms of water sharing arrangements, principles one and three refer to basic human water needs, while principle seven refers to the non-suppression of these needs. The remaining two principles on 'congruence' and 'nested enterprises' speak to the concepts of comprehensibility and manageability which, as they are discussed by Antonovsky (1979), are closely related to *resilience* as the ability to cope with stress (MacNair, 2012), which will be explored in Section 7.4. Or as Ostrom (2000, 2009) herself identified in her later work, the CPR principles serve to foster the establishment and maintenance of *trust* (G. R. Marshall, 2008; Moore, 2018).

7.3.4   The centricity of trust

Frequently emerging from the research data was the issue of trust as a central component of relationships, and distrust as a common theme in conflict amid water scarcity. Trust is an expansive, multi-disciplinary and multi-faceted term, with most definitions involving a combination of relationships, expectations, and the behaviours linked to those expectations (Notter, 1995, p. 4). As Feltman (2011, p. 7) writes, trust often involves 'choosing to risk making something you value vulnerable to another person's actions'.

Analysing the research data on trust through the lens of relationships, expectations, and behaviour, the social aspects of water sharing which participants held in high value were emphasised. In many

instances, conversations which were framed in terms of water security revealed underpinning values of social trust. As Mr Glyde (H-Aus.) remarked, "you can deal with it [drought] if you can trust the institutions that are making decisions about your life or the life of the river" (Ex. 6.98).

Having confidence that authorities are "professional, thoughtful, honest, driven by evidence" (Ex. 6.98) relates to the expectation for 'people in powerful roles to wield that power competently' (Notter, 1995, p. 5). Similarly, Mr Al Hassan's (M-Yem.) expectations placed in "performance" (Ex. 6.105) and Ms Fakhoury's (M-Yem) problem of convincing donors of "capacity" (Ex. 6.107) highlight the value placed on reliability in the ability to know that what is promised will be delivered (B. Brown, 2018, p. 225). By nature a social dynamic, 'Trust in technical competence refers to a basic trust in our social system and the roles that are inherent in it' (Notter, 1995, p. 7).[78,79]

As well as being key to relationships between water sharers and authorities, trust is likewise closely related to cooperation between water sharers for mutual benefit (Deutsch, 1958). Reciprocity of rule-following is what Ostrom (1990) describes as 'the problem of credible commitment' – a prisoner's dilemma-like situation by which actors in an interdependent situation as sharers of a common resource are incentivised to act independently. Or put simply, the mutual agreement that 'I will keep my commitment if you keep yours' (p. 44). According to Notter (1995, p. 5):

> Much of the research done on trust has created "games" like the Prisoner's Dilemma, in which cooperative or competitive behaviour is elicited, depending on the level of trust between the two players. The need for interdependence is revealed clearly in these exercises, as the benefit of trust can only be gained if both players trust each other. … Trust is the key element, because you must trust that the other person will cooperate. The difficulty, of course, lies in the fact that by trusting, you expose yourself so that the other person can take advantage of that trust and turn the situation into win/lose (the other person wins/you lose), or if both are distrustful, it can turn into a lose/lose situation.

'Trust', writes Moore (2018, p. 37), 'is the bedrock of successful collective action' (Ostrom, 2000).

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[78] By some definitions, trust is seen as or as a cause, outcome, or an either/or binary (Gabarro, 1990). However, trust is referred to here as a 'dynamic' since, as Rousseau et al. (1998) argue, it is important to recognise that trust is a process, subject to changing over time.

[79] As Brown (2018, p. 225) helpfully points out, reliability not only involves competence in the ability to do things, but also the awareness and communication of limitations to enable the balancing of competing priorities and avoiding over-commitment.

The challenge of maintaining such commitment in the face of water scarcity was demonstrated by study participants. As Mr Taylor (G-Aus.) observed, "There are lots of other people who sort of look at the big boys and sort of go, well if it's alright for them, it's all right for us" (Ex. 6.102). Or, as stated by Sen. Hanson-Young (H-Aus.), "if the guy next door isn't doing the right thing, … why should anyone play by the rules?" (Ex. 5.37). It was for this reason that Mr Taylor (G-Aus) insisted on the need for close "monitoring" (Ex. 6.101) – an argument supported by Ostrom (1990, p. 45) when she suggests that 'Without monitoring, there can be no credible commitment'.

However, critiquing the application of game theory to transboundary water interaction, Mirumachi (2015, p. 48) recognises that characterising a situation as the prisoner's dilemma 'risks failing to grasp the simultaneous nature of conflict and cooperation in relationships'. On this point, she touches on a profound notion, but acknowledges that TWI has further to go in establishing an analytical framework of cooperation. That notion, this thesis contends, is the concept of agency. Describing a lack of "solidarity among people" (Ex. 6.103), Mr Ghanem (M-Yem.) perceived that the problem of credible commitment was related to an "absence of awareness" (Ex. 6.103). In this subtle linkage emerges a profound point: that the problem of credible commitment can be addressed through improved communication, whereby 'the structure of the situation generates sufficient information about the likely behaviour of others to be trustworthy reciprocators who will bear their share of the costs of overcoming a dilemma' (Ostrom, 2010, p. 432). To this point, agency as a counterpoint to 'remorseless tragedy' of the commons is unpacked in Section 7.4.

Simply put, Lewicki et al. (1998) assert that 'both trust and distrust involve movements toward certainty: trust concerning expectations of things hoped for and distrust concerning expectations of things feared' (p. 439). In Ex. 6.100, Mr Butler (H-Aus.) said that an effort to "constantly open the books" for the transparent sharing of information would counter "uncertainty, which is the enemy of trust". Reporting on water markets in the Murray-Darling/Barka basin, the Australian Competition and Consumer Commission (ACCC) (2021, p. 17) stated that 'Water markets are opaque because of poor quality public data. A lack of market transparency also contributes to misconceptions and misinformation about the conduct of market participants'. This link between uncertainty and mistrust is consistent with Lederach's (2010, p. 63) argument that 'uncertainty goes hand in hand with the experience of unpredictability', whereby people 'suspend trust in what is happening around them' (p. 63). Or using the language of security, 'insecurity poses a challenge of how to recover a basic sense of trust in the outer social landscape and the inner personal journey' (p. 63). While conversely, 'insecurity creates the permanency of feeling uncertain' (p.63).

It is argued here, then, that trust is ingrained in security which, along with water scarcity, is an intrinsically social concept. Applying this argument to the previous section on critical human water needs, it follows that trust and distrust are pivotal to the satisfaction of basic human water needs. As Notter (1995, p. 15) asserts, 'For the security need, the transformative skill set is trusting'. Yet this also begs a daunting question: 'How does trust ever develop if, in order for it to develop, there needs to be trust?' (1997 Ch. 6, para. 3). At the core of this paradox, they write, is the challenge of 'How safety is created out of fear' (para. 4).

7.3.5   Information flow

Building on the research data, improved communication of and access to basin information represents a significant opportunity to counter fear and build trust in water-scarce contexts. As described by study participants in Chapter 6 (Section 6.5), shortcomings in two-way information flow represented one of the most commonly reported obstacles to fair and peaceful water sharing, fostering and perpetuating uncertainty and mistrust. For high-level decision makers, the difficulty of disseminating complex hydraulic information was repeatedly discussed as a barrier to effective policy implementation, while at the same time grassroots water sharers were desperate to understand what they could expect from water sharing arrangements – a lack of which was frequently cited as a source of angst.

The problem of access to information was seen in the functioning of water markets. Reporting on the state of water markets in the Murray-Darling/Barka, the Australian Competition and Consumer Commission (ACCC), for example, found that 'The perception of misconduct by water investors has reduced water users' confidence in the water markets. Greater market transparency and effective oversight, including data analysis, investigations, and regular reporting, are necessary to build and maintain confidence in water markets' (ACCC, 2021, p. 17).

Applying Sen (1999, p. 142), to this analysis, inadequate preparation to make use of market transactions and a lack of transparency facilitates:

> unregulated use of activities that allow the powerful to capitalise on their asymmetrical advantage. These have to be dealt with not by supressing the markets, but by allowing them to function better with greater fairness and with adequate supplementation.

This is countered, he argues, by education (p. 142), therefore suggesting that access to information can lead to greater confidence in water markets. In a conflict context, Lederach (1997) identifies

inverse relationships between access to information and the consequences of related decision-making across levels of social influence, as represented in his pyramid of peacebuilding actors (see Chapter 3, Section 3.4.2).

> On the one hand, a higher position in the pyramid confers on an individual greater access to information about the bigger picture and greater capacity to make decisions that affect the entire population, but it also means that the individual is less affected by the day-to-day consequences of those decisions. On the other hand, a lower position increases the likelihood that an individual will directly experience the consequences of decision making, but reduces the ability to see the broader picture and limits access to decision making power (p. 43).

This reflects what was labelled *proximity* in relation to the analysis of interview responses in Chapter 6 (Section 6.6.4). Consistent with participants' complaints of distant decision makers, either through structural or geographical means, Lederach (p. 43) argues that this is a relationship gap that poses a significant problem for the design and implementation of peace processes. Such processes include water sharing arrangements.

For example, Mr Najar (M-Yem.) pointed to the transformative potential of information and understanding, suggesting that "work to increase and intensify awareness among people will guarantee changing their ways of dealing with problems, imbalances, and shifting from conflict to dialogue and understanding" (Ex. 6.32). This can be explained by Freire's (1968/2017, p. 9) *conscientização*, or critical consciousness, which 'refers to learning to perceive social, political, and economic contradictions, and to take action against the oppressive elements of reality'. For Freire, knowledge is a means of humanisation, and agency through information and education is resistance against oppression. Conscientisation based on knowledge and information is thus a process of personal and social transformation that is the basis for Lederach's theories of conflict transformation. In the context of water sharing arrangements, this may take the form of water literacy to enable greater engagement with complex basin systems.

7.3.6   Paradox and complexity

The research data revealed tension between the importance of communicating complex basin information and presenting that information in a manner that is accessible to water stakeholders. Several participants were desperate for information on expected water flows, especially in times of high stress. At the same time, participants in a position to share basin information complained of

the difficulty of doing so, even though they knew it to be important for mitigating distress among water sharers.

In essence, both sides of the communicating complexity tension are about understanding. Or more specifically, the ability to take "information and turn it into knowledge and an understanding", as Ms Maywald put it (Ex. 6.39). Certainly, in a geographically large, population-dispersed, and historically over-developed water basin like the Murray-Darling/Barka; or a water sharing situation marked by an absence of effective regulation like Jibal as-Sarawat – contexts 'wrapped in histories of violence that date back generations' – this is no small feat (Lederach, 2005, p. 31). So too, with water scarcity a topic dominated by the "hard sciences", where a focus on positivist metrics that readily offer a short-term gauge on wellbeing are both conflated with and risk causing 'prohibitively high social cost', the relief of simplicity and the fairness of complexity in water basins make for a difficult balance (Water Act 2007 (Cth) No 137 (Austl.)).

Participants in both basin contexts demonstrated clearly that there is safety, calm and relief in simplicity. The lure of simplifying water sharing systems is not surprising, but nonetheless sits in tension with complex realities. As Ostrom (1990, p.100) observes on CPR longevity, 'In theoretical models of rule-governed behaviour, the rules that structure the strategies available to participants are unambiguous and are enforced by external, all-knowing officials. In field settings, applying the rules is never unambiguous.' Uncertainty is exhausting, as Kahneman (2011) writes, and 'the list of situations and tasks that are now known to deplete self-control is long and varied. All involve conflict and … making a series of choices that involve conflict' (p. 42). Indeed, 'Cycles of violence are often driven by tenacious requirements to reduce complex history into dualistic polarities that attempt to both describe and contain social reality in artificial ways' (Lederach, 2005).

Yet, despite its clear challenges, resilience can be found in complexity. 'It is important to underline' de Coning (2021, p. 260) argues, that 'within a complexity framework, non-linearity is not associated with disorder and chaos'. Rather than a reflection of imperfect knowledge, inadequate planning or implementation, uncertainty is an intrinsic quality of complex systems (Popolo, 2011). 'Non-linearity in complex systems is what makes it possible for them to adapt and to evolve' (p.260).

> Kistin (2007, p. 8) calls us to move 'beyond the notion of cooperation as treaties to a more dynamic view of transboundary water cooperation as an on-going and non-linear process in which state and non-state actors establish, challenge, modify and legitimise multi-layered governance structures' (Zeitoun & Mirumachi, 2008, p. 7).

Study participants readily acknowledged that their water sharing contexts were "very complex" (Ex. 4.27). Expansive, complicated hydrological systems, confusing regulation, and webs of social and political allegiance were just some of the factors that resulted in highly complex water arrangements.

Though some participants pointed to the desire for "one system", be that for identity, market, or sustainability purposes, a system can be "one" in various ways. As NSW grazier Rachel Strachan suggests, a basin can be united through connectivity, rather than homogeneity:

> The way to fix it is, you have to have storage targets and flow targets throughout the whole system. You can't just silo-ise each section. … Even though they're all [hydraulically] connected, none of their water sharing plans actually connect, and they don't recognise downstream needs of each other. That's where we have to actually have policy that protects the base health of the river (Corrigan, 2021).

The importance of regional distinction with interconnectedness is addressed by Ostrom, (1990, p. 92) who argues that 'no single set of rules defined for all irrigation systems in the region could deal with the particular problems in managing each of these broadly similar, but distinctly different, systems. Instead, 'Appropriation rules restricting time, place, technology, and/or quantity of resource units are related to local conditions' (p. 92). This *congruence*, she points out, speaks to the applicability of appropriation and provision rules and local conditions; while *compatibility* allows for harmonious operation of distinct components under the same umbrella.

These enablers of interconnectedness relate to BHN theory in what Burton (1979) calls coherence and consistency, as distinct from integration. Each of these factors contributes to a sense comprehensibility, which MacNair (2012) positions as contributors to resilience, since they serve to strengthen self-organisational capacity.

> The recognition in the adaptive peacebuilding approach of the fact that there is no external privileged knowledge or predetermined model, and that the design of solutions for peace should emerge from the process itself, creates meaningful opportunities for all stakeholders, and especially for local societies and communities, to co-own and co-manage the process (de Coning, 2021, p. 261).

As with Sen's (2009) earlier argument on rights, de Coning argues leaders have an ethical responsibility to embrace complex systems in 'their choices and actions' (de Coning, 2021, pp. 257–258). So too Brown (2018, pp. 104–105) associates this responsibility with paradox in times of uncertainty:

In the midst of uncertainty and fear, leaders have an ethical responsibility to hold their people in discomfort – to acknowledge the tumult but not fan it, to share information and not inflate or fake it. Daring leaders acknowledge, name, and normalise discord and difference without fuelling divisiveness or benefitting from it.

According to Yunkaporta, embracing complex systems is part of satisfying the need to belong. He asks: 'how can we bring these ideas into a dialogue with science in ways that will actually help? Perhaps the first step would be a subtle shift in the focus of enquiry to include an Indigenous orientation examining multiple interrelated variables situated in place and time' (2019, p. 193). Hughes (2012, p. 116) argues that in conflict settings, 'an explicit, reflexive awareness of the incompleteness of our understanding is … vital so that decisions are taken with a large degree of caution (and humility) while at the same time demanding that we think through the possible ramifications'.

A transformational approach to water scarcity, it is clear, is replete with complexity and paradox. Leaning into the tension of duality is a crucial component of dealing with water scarcity, as it is with conflict generally. As Lederach (2005, p. 36) writes, 'The gift of paradox provides an intriguing capacity: It holds together seemingly contradictory truths in order to locate a greater truth'. Comparing the views of study participants, simultaneous simplicity and complexity presents as one such paradox in water sharing. But rather than forging division, the simple truth of "water is life" can inspire action, while complexity is embraced for trust-building and fairness (Lederach, 2005; Ostrom, 2009, 2010). These, as the following section will discuss, are essential elements of resilience to water scarcity.

7.4   Resilience to water scarcity

7.4.1   Coping with water scarcity

All study participants discussed the stress and pressures of water scarcity, as well as the ways in which they coped with prevailing circumstances. This research found that water scarcity itself, as well as ensuant conflict, can be an immensely painful and emotionally draining experience.

According to study participants, coping with water scarcity requires significant effort and energy on the part of the person experiencing it. Mr Murphey (H-Aus.), for instance, described managing water allocations during drought as "the most intense and stressful period of all my working

career" (Ex. 4.49), while Moh. Hadid (M-Yem.) said that the stress of water scarcity was "affecting our capacity to deal with life" (Ex. 4.53). As Mullainathan & Shafir (2013, p. 12) write, 'Scarcity is not just a physical constraint. It is also a mindset. … By staying top of mind, it affects what we notice, how we weigh our choices, how we deliberate, and ultimately what we decide and how we behave'. Over a sustained period, this can lead to exhaustion, dissonance, and/or trauma (Hamber, 2009; Kahneman, 2011; Sandole, 2013).

As Brown (2020) observes, 'There is profound 'correlation between fear, scarcity, and pain'. 'Fear' Lederach (1997, p. 13) writes, 'is driven by something we don't have capacity to control'. In fearful situations, including water scarcity itself and ensuant conflict 'people seek *security* by identifying with something close to their experience and over which they have some control. In today's settings, that unit of identity to offer protection may be clan, ethnicity, religion, or geographic/regional affiliation, or a mix of these'. Or, as Brown (2015a, p. 23) puts forward, 'When we're hurting … we reach for what we think will offer us the most protection'.

Participants described the ways in which they and their communities addressed the adversity of water scarcity in an effort to gain some degree of protective control over their prevailing circumstances (Kobasa, 1979; Kulig et al., 2008; van Breda, 2018). Some coping methods were seen to be helpful or constructive, while others were more destructive (Deutsch, 1973).

7.4.2   Adaptation, and its limits

As introduced in Chapter 2, 'the ability (or inability) of a social entity to cope with the increasing demands caused by water scarcity' is generally considered within an interdisciplinary body of literature as resilience achieved through 'adaptive capacity'. Resilience, when presented as a high adaptive capacity, is typically presented in a positive light, while vulnerability is often seen as negative. The language used by study participants was consistent with this tendency.

In every instance that adaptation was expressly raised in interviews, it was framed positively as an enviable ability to absorb prevailing difficulties and maintain a sense of wellbeing in the face of hardship. Mr Kelly (H-Aus.) for instance advocated for the "good practice" of "rules that allow for adaptive management and flexibility", linking this to "people being treated with integrity" (Ex. 5.31). Moh. Hadid (M-Yem.) (Ex. 5.53) spoke of his aspiration to be adaptable to water scarcity, saying he "would like to be like water - adapting to the situation where I am, bringing happiness and life to people".

However, while adaptation to hardship was seen as admirable, it was also presented as challenging. Mr Al Saif (H-Yem.), for instance, listed "trying to adapt to the current situation of water scarcity" as one of the "many challenges" he was experiencing (Ex. 5.52). For Mr Collins (G-Aus.), while not having adaptive sharing rules was "the biggest impediment" to fair water management, he also felt that making "rules that can uniformly be fair" was difficult (Ex. 5.51). Such examples highlight the limits of adaptation, whereby attempts to adapt to water scarcity were limited by unequal capacities to do so.

Unequal capacities to adapt

Study participants' lived experience of water scarcity demonstrated that resilience is not simply a binary 'have' or 'have not' status, but an ebb and flow of capacity to cope with hardship. As van Breda (2018, p. 7) writes, 'Resilience to chronic, particularly distal-onset chronic adversity, draws for extended periods on a well of resources that is not limitless. Eventually, these wells run dry through resilience exercised in response to adversity after adversity.' As such, 'Resilient systems can be highly unequal with the benefits from such resilience unevenly distributed' (Walsh-Dilley & Wolford, 2015, p. 174).

Unequal capacities of water sharers to adapt to water scarcity emerged from this study in several forms, including economic disparity, inadequate access to water sharing information, and discriminatory representation in water sharing fora, agreements and governance on grounds including gender, racial and historical oppression, and physical ability.

Several participants in both contexts complained that market conditions, and particularly highly inflated water prices, meant that ability to adapt to prevailing scarcity conditions was heavily biased towards the wealthy. In the Australian context, inequitable water markets presented as both demand-driven price inflation as explained by Mr Collins (G-Aus.) (Ex. 6.22), as well as supply-side price collapse in Mr Conti's (G-Aus.) experience (Ex. 6.25). The ACCC (2021, p. 431) related such market volatility to basin variability, stating that 'Trade rules could better align with changing system conditions, be more equitable and better able to maximise trade within physical constraints and environmental tolerances.' In Yemen, water market inequity presented at a household demand level as indicated by Mr Abadi's (M-Yem.) complaint that the price of water had "risen dramatically" to "more than the capacity" of the average Yemeni. In such cases, as Moh. Hadid put it, Yemenis "are coping because we have no option" (Ex. 6.27).

Despite clear disparity in adaptive capacity, participants were nonetheless expected or forced to absorb significant hardship. In such instances 'forms of self-protection' against vulnerability can serve as unconstructive, to the point of trade-off between resilience and wellbeing (Armitage et al., 2012; B. Brown, 2018, p. 161). Absorptive coping was seen in both basin contexts, particularly (though not exclusively) at the grassroots. Mr Faysal's (G-Yem.) warned that the "patience, flexibility, and adaptation to water scarcity" shown by Yemenis "may not prolong for the coming years" (Ex. 5.56). In the Australian context, an ability to "just deal with it" as described by Mr Murphey (H-Aus.) (Ex. 6.69) and Mr Whittaker (G-Aus.) (Ex. 4.61), or to cope without being "too worried" (Ex. 4.6) was frequently presented in a favourable light.

Such veneration of coping reflects the view of resilience as a positive outcome, such as Fraser, Richman and Galinsky's (1999, p. 136) description of 'individuals who adapt to extraordinary circumstances, achieving positive and unexpected outcomes in the face of adversity' (van Breda, 2018). In a practical example of how an ability to cope with water scarcity can be culturally revered, Figure 7.1 shows an Australian advertisement for paint that links 'toughness' to the ability to withstand harsh climatic conditions.
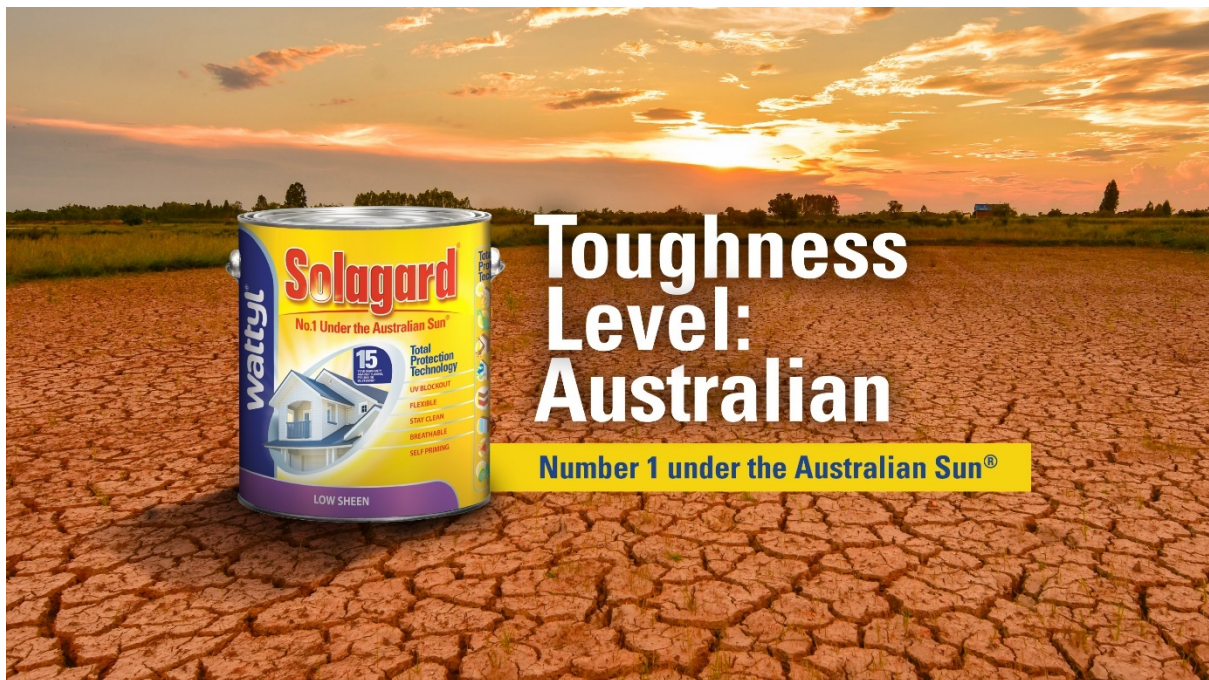

Figure 7.1: Wattyl Solagard paint advertisement (Wattyl, 2021)

Yet, van Breda (2018, p. 7) argues that an approach to dealing with adversity 'which valorises such resilience, without considering the social structures that create or perpetuate adversity, has colluded with a neoliberal agenda'.

Adopting a resilience identity can be a profoundly mobilising force for resistance and change, if accompanied by due recognition of underpinning structural vulnerability. Ms Fakhoury (M-Yem.), for example, spoke of perseverance and social solidarity in the face of hardship as a both a unifying motivator and a point of leverage in negotiations with government (Ex. 6.96).[80] Importantly, however, her perspective was presented with accompanying recognition of the severity of the situation faced, and active lobbying for structural change. Without such recognition, the construction of a resilience identity may instead carry the expectation that hardship will be absorbed, creating a false sense of security through the denial of vulnerability. As social psychologists Sagarin, Cialdini, Rice, & Serna found (2002, p. 539) found, 'Far from being an effective shield, the illusion of invulnerability undermines the very response that would have supplied genuine protection'.

In Chapter 5, differing perspectives emerged from the research data regarding who is responsible for the allocation and distribution of scarce water resources. Participants fell largely into one of three camps: those who felt it was the prerogative of individual water sharers to use water in a fair and sustainable manner; those who felt that it was the responsibility of government to provide water and if an allocation had been legally acquired, the usage purpose of that water was irrelevant; and those who saw a combination of both individual and government responsibility for fair water sharing. Who is responsible for meeting critical human water needs also presented in the context of water rights, as identified in Section 7.3.2. Mr Faraj (G-Yem.) summarised the tension between individual and social responsibility, reflecting that water "must be perceived as a public right" while at the same time "individuals should feel responsible for water and the need of others for it during their consumption" (Ex. 6.117).

Considering the immensity of pain experienced amid water scarcity, an 'understanding of human defence mechanisms that allow us to deny what is painful' is a relevant consideration for water conflict analysis (de Zulueta, 1993, p. xi; MacNair, 2012). Mr Whittaker's (G-Aus.) expressed need to "just put up a bit of a wall" (Ex. 6.56) offered a glimpse into what Hartling (2000, p. 4) and

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[80] Ms Fakhoury spoke in English, so her quote here is verbatim. However, on the point of resilience identity construction, the terms she used including "persevering", "solidarity", and "doing what we can in our capability" are reminiscent of the Arabic term 'صمود' (*sumud*) – most often but not exclusively associated with Palestinian 'steadfastness' or 'heroic perseverance against impossible odds' (Khalidi, 2010, p. 195).

Brown (2015a) describe as relationally disconnecting coping mechanisms such as withdrawal (or 'moving away'), which are not yet represented in TWI.[81] How water sharers behave when their limits are reached requires a level of engagement with psychology that is beyond the scope of this thesis. However, as will be outlined further in Chapter 8 (Section 8.6) this may hold potential to build on TWI theory and thus represents a potential angle for further research.

Short-term adaptation and shifting the burden

More than challenging, adaptation that does not balance short term priorities with long term can be problematic. As Lambourne (2021, p. 60) writes, 'short-term survival strategies may be maladaptive and adaptation may not be consistent with long-term sustainability.'

In both basin contexts researched in this study, the cultivation of water-thirsty crops was perceived by several participants to be motivated by greed, self-interest, and even "evil" (Ex. 5.20). Yet, in a case recounted by Mr Collins (G-Aus.), crop choice was not the most lucrative option, but was a short-term coping strategy, driven by the need to adapt to highly variable rainfall context. Cotton, he said, was less lucrative than nuts, but was attractive due to its annual harvest cycle that allowed for year-to-year adjustment to prevailing water allocations. In Yemen, the multiple accounts of unrestrained extraction of groundwater, such as those offered by Mr Al Hassan (Ex. 5.34) and Mr Bashar (G-Yem.) (Ex. 6.58) demonstrate adaptive coping with a heavy bias towards the satisfaction of immediate needs over long-term sustainability. As Al-Saidi (2021, p. 2) observes, while 'Yemenis' self-adaptations have been necessary to overcome the lack of services', 'resilience is conditioned on locally available resources', and infrastructure services are 'fragmented, uncoordinated, and unaffordable to the poor'.

Relatedly, when individuals with unequal capacities to adapt to water scarcity are expected to carry the responsibility for resilience, a whole-of-basin view is unreasonable to expect. Indeed, balancing the needs of a hydro-geographically and culturally diverse water stakeholder group is difficult enough for government, let alone individuals. The study revealed instances in which adaptation strategies aimed at reducing vulnerability to water scarcity were perceived to alleviate the hardship

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[81] Currently, the TWINS model situates violence on its 'conflict intensity' axis, while 'confrontation of the issue' is given the lowest metric of 'cooperation intensity' (Mirumachi, 2015). Thus, the model measures only active steps towards working together, and in doing so neglects to identify *avoidance* of cooperation. Further development of the TWINS model may better represent destructive responses to water scarcity, including violence and avoidance, as the breakdown of relationships as argued by Lederach (1997, 1999).

of one or more water sharers but came at another's expense. Writing on mechanisms of structural violence, Galtung (1996, p. 198) argues that 'One type of violence may be reduced or controlled at the expense of increase or maintenance of another'.

In some instances, engineering solutions discussed by participants attempted to address a particular water scarcity vulnerability but in doing so created another. Examples include Mr Woods (M-Aus.), who said "we don't want concrete structures on country" but lamented that "the Authority [MDBA] didn't take it into consideration" (Ex. 6.3). In synergy with Mr Woods' comments, both on lack of Aboriginal "participation in decision-making" (Ex. 6.4) and market access (Ex. 6.21), Hartwig, Jackson and Osborne (2020) profile 'clear equity challenges' stemming historical and ongoing dispossession of water from Aboriginal people in the Murray-Darling/Barka as 'factors that constrain the ability of all Aboriginal people to fully enjoy the benefits of water access, including water market participation'.

In Jibal as-Sarawat, the near absence of state institutions with capacity to facilitate water access gave the perception of situations where "the weak lose, the strong get what they want, and the rest all get what they can manage", according to Moh. Shadi (G-Yem.) (Ex. 4.36). The inability to participate in water sharing negotiations on gender grounds by Ms Fakhoury (M-Yem.) (Ex. 6.13) was also cited as an example of unequal capacity to adapt to prevailing water scarcity that is a function of the system yet puts the responsibility for resilience on individual water sharers and/or their communities.

Contrary to building resilience, such interventions had the negative-sum effect of *shifting* hardship, or the risk of it, from one place or entity to another rather than creating a constructive outcome for all basin stakeholders. 'While such strategies may reduce local vulnerability, they are not sustainable solutions because they transfer risks to other places, and thus contribute to vulnerability elsewhere' (Collins & Bolin, 2007, p. 1).

Thus emerges a link between critical human water needs and resilience. The research data suggests that short-term adaptation strategies that fail to recognise and address the structural inequities in water-sharing societies may function to perpetuate conflict, rather than transform it. In this sense, adaptive resilience may fall into a similar trap as water sharing arrangements that 'favour one actor at the expense of a collective win', perpetuating conflict and deepening divisions between water-sharers (Zeitoun & Mirumachi, 2008). This aligns with Burton's (1990) BHN theory that frustration of needs for recognition, participation, identity and security will provoke ongoing resistance. The question then turns to how approaches to water scarcity resilience may better satisfy such needs.

7.4.3 Agency

Reactions to vulnerability can cast water sharers as helpless; or it can catalyse action. By working to strengthen personal and collective agency to deal with water scarcity, water actors can build resilience to water scarcity for themselves and their communities.

Adger (2006) suggests that neither vulnerability nor resilience are inherently positive nor negative since they, like conflict transformation, are not simply outcomes but also processes. Rather than focussing on recovery or returning to a state of equilibrium following hardship, several authors have instead argued that in both theory and practice, a dynamic ability to respond to hardship is a more useful conceptualisation of resilience (D. D. Brown & Kulig, 1996; Norris et al., 2008; Pfefferbaum et al., 2005). 'What is necessary to resist a shock', write Béné et al. (2012, p. 11), 'may be quite different from what is needed to adapt to it'.

Much of the debate on resilience and social-ecological systems focuses on the ability of 'systems' to recover from shocks, veiling the agency of people within a system to exercise choice or exert control over the processes by which resilience is shaped (Béné et al., 2012; Berkes et al., 1998; Coulthard, 2012; Folke, 2006; Young et al., 2006). Similarly, Janssen and Ostrom (2006) make a nuanced but profoundly insightful observation that vulnerability 'includes the attributes of persons or groups that enable them to cope with the impact of disturbances' (p. 237). Of crucial importance here, is that while still presenting vulnerability as susceptibility to exposure, it is framed in the positive as an enabler. From a social psychology perspective, Brown (2015a, p. 2) argues that, contrary to popular belief, vulnerability is not itself negative. She writes:

> Vulnerability is not weakness, and the uncertainty, risk, and emotional exposure we face every day are not optional. Our only choice is a question of engagement. Our willingness to own and engage with our vulnerability determines the depth of our courage and the clarity of our purpose; the level to which we protect ourselves from being vulnerable is a measure of our fear and disconnection.

In this view, it is not the avoidance or engineering-away of vulnerability but its acknowledgement that functions as an enabler of agentic resilience. In this way, critical human water needs can be understood not as weakness, but as facilitative vulnerabilities – the necessary acknowledgement of which can serve to enable positive change.

A lack of access to hydro-geographically-specific information emerged frequently from the research data as a profoundly disempowering problem. As was discussed in Section 7.2.3, this is at least in part a function of decision-making hierarchy amid conflict (Lederach, 1997). The effect is

such that water sharers, explicitly or not, are situated and analysed as helpless. Writing on public provisioning with strong relevance to water sharing arrangements, Sen (1999, p. 136) argues for 'the importance of seeing agency (seeing people as agents rather than as patients) and the informational focus on capability deprivation (rather than only on income poverty)', whereby access to information is a key enabler of equitable engagement with social institutions. As Ostrom's powerfully observes, this tendency in CPRs is highly problematic because it limits creative response to adversity.

> As long as individuals are viewed as prisoners, policy prescriptions will address this
> metaphor. I would rather address the question of how to enhance the capabilities
> of those involved to change the constraining rules of the game to lead to outcomes
> other than remorseless tragedies (Ostrom, 1990, pp. 6–7).

The difference lies in vulnerability as understood as a state, while fear is a reaction to that perception. This represents a profound distinction, because it illuminates notions of control, choice, and response in coping with adversity. To that effect, Lederach (2010, p. 71) remarks that 'Resiliency underscores the importance of purposeful hope over the dependency of wait-and-see grievance, requiring a proactive capacity for proposal, engagement and sustained relationships in the midst of external challenges and local polarisation'.

MacNair (2012) describes agency as relating to an internal 'locus of control', and also relates to the earlier concept of vulnerability. This is relevant to the so-called tragedy of the commons (Hardin, 1968), and asks questions of what it means to be resilient. When vulnerability to water scarcity is viewed in the negative, it casts water sharers as helpless and at the mercy of an external locus of control, be that reliance on individually uncontrollable environmental factors such as climate variability, or social institutions such as governing authorities. But when viewed in the positive as an acknowledgement and acceptance of exposure, vulnerability can instead serve to galvanise responsive action. As Ostrom (1990, p. 8) argues, 'By referring to natural settings as "tragedies of the commons," "collective-action problems," "prisoner's dilemmas," or even "common property resources," the observer frequently wishes to invoke an image of helpless individuals caught in an inexorable process of destroying their own resources' (Ostrom, 1990, p. 8).

Indeed, many study participants readily acknowledged their exposure to vulnerability and discussed their eagerness and attempts to proactively respond to it. In such instances, the complaints of participants across both basin contexts were rarely about a lack of voice, but about a lack of acknowledgement or opportunity to participate in the decisions that affected them. Mr Woods (M-Aus.) (Ex. 6.4), Mr Taylor (G-Aus.) (Ex. 6.7), and Ms Fakhoury (Ex. 6.11), for instance, all spoke

of exclusion from decision-making fora; while Mr Besser (M-Aus.) (Ex. 6.5), Moh. Hadid (M-Yem.) (6.10), and Mr Taylor (G-Aus.) reported that efforts of water sharers to contribute to decision-making that affected them were not being heard by those with decision-making power. Crucially, none of these instances reflect a passive engagement with prevailing vulnerability to water scarcity, and while subtle, each example puts responsibility on the decision-maker to listen and engage. For Ms Maywald (M-Aus.), "making sure that everyone has the opportunity to be heard" constituted "fairness" (Ex. 6.2).

According to Ostrom's (1990) principle of 'collective choice arrangements', the opportunity for resource sharers to participate in the modification of rules that affect them is crucial to the sustainability of CPRs. Yet, 'In settings of protracted conflict people in local communities often express a common … simple observation: 'Nobody listens to us." (Lederach, 2010, p. 65). While participation in political process is associated with feelings of inclusion, power, and meaningfulness, the experience of being left out, 'solidifies a profound sense of distance and exclusion' (p. 65). 'They are *talked about* but not *talked with* and, when they are talked with, they often express a sense that the talk was not meaningful because it did not lead to expected change' (p, 65).

Key to resilience is the element of action. But there are subtle differences in language that speak to the difference between internal agency and external obligation. For example, Homer-Dixon (1999, p. 107) argues that if societies 'wish to prevent severe environmental scarcity, they need to understand and act on its precursor ideational and physical variables'. In contrast, Lambourne (2021, p. 60) writes that 'More than a passive protective factor that enables individuals and communities to recover from stressful events', resilience 'also suggests an essential agentic quality that enables individuals and communities – and organisations – to adapt and evolve as necessary to maintain functionality beyond mere survival and to effect social change'. In both cases, the ability of communities to act for themselves is acknowledged, but in the former is presented as a necessity, while in the latter it is an enabling internal choice.

From the positivist approach of Chandler and Reid (2016, p. 138), 'the role of information technology and data access in empowering communities is one of enabling them to cope with disaster through a better understanding of the self … so that they can overcome their own social and ideational barriers to adaptive choice-making'. This, they argue, is 'the neoliberal goal of resilient communities and societies' (p. 139). This thesis does not concur with Chandler and Reid (p. 139) on this point, since it detaches 'external understandings of causality in the world' and thus ignores ethical imperative as argued in Section 7.3.2 on water rights. Nonetheless, the authors draw

attention to an important caution: a focus on agential resilience should not be about individual accommodation of adversity, thus relieving broader society of its responsibility.

Instead, an agential approach to water scarcity should centre on empowerment and critical engagement that resists a victimhood presentation of vulnerability. Where water scarcity causes 'shared injuries to a population's social, cultural, and physical ecologies', a capacity to withstand that trauma, loss, and hardship is likewise strengthened in shared community and collective recovery (Hamber, 2009; Kulig et al., 2008; Saul, 2014, p. 1). In this light, resilience is revealed as an inherently social endeavour.

In order that the burdens of absorption and adaptation are not simply shifted from one water stakeholder to another, water scarcity resilience may be strengthened by greater attention to the ongoing transformation of social relationships as well as physical systems. Vulnerability may be seen as an acknowledgement of susceptibility to harm that enables and encourages water stakeholders and broader society to question why things are as they are, which in turn empowers a water-sharing society to both make and demand improvements to infrastructure, information flow, planning, wellbeing, and participation in water sharing arrangements.

This thesis thus suggests that approaches to water scarcity conflict may be significantly strengthened by engaging with concepts of agential resilience that embrace the paradox and process of critical engagement and mutual learning, akin to Sen's (2009) argument on ethical imperative, Freire's (2017) *conscientização*, Lederach's (1997, 1999, 2005) theories of conflict transformation, and Brown's (2015a) approach on transformative vulnerability.

Such an approach has wide scope for application in both theory and practice, from consultations on water sharing arrangements and policy, like those seen in the Murray-Darling/Barka, peacebuilding for a such as a Yemeni National Dialogue, the methodology of humanitarian assistance delivery, or analysis of water scarcity conflict. In each such application, opportunity exists for fostering continual transformation and improvement of water sharing arrangements, centred on strengthened relationships between grassroots water sharers, middle-influencers, and high-level decision-makers.

7.5   Chapter conclusions

Building on participants' lived experience of water scarcity conflict presented in Chapters 4-6, this chapter has synthesised the research data alongside relevant theory.

The chapter first argued that critical human water needs are social in nature as well as physiological, including needs for participation, recognition, and security. The criticality of water needs includes differentiating between first and highest priorities, since access to water for a given purpose may require facilitative prerequisite water, such as conveyance. Such prioritisation includes consideration of time and urgency, whereby the satisfaction of immediate needs must be balanced with forecasted future needs. These considerations represent a move away from needs frameworks that are instantaneous and hierarchical, towards simultaneous entertainment of multiple priorities.

The importance of water sharing with justice was then unpacked. Disparity between what water sharers expected from water sharing agreements and what those arrangements delivered in practice was seen to give rise to feelings of injustice. Sometimes this was made explicit by participants, while in other instances injustice was expressed in the language of rights. Further unpacking of participant accounts identified that water rights were primarily presented in defence of needs, which is consistent with development of the human right to water but not necessarily reflected in water sharing arrangements.

Strong social relationships were then argued to be central to constructive responses water scarcity conflict. Addressing conflict between basin stakeholders through a process of transforming relationships for the satisfaction of social as well as physiological water needs was found to play a central role in navigating water scarcity constructively. Trust was demonstrated to be an essential factor for coping with the immense stresses of water scarcity, with a significant part of trust-building seen to be the accessible communication of water sharing information. The transformation of water stakeholder relationships and resilience to water scarcity were replete with paradox, but a focus on balancing basin simplicity and complexity was argued to hold significant potential for improved water sharing.

Lastly, the chapter discussed concepts of resilience, presenting concepts of coping, adaptation, and agency. Building on the emergent research data, a focus on adaptive resilience was found to be burdensome on water sharers who may not have equal adaptive capacities. This both reveals and undercuts the very nature of resilience as a social endeavour, in which strength, healing, and capacity to cope is found in relationships. Instead, resilience may be better approached by viewing basin stakeholders as agential, rather than helpless. Approaching water sharing arrangements with an emphasis on enabling reflexive stakeholder engagement encourages proactive communication of water sharing information, which is itself fosters constructive responses to water scarcity conflict.

8 Opportunities to transform water scarcity conflict

8.1 Chapter introduction

This chapter, the final in this thesis, offers the conclusions to the study. These are put forward as they relate to the advancement of theory, opportunities for policy improvements, and the practice of sharing scarce waters.

The first conclusion, presented in Section 8.2, discusses the nature of water needs not only as physiological but as social, and accordingly offers a reconceptualisation of what constitutes critical human water needs.

Section 8.3 then presents an opportunity to reframe hydro-hegemony as an important consideration for the satisfaction of water needs, rather than it being the central focus of water sharing arrangements. Doing so creates space for transformative approaches to conflict that duly consider but are not contingent on power-asymmetric negotiation for conflict resolution.

Building on this, Section 8.4 then addresses the essentiality of constructive social relationships to water sharing arrangements, considering their pivotal role in needs satisfaction and adaptive resilience to water variability and disaster.

Section 8.5 then discusses water scarcity resilience beyond adaptation, summarising the benefits and risks of viewing resilience first as adaptation and then as agency, with an accompanying recommendation that constructive engagement with paradox and complexity in water sharing arrangements offers potential for constructive navigation of conflict in the face of water scarcity.

Section 8.6 discusses potential avenues for further research, as a result of both the limitations in scope of this study and new questions that emerged over the course of this research.

Lastly, Section 8.7 concludes the thesis, collating the overall implications for hydropolitics-based policy and practice, and the contribution of PACS theories and concepts to understandings of water scarcity conflict. The section reflects on how the research question was answered, and summarises the thesis argument.

8.2   Addressing critical human water needs

This thesis has argued that the conceptualisation of critical human water needs as social necessities for human wellbeing offers a useful way to understand and address human interactions over water scarcity in the pursuit of peaceful water-sharing outcomes.

The terminology of needs is laden with assumptions owing to different models and takes on the concept, and thus warrants careful communication. Recognising that different needs theories use different descriptive terms, the core concept of critical human water needs is the consideration of non-negotiable, inescapable human requirements for water. Proposing a significant expansion of how water needs are understood and employed in both theory and practice, this study has argued that critical human water needs go beyond physiological requirements to include water necessary for human wellbeing, not just survival. Practically, this study showed that the failure to satisfy human water needs resulting from natural and/or human-induced water scarcity becomes problematic long before people are thirsty. Water scarcity has profound negative impacts on livelihoods, social cohesion, and mental health, which this thesis has argued should be considered of critical importance alongside physiological water needs.

While Yemeni and First Nations Australians discussed ontological water needs most overtly, the 'water is life' (or similar) motif nonetheless emerged in discussions of needs among participants beyond these identities, including irrigators, graziers, and environmentalists in the Murray-Darling/Barka. The fundamentality of water not just to physiological survival but to wellbeing and social coherence presented as a powerful interest for many water sharers, and in some instances functioned as a unifying commonality between otherwise adversarial identity groups. Several participants reported a degree of fluidity across commonly depicted lines of allegiance including politics, industry, hydro-geography, water functionality and culture, with even deeply rooted identities evolving or in some instances breaking down amid the desperation of water scarcity. Such fluidity among water sharer identities supports the notion that interests and values may vary across time, in order to satisfy needs. This holds significant implications for the negotiation of water sharing agreements which are constructed around water sharer identity groups outwardly presented as opposing or fixed.

The frustration of social critical human water needs for identity, recognition, participation and security as well as physiological requirements represents a helpful way to understand and analyse the sources of water scarcity conflict. Social water needs are not scarce in the absolute sense, which opens the door for satisfying basic human water needs by means beyond the material distribution

of water. So too, the satisfaction of basic human water needs for all water sharers can be thought of as the primary goal of cooperation in the face of water scarcity. This offers an approach to water conflict resolution that acknowledges the role of power-asymmetries but does not hold it as the central focus in addressing conflict.

Clear messaging in water allocation priorities is imperative. The basin contexts demonstrated a difference between highest priority water needs, which refers to importance, and first priority water needs, which is a matter of sequence. These are quite different concepts, yet very easily confused, and in contexts of water scarcity conflict, communication that informs understandings of these concepts can calm or exacerbate tensions. At the time of writing, even the website of the MDBA claims that 'The highest priority water in the River Murray System is conveyance water'. But this does not accurately reflect the underpinning legislation, which instead states that critical human water needs are the highest priority while the first priority is conveyance water. The former puts forward the goal; the latter is an enabler of that goal. While this may seem like splitting hairs, the difference is impactful because of what it communicates to water sharers about the importance of their concerns. It can be the difference between communicating that "your needs are important, and they will be attended to through a necessary sequence of events"; or giving the impression that "someone or something else's needs are more important than yours".

8.3   Reframing hydro-hegemony for needs satisfaction

This thesis proposes that TWI would be well served by avoiding using the term 'conflict' to describe an escalation from dispute into violence. Instead, conflict may be better understood as a clashing of values, and an inevitable part of life that can be responded to in either constructive or destructive ways. Such a framing would iron out a problematic inconsistency in TWI theory, by supporting the established hydropolitical view that conflict is neither inherently positive nor negative. Decoupling assumptions of determinism between conflict and violence in response to water scarcity enables deeper engagement with conflict as neither positive nor negative, but as a phenomenon that can be responded to constructively or destructively.

This holds implications for current understandings of TWI. The TWINS model, being built on the WEIS and CIF metrics for measuring water conflict, currently employs 'conflict intensity' and 'cooperation intensity' on its axes. This model may be further developed by reframing these concepts in terms of 'power over' and 'power with'. This proposed change was not a core focus of this study and as such warrants further exploration. However, the data emergent from this study

has sparked a critique of the intensity scales and points to the possible value of reframing the TWINS model as a map of power interactions, rather than attempting to measure conflict intensity which is better understood as a phenomenon than a metric. This would serve to both decouple the assumed causality between conflict and violence, and open space for the analysis and incorporation of values and perspective in addressing water scarcity conflict.

While BHN frameworks and power asymmetry have been the subject of mutual critique, this thesis argues that this is mostly a theoretical exercise, and in practice the two may play out simultaneously. Hydro-hegemony should be viewed as an important consideration in water-sharing arrangements, but not as central where it can mask other important elements of conflict such as the frustration of basic human water needs. From a BHN standpoint, power-over reflected as power asymmetry between water stakeholders can be understood as ineffective in the long-term, as it will always generate resistance.

The basin studies illuminated that commonly referenced upstream/downstream hydro-hegemonic dynamics can change when values are analysed in addition to material distribution of water. The interplay of national identity and material distribution in downstream areas of the Murray-Darling/Barka was one such demonstration, as was the emphasis placed on spirituality and responsibility in groundwater management in Jibal as-Sarawat.

The implications of this reframing for policy and practice are significant. Decentring power as dominance necessitates a proportionate shift from binaries and endpoints towards paradox and tension in water sharing arrangements. For policy makers (and, crucially, policy communicators), water sharing agreements like the Murray-Darling Basin Plan, or relevant aspects of Yemeni peace negotiations, should be process-orientated rather than goal-orientated. This may mean acknowledging that conditions as well as community expectations are not fixed, but rather will change over time. Water sharing agreements should aim to offer water sharers predictability, but not necessarily rigidity. Building in clear, iterative review periods, for instance, can help water sharers know what to expect from a governance framework and for how long, thereby facilitating a sense of water security based on the opportunity to make informed decisions along with foreseeable further consultation and refinement, rather than locking in static systems that do not meet water sharers' changing needs.

8.4   The essentiality of water-sharing relationships

With critical human water needs reframed as social in nature as well as physiological, constructive relationships between water basin stakeholders are of crucial importance for addressing arising water scarcity conflict. Participants in this study showed strong awareness of the breakdown of social relationships and the need to transform them, though possible pathways forward were less clear to them.

Social identities were seen in multiple instances as offering perceived safety from water scarcity. Social groups among water stakeholders were commonly formed around political persuasions, industries and professions, hydro-geographical locations or cultural similarities, dividing communities along these identity lines. Some basin stakeholders – particularly high-level decision makers – invoked unifying, such as nationalism or a uniting culture to advocate for homogeneity or simplicity in water sharing arrangements, yet at the grassroots this inclination was only seen among Australian riparians or urban water sharers in Yemen, who generally held less hydro-hegemonic power. Thus, a common identity between water sharers seemed to be seen more as a bargaining tool than a genuine reflection of a social reality. Interrogating the research data through the theoretical lenses of BHN and CPR sharing, hydro-geographical distinction was seen to be important for building trust between water sharers and governing institutions. With the basin contexts studied both having large internal variations in climate, associated industry, and culture, and as such a broad one-size-fits-all approach gave rise to accusations of inaccuracy and subsequent mistrust.

Both trust and distrust emerged as pivotal to certainty in water sharing arrangements, and by extension to individual and social wellbeing. With certainty considered a key element of coping with stress, trust was also seen to affect confidence in institutional competence, the reliability of those institutions to deliver essential services, and the credibility of other water sharers for mutual consideration of water needs. In this sense, the functionality of water sharing systems was seen to hinge on trust between water stakeholders, and efforts to improve trust were frequently presented as holding significant potential for relationship and conflict transformation among water stakeholders.

The two basin contexts demonstrated implications of this, even at a hydro-geographical level. That the Murray-Darling/Barka basin is immense in area means that, even despite unifying identities such as nationalism, many water sharers within the basin would rarely interact, or have the opportunity to mutually build understandings of and empathy with each other's cultures,

industries, perspectives, and needs. In Jibal as-Sarawat, even without the intense divisions of war, the relative invisibility of groundwater and the effects of its extraction make accountability, including the necessary relationships that underpin it, difficult. Hydro-geographical distance is a common feature of many shared basins, suggesting that the difficulty of fostering relationships between water sharers that emerged from this study could be a challenge to be addressed in other basin contexts as well.

The psychological distance between water sharers that comes with hydro-geographical distance can also make the attribution of blame easier. Though attribution of blame 'gives a semblance of control' it 'has an inverse relationship with accountability', which is relational and an inherently vulnerable process that takes courage and time (B. Brown, 2015c). If water sharers value two-way accountability as a component of water sharing arrangements and/or water justice initiatives, policy makers and practitioners in water sharing can benefit from increased focus on strengthening genuine, mutual listening, learning, and sharing.

The quality of social relationships represents a common thread that ties together key themes and theories referenced throughout this thesis, including TWI, critical human water needs, conflict transformation, water sharing with justice and resilience.

8.5   Water scarcity resilience beyond adaptation

Owing largely to its conceptual roots in hazard reduction and amplified by theoretical and policy discourses dominated by quantitative metrics, resilience in the face of water scarcity is commonly framed in terms of adaptation to prevailing stressors. However, a focus on the adaptive capacity of water sharers without accompanying critique of structural inequities that create or perpetuate adversity may place unfair expectations on water sharers to adapt to prevailing scarcity despite unequal capacities to do so. This implication manifested in the study in several ways, such as economic disparity, inequitable access to water sharing information, and lack of representation in water sharing agreement formation and governance. Inequalities discussed in this study included economic disparity, inequitable access to water sharing information, and discrimination on gender, racial, and ability grounds, including unconscious bias. Relatedly, a focus on personal capacity to adapt to water scarcity risks implying that resilience is an individual endeavour, trait, or outcome, lacking acknowledgement that the capacity to overcome the water scarcity adversity is itself reliant on the strength of social relationships.

This study highlighted an important effect of water scarcity on psycho-social wellbeing. Significant experiences of stress and anxiety, particularly associated with uncertainty and social breakdown amid water scarcity, were prevalent across participants from both the Murray-Darling/Barka and Jibal as-Sarawat. The descriptions of distress offered by participants demonstrated a profound impact on health and wellbeing that is not effectively addressed by a water policy platform that focuses primarily on material distribution without attention to social cohesion. This policy focus is followed despite the internationally-recognised 'inextricable' link between water and mental health (UNHRC, 2010).

An alternative approach to coping with the immense stress of water scarcity can be through an approach to resilience which prioritises equitable empowerment, strong social connections and community support, and a recognition that adversity draws on personal and communal resources that are not limitless.

Another view of resilience is as resistance. In this approach, which encourages agency, resilience as resistance invites a critical questioning of why water sharing arrangements are as they are. This in turn allows for continual appraisal and addressing of the psychological, social, cultural, and physical resources which sustain human wellbeing. Finally, the study has illuminated the potential trap of 'resilience identity', in which water sharers had found social solidarity and security in a disingenuous outward presentation of toughness in the face of hardship. In sum, rather than something to be avoided or engineered away, vulnerability to water scarcity should be acknowledged and confronted as an enabler of reflexive, agentic response. In this way, policy and practice in water sharing arrangements that emphasise acknowledging vulnerability as challenge rather than weakness can help to address critical, social human water needs that may perpetuate conflict if left unsatisfied.

Though frequently assumed to be a function of self-interest and greed, the inequitable satisfaction of critical human water needs in the two basin contexts explored by the thesis was often seen to arise through ignorance, whereby the addressing of critical water needs for some basin stakeholders came at the expense of others'. In this way, vulnerability to water scarcity was frequently seen to be merely transferred from one water stakeholder to another, rather than addressed for all water sharers.

8.6   Further research opportunities

Considering this project's wide scope, several themes emerged that were beyond the reach of this research yet raised interesting questions and potential opportunities for further engagement and research.

There is further scope to investigate the interplay of BHN and hydro-hegemonic framings of water scarcity conflict. If prior assumptions of causality between conflict and violence are discarded, violence is instead revealed as a tool of power. In this way, the use of violence may be seen as a tool that is used to secure the human water needs of a given entity at the expense of another's.

With implications for both theory and practice, further research may be warranted investigating the nature of avoidant coping mechanisms in the face of water scarcity. This topic fell beyond the scope of this research, requiring a level of psychological expertise not readily accessible to the project. However, the apparent use of passive mechanisms to cope with the stresses of water scarcity emergent in this study may hold insights for TWI, since current representations – such as the TWINS – only account for active engagement towards cooperation, and as such is unlikely to recognise passive coping.

As detailed in Chapter 3 (Sections 3.3 and 3.4), participants were recruited for this study with consideration of their societal influence. While this approach is helpful for understanding existing social structures, it likewise risks perpetuating inequitable norms embedded in those structures. Further research using an alternative sampling approach may capture different demographics, and with them new perspectives and insights. A participant sample that amplifies the voices of underrepresented groups in society, for example, may offer deeper understanding of privilege and barriers to participation in water sharing arrangements.

8.7   Conclusion

This study examined the lived experience of 35 people facing situations of water scarcity in their day-to-day lives. In doing so, the study sought to deepen understandings of how people view and respond to water scarcity conflict to gain grounded insights into how it may be addressed constructively.

The primary research question steering the research was: How is conflict relating to water scarcity understood and responded to by people who experience it first-hand, and what are their perceived barriers to and opportunities for fair and peaceful water sharing arrangements?

To answer this question, participants were recruited across two water-scarce but culturally and politically different contexts. Seventeen of the participants were associated with the Murray-Darling/Barka Basin in Australia, with 18 from Jibal as-Sarawat in Yemen. Within each context, participants were purposively selected with reference to Lederach's (1997) peacebuilding pyramid that distinguishes between three levels of social influence in protracted conflict.

Using semi-structured interviews, participants were asked the same set of questions (with minor contextual adaptation), enquiring into their relationships with water, the nature of social interactions during times of water scarcity, and perceived difficulties and opportunities for addressing conflict constructively. IPA was used to code participant perspectives into subordinate and subsequently superordinate themes, which allowed for comparison between top decision-makers, mid-level community leaders and grassroots water sharers across divergent hydrological, cultural, and political contexts in order to make sense of their relationships to water and emergent conflict in the face of water scarcity, as well as barriers to and opportunities for fair and peaceful water sharing.

Through an interdisciplinary lens of hydropolitics and PACS, participant perspectives were then analysed in relation to existing literature to identify areas of synthesis and disparity between theory and lived experience. The research found that, even though all participants conceived of water requirements that were essential for life, perspectives as to what those critical needs were differed significantly across hydro-geographical context, but also along other lines of division including industry, politics and ideology, perceptions of water functionality, culture, and time.

In contrast to common presentations of critical human water needs that focus on physiological survival requirements, only one study participant expressly prioritised physiological water needs over other water needs. All other participants discussed water's essentiality for life in terms of needs beyond mere survival, including for the construction and ongoing understanding of personal and social identity; recognition and participation in social institutions, including the design of water sharing arrangements but also more generally; and security found not just in physical access to water itself, but in connection with community and culture.

Accordingly, the study demonstrated that water scarcity conflict can wear down community resilience long before physiological needs arise, with devastating effects on mental health and social cohesion. Uncertainty, not just in climate variability but also in basin policy environments, was seen to be a frequent source of angst for water sharers. Challenges in communication of basin information gave rise to deep mistrust, othering and perceptions of nefarious intent among stakeholders.

At the same time, the research found that opportunities to transform water scarcity conflict lie in the strengthening of social relationships between water stakeholders. Approaches to water sharing arrangements that promote the building of trust, emphasise justice, and foster equitable, agential resilience represent avenues to address the social critical human water needs of all water sharers. However, approaches to resilience that do not account for structural inequities that cause or perpetuate adversity among water sharers can lead to destructive short-term water scarcity adaptation that shifts the burden of water scarcity from one stakeholder to another, rather than addressing the water needs of all water sharers. This represents an ongoing process which is costly and replete with paradox. But rather than avoiding the unknown or oversimplifying complex basin systems, acknowledging such vulnerabilities brings opportunity to genuinely engage with social critical human water needs and address water scarcity conflict beyond questions of supply and demand.

The study findings carry significant implications for hydropolitical theory. Where transboundary water interactions have been previously framed in variables of conflict and cooperation intensity, this thesis has argued that conflict is better understood as a neutral phenomenon than a metric. Responses to conflict are subsequently illuminated as optional, which introduces a greater ethical imperative to framings of TWI. This role of power in TWI is not dismissed, but rather acknowledged and reframed as an ability to either frustrate or satisfy critical human water needs.

In practice, water *is* life. This everyday mantra, so obvious in its basic truth to so many people, can serve to motivate and spark a uniting empathy among water sharers. So too, the strengthening of social relationships fostered through this simplicity can open space for creative engagement with the complex physical and social realities of climate variability, basin hydraulics, painful histories, and community wellbeing.

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Appendix A: Human Research Ethics Committee endorsement

Figure A.1 below shows the research ethics approval document.

Figure A.1: HREC approval

THE UNIVERSITY OF
SYDNEY

Research Integrity & Ethics Administration
Human Research Ethics Committee

Wednesday, 20 December 2017

Dr Wendy Lambourne
Peace & Conflict; Faculty of Arts and Social Sciences

wendy.lambourne@sydney.edu.au

Dear Wendy,

The University of Sydney Human Research Ethics Committee (HREC) has considered your application. After consideration of your response to the comments raised your project has been approved.

Approval is granted for a period of four years from **20/12/2017** to **20/12/2021**.

Project title:	**Water in divided societies: water scarcity, conflict & the community experience**
Project no.:	2017/922
First Annual Report due:	20/12/2018
Authorised Personnel:	**Lambourne Wendy; Mayroz Eyal; McArdle Peter;**

Documents Approved:

Date Uploaded	Version number	Document Name
20/12/2017	Version 3.1	PIS Australia v3.1
20/12/2017	Version 3.2	PIS Yemeni v3.2
17/12/2017	Version 3.1	Invitation letter - Yemeni community members
17/12/2017	Version 3.2	Invitation letter - Yemeni specific position holders
17/12/2017	Version 2.3	Invitation letter - Australian community members
17/12/2017	Version 2.4	Invitation letter - Australian specific position holders
30/10/2017	Version 1	Interview Schedule, annotated
29/10/2017	Version 1	Fieldwork Safety Protocol
29/10/2017	Version 1	Recruitment letter for community members
29/10/2017	Version 1	Recruitment email
29/10/2017	Version 1	Recruitment letter for specific participants
29/10/2017	Version 1	Participant Consent Form

Special Condition/s of Approval

- As per sections 4.8.16 and 5.6 of the National Statement, a local, readily accessible contact should be made available to participants in the event that they have complaints about the research project. This complaints contact should be independent of the research team. As a condition of any approval, please include details of the contact person on the Participant Information Statement.

- It is a condition of approval that certified translations of the public documents (e.g. Participant Information Statement, Participant Consent Form, Survey) are provided in IRMA before being used for recruitment.

Condition/s of Approval

- Research must be conducted according to the approved proposal.
- An annual progress report must be submitted to the Ethics Office on or before the anniversary of approval and on completion of the project.
- You must report as soon as practicable anything that might warrant review of ethical approval of the project including:
  - Serious or unexpected adverse events (which should be reported within 72 hours).
  - Unforeseen events that might affect continued ethical acceptability of the project.
- Any changes to the proposal must be approved prior to their implementation (except where an amendment is undertaken to eliminate *immediate* risk to participants).
- Personnel working on this project must be sufficiently qualified by education, training and experience for their role, or adequately supervised. Changes to personnel must be reported and approved.
- Personnel must disclose any actual or potential conflicts of interest, including any financial or other interest or affiliation, as relevant to this project.
- Data and primary materials must be retained and stored in accordance with the relevant legislation and University guidelines.
- Ethics approval is dependent upon ongoing compliance of the research with the *National Statement on Ethical Conduct in Human Research*, the *Australian Code for the Responsible Conduct of Research*, applicable legal requirements, and with University policies, procedures and governance requirements.
- The Ethics Office may conduct audits on approved projects.
- The Chief Investigator has ultimate responsibility for the conduct of the research and is responsible for ensuring all others involved will conduct the research in accordance with the above.

This letter constitutes ethical approval only.

Please contact the Ethics Office should you require further information or clarification.

Sincerely,
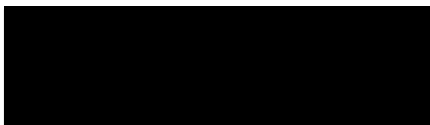
Associate Professor Stephen Assinder
Chair, Human Research Ethics Committee (HREC 1)

Appendix B: Interview documents

The following figures are copies of interview documents approved by the HREC:

- Figure B.1 shows the annotated interview schedule.
- Figure B.2 and B.3 show the participant information statement, in English and Arabic respectively.
- Figure B.4 and B.5 show the participant consent form, in English and Arabic respectively.

Figure B.1: Annotated interview schedule

THE UNIVERSITY OF SYDNEY

Department of Peace and Conflict Studies

ABN 15211513464

Mackie Building K01
University of Sydney
NSW 2006 Australia

Telephone   +61 2 9036 9286
Facsimile   +61 2 9660 0862
wendy.lambourne@sydney.edu.au
http://sydney.edu.au/arts/peace_conflict

Dr Wendy Lambourne, Senior Lecturer

Interview Schedule

Water in Divided Societies: The Community Experience of Water Conflict

Questions

1. Can you tell me a little about yourself? Your background (such as where you're from, your vocation, your education)?

   - *Allows the participant to introduce themselves; establishes some basic background and relevant demographic data about each participant to assist with analysing the context of their responses.*

2. Can you describe your relationship with water? In what ways is water part of your life or work?

   - *Establishes how the participant sees themselves fitting and interacting within their water context. Aims to identify self-viewed roles, values, needs and/or engagement.*

3. How are you affected when water is scarce? Do you see the way you are affected as similar to or different from that of other people?

   - *Firstly, this question establishes the manner in which the participant sees the effect of water scarcity on themselves and their environment. Secondly, considering that quantitative transboundary water interaction literature indicates that, in the majority of cases, people tend towards cooperation rather than violence around water scarcity: this question aims to enquire as to the extent of the participant's empathy or self interest in such interactions.*

4. What particular challenges do you experience as a result of water scarcity?

   - *In relation to Basic Human Needs conflict resolution theory, this question aims to draw out what (if any) human needs the participant may feel are not being met currently in relation to water.*

5. Who or what determines how water is managed, in your experience? Are you content with this? If no, how do you think water could be better managed?

   - *Aims to see how the participant sees their ability to exert control over their circumstances in regard to water scarcity, and where — in their own view — they sit in the social water management structure. It then brings the question back to Basic Human Needs theory in enquiring as to how their situation could be improved. This is particularly important for participants coming from lower social hierarchy positions who may feel they have limited control over their circumstances.*

6. How do people tend to interact when more than one party rely on the same scarce water resource?

- *This relates to contemporary frameworks for analysing conflict over water resources. The question seeks to gauge how the participant views the cooperative environment in which conflict over water takes place, so the researcher can relate it to those frameworks.*

7. Does water scarcity contribute to disputes or conflict, in your experience? If so, how?

   - *Enquires as to the extent to which the participant feels that water scarcity is a contributing factor to conflict. Important in itself to further explore the level of cooperation in dealing with water scarcity, according to the participant, and also opens the discussion to the possibility that water scarcity may not be seen as the the cause of conflict. Note that the question seeks perspectives, not facts or 'truths'.*

8. What do you think are some of the most important elements and factors for fair and peaceful management of scarce water resources?

   - *This question seeks to ascertain the participant's view of their own needs, and also how they see fairness in the broader community sense. The question also raises the concept of peace, and particularly the participant's view of what peace means. On the basis of peace and conflict studies literature, what people view as peaceful will likely vary widely which is highly relevant for questioning regarding barriers and means to peaceful outcomes.*

9. What is your experience of rules or laws that affect the use and management of water? How relevant or important are these kinds of rules to you? In what ways are they helpful or unhelpful?

   - *Considering contemporary water conflict resolution discourse which has a heavy emphasis on inter-state relations and regulation, this question seeks to ascertain how people relate to those laws, and particularly whether such state-based regulation addresses people's needs, in their experience.*

10. What do you see as the main impediments for fair and peaceful sharing of water resources?

    - *Directly addresses the element of the research question that asks what barriers exist to peaceful outcomes in relation to water conflict.*

11. What do you think would be important for fair and peaceful water management in the future?

    - *Building on the previous question, this question takes a more solution-orientated approach to Basic Human Needs, in enquiring how needs may be fulfilled.*

12. Is there anything else you would like to say about water scarcity?

    - *An opportunity for the participant to speak about anything that may not have otherwise come up in the interview in relation to the research topic.*

13. Do you have any questions for me?

Figure B.2: Participant information statement – English

THE UNIVERSITY OF SYDNEY

Department of Peace and Conflict Studies

ABN 15211513464

Mackie Building K01
University of Sydney
NSW 2006 Australia

Telephone   +61 2 9036 9286
Facsimile   +61 2 9660 0862
wendy.lambourne@sydney.edu.au
http://sydney.edu.au/arts/peace_conflict

Dr Wendy Lambourne, Senior Lecturer

Participant Information Statement

Water in Divided Societies: The Community Experience of Water Conflict

Australia Case Study

(1) What is the research about?

You are invited to take part in a research study about differing perspectives and competing interests of various communities facing scarcity of water resources. The purpose of this research is to better grasp the nature of personal and community experiences, contributing to a deeper understanding of how contentious issues regarding scarce water might be peacefully addressed.

You have been invited to participate in this study because you have experienced a situation where there are differing perspectives on or approaches to scarce water resources. This Participant Information Statement tells you about the research study, and knowing what is involved will help you decide if you want to take part. Please read this sheet carefully and ask questions about anything that you don't understand or want to know more about.

Participation in this research study is voluntary.

By giving consent to take part in this study you are telling us that you:

✓ Understand what you have read.
✓ Agree to take part in the research study as outlined below.
✓ Agree to the use of your personal information as described.

You will be given a copy of this Participant Information Statement to keep.

(2) Who is carrying out the research?
The research is being conducted by Peter McArdle, PhD student in the Department of Peace and Conflict Studies, University of Sydney, and his PhD supervisor, Dr Wendy Lambourne, Senior Lecturer, Department of Peace and Conflict Studies, University of Sydney. The research is funded by a scholarship and grant from the University of Sydney, with an additional financial grant from Rotary International.

(3) What does the research involve for me?
The research will enquire about your personal experience of conflict relating to scarce water resources. With this information, the study will look at how your perceptions and experiences compare with those of others and how the conflict is more broadly understood.

Your participation will be in the form of an interview, in which you will be asked questions about what you think and what you have experienced regarding conflict over scarce water resources. The interview location will be chosen to ensure privacy and the confidentiality of your participation. With your permission, the interview will be audio recorded.

Participant Information Sheet: Australia Case Study – Revision 5.1   Page 1 of 3

(4) How much of my time will the study take?
The time allocated for completing an interview will be approximately 1 hour.

(5) Do I have to be in the study? Can I withdraw from the study once I've started?
Participating in this study is completely voluntary and you do not have to take part. Your decision whether to participate will not affect your current or future relationship with the researcher or anyone else at the University of Sydney.

We can discuss any concerns or questions you may have about the research at any time during the process. If you decide to take part in the study and then change your mind later, you are free to withdraw at any time. You can do this by indicating to the researcher at any time that you would like to stop the interview. It is no problem if you decide to withdraw from the study. Unless you say that you want them to be kept, any recordings will be erased and the information you have provided will not be included in the study results. You may also refuse to answer any questions that you do not wish to answer during the interview.

(6) Are there any risks or costs associated with being in this study?
We do not expect that there will be any risks or costs associated with taking part in this study other than taking up your time.

(7) Are there any benefits associated with being in this study?
The research may directly or indirectly benefit you in that it is aimed at improving understandings of conflict, and how the needs of people experiencing it may be addressed.

(8) What will happen to information about me that is collected during the study?
By providing your consent, you are agreeing to the researcher collecting personal information about you for the purposes of this research study. Your information will only be used for the purposes outlined in this Participant Information Statement, unless you consent otherwise.

Unless you agree to your name being used, the information that you provide will be strictly confidential, and afterwards only the researcher will have access to the answers you provide during the interview or focus group discussion. The interview may be recorded with your permission. The interview recording and transcript will not have your name or any other identifying information on it, and your answers to my questions will be used anonymously in any reports or publications arising from the research, unless you agree to your name being used.

The interview recordings and transcribed information will be stored securely during and after the collection of information. The information about you and what you said in the interview will only be disclosed with your permission, except as may be required by law.

(9) Can I tell other people about the research study?
Yes, you are welcome to tell other people about the research study, but not to reveal the identity of any other participants in case they have requested confidentiality.

(10) What if I would like further information about the study?
When you have read this information, the researcher, Peter McArdle will be available to discuss it with you further and answer any questions you may have. If you would like to know more at any stage during the study, please feel free to contact Peter McArdle by telephone or WhatsApp on +61 438 851124 or via email at pmca5084@uni.sydney.edu.au .

(11) Will I be told the results of the study?
You have a right to receive feedback about the overall results of the study. You can tell Peter McArdle if you wish to receive feedback by ticking the relevant box on the consent form. This feedback will be in the form of a summary report to key stakeholders which you will receive after the study is finished and the results have been analysed. You will be welcome to discuss the results further with the researcher after you receive it.

(12) What if I have a complaint or any concerns about the study?
Research involving humans in Australia is reviewed by an independent group of people called a Human Research Ethics Committee (HREC). The ethical aspects of this study have been approved by the HREC of the University of Sydney *Protocol No. 2017/922*. As part of this process, this study has been carried out according to the *National Statement on Ethical Conduct in Human Research (2007)*. This statement has been developed to protect people who agree to take part in research studies.

If you are concerned about the way this study is being conducted or you wish to make a complaint to someone independent from the study, please contact the University using the details outlined below. Please quote the study title and protocol number.

The Manager, Ethics Administration, University of Sydney:
- **Telephone:** +61 (0) 2 8627 8176
- **Email:** human.ethics@sydney.edu.au
- **Fax:** +61 (0) 2 8627 8177

Alternatively, you can contact the following local person who is not involved in the study if you have any concerns or complaints about the research and the way it has been conducted:
- **Name:** Dr Miriam Williams
- **Telephone:** +61 (0) 2 98502153
- **Email:** miriam.williams@mq.edu.au

This information sheet is for you

Figure B.3: Participant information statement - Arabic

THE UNIVERSITY OF
SYDNEY

قسم دراسات السلام والنزاعات

ABN 15211513464	Mackie Building K01 University of Sydney NSW 2006 Australia	Telephone +61 2 9036 9286 Facsimile +61 2 9660 0862 wendy.lambourne@sydney.edu.au http://sydney.edu.au/arts/peace_conflict

الدكتور وندي لامبورن، أستاذة محاضرة أساسية

ورقة معلومات المشارك

المياه في المجتمعات المقسَّمة: التجربة المجتمعية للنزاع على المياه
دراسة حالة اليمن

(1) ما هو موضوع البحث؟

أنت مدعوّ للمشاركة في دراسة بحثية عن تجارب الناس في حالات النزاع على الموارد المائية الشحيحة. و"النزاع" في هذه الحالة يعني بكلّ بساطة حالة تتنافس فيها مصالح الناس في ما يتعلَّق بالموارد المائية وكيفية إدارتها. ويسعى هذا البحث إلى الاستماع إلى آراء أشخاص مختلفين في المجتمع المحلي ممّن يعانون نزاعًا متعلِّقًا بالموارد المائية الشحيحة من أجل تحقيق فهم أفضل لطبيعة تجربتهم وكيفية معالجة النزاع بطريقة سلمية.

لقد دعيتَ للمشاركة في هذه الدراسة لأنك خبرت حالة فيها نوع من النزاع على موارد مائية شحيحة. ومن شأن ورقة المعلومات هذه أن تطلعك على الدراسة البحثية. فاطّلاعك على ما تتضمّنه هذه الدراسة سيساعدك على اتّخاذ القرار بشأن مشاركتك أم عدمها. الرجاء قراءة هذه الورقة بعناية وطرح أيّ أسئلة عن أيّ أمر لا تفهمه أو تودّ أن تعرف المزيد عنه.

المشاركة في هذه الدراسة البحثية طوعيّة:

بالموافقة على المشاركة في هذه الدراسة تؤكّد أنّك:

✓ فهمت ما قرأت؛

✓ توافق على المشاركة في الدراسة البحثية كما هو وارد أدناه؛

✓ توافق على أن تُستخدَم معلوماتك الشخصية كما هو مفصّل.

سوف تحصل على نسخة من ورقة معلومات المشارك هذه لتحتفظ بها.

ورقة معلومات المشارك: دراسة حالة اليمن – مراجعة 3.2

(2) مَن يقوم بالبحث؟

يجري البحث بيتر مكاردل وهو طالب دكتوراه في قسم دراسات السلام والنزاعات في جامعة سيدني، والمشرف على أطروحته هي الدكتور وندي لامبورن، وهي محاضرة أساسية في قسم دراسات السلام والنزاعات في جامعة سيدني. ويحظى البحث بتمويل وهبة من جامعة سيدني، مع هبة إضافية من روتاري الدولية.

(3) ماذا يفترض البحث من جانبي؟

سيتقصّى البحث عن تجربتك الخاصة في النزاعات في ما يتعلق بالموارد المائية الشحيحة. ويفضل هذه المعلومات، سوف تنظر الدراسة في مدى تشابه مفاهيمك وتجاربك مع مفاهيم الآخرين وتجاربهم وكيف يفهَم النزاع بشكل أوسع.

وتتّخذ مشاركتك شكل مقابلة تجري بالهاتف، أو بواسطة سكايب، أو تطبيق الواتساب أو أيّ منصّة أخرى من اختيارك. يتّصل الشخص الذي يجري المقابلة من الأردن ويطرح عليك أسئلة حول رأيك وتجربتك في ما يتعلّق بالنزاعات على الموارد المائية الشحيحة. ويمكنك أن تختار المكان الذي تريده لإجراء المقابلة. وبعد إذنك، سوف يتمّ تسجيل المقابلة. وسيحضر مترجم فوريّ إن اقتضت الحاجة لذلك، للحرص على أن تفهم الأسئلة كلّها وكذلك أهداف مشروع البحث وما تستلزمه مشاركتك، كما هو وارد في ورقة معلومات المشارك.

(4) كم ستستغرق الدراسة؟

الوقت المخصّص لإتمام المقابلة هو ساعة تقريبًا.

(5) هل يجب أن أكون ضمن الدراسة؟ هل يمكنني أن أنسحب من الدراسة بعد أن أكون قد بدأت بها؟

المشاركة في هذه الدراسة هي طوعية بالكامل ولست ملزمًا المشاركة فيها. ولن يؤثّر قرارك بالمشاركة أم عدمها على علاقتك المستقبلية بالباحث أو بأيّ شخص آخر في جامعة سيدني.

يمكننا أن نناقش أيّ مخاوف أو تساؤلات قد تراودك بالنسبة إلى البحث في أيّ وقت خلال العملية. وإذا قرّرت أن تشارك في الدراسة وغيّرت رأيك في وقت لاحق، يمكنك أن تنسحب في أيّ لحظة. ويمكنك أن تنسحب بمجرّد إبلاغ الباحث في أيّ وقت برغبتك في إيقاف المقابلة. وما من مشكلة إن أنت قرّرت الانسحاب من الدراسة. وسوف تمحى أيّ تسجيلات إلاّ إذا طلبت الاحتفاظ بها، ولن تتضمّن نتائج الدراسة المعلومات التي قدّمتها. كما أنّك يمكنك أن ترفض الإجابة عن أيّ أسئلة لا ترغب في الإجابة عنها خلال المقابلة.

ورقة معلومات المشارك: دراسة حالة اليمن — مراجعة 3.2

(6) هل يترتّب عن هذه الدراسة أيّ مخاطر أو تكاليف؟

لا نتوقّع ترتّب أيّ مخاطر أو تكاليف عن المشاركة في هذه الدراسة غير أخذ البعض من وقتك.

(7) هل من منافع متصلة بالمشاركة في هذه الدراسة؟

قد تفيدك الدراسة بشكل مباشر أو غير مباشر إذ تهدف إلى تحسين طريقة فهم النزاعات وكيفية معالجة حاجات الناس الذين يختبرونه.

(8) ماذا يحلّ بالمعلومات التي جمعت عنّي خلال الدراسة؟

بمنحك الموافقة، توافق على أن يقوم الباحث بجمع معلومات شخصية عنك لأغراض هذه الدراسة البحثية. ولن تستعمل معلوماتك إلاّ للأغراض المذكورة في ورقة معلومات المشارك هذه، إلاّ إذا وافقتَ على غير ذلك. ستبقى المعلومات التي تقدّمها سرّية إلاّ إذا وافقت على أن يستخدم اسمك، وبعد ذلك وحده الباحث يستطيع الاطّلاع على الأجوبة التي تقدّمها خلال المقابلة أو مناقشة مجموعة التركيز. وقد تسجّل المقابلة بعد موافقتك. ولن يحمل تسجيل المقابلة ونصّها اسمك أو أيّ معلومات أخرى تحدّد هويتك كما ستستعمل أجوبتك على أسئلتي بدون ذكر هويتك في أيّ من التقارير أو المنشورات الناشئة عن البحث إلاّ إذا وافقت على أن يستخدم اسمك.

تخزّن تسجيلات المقابلة والمعلومات المدوّنة المستخلصة منها بشكل آمن خلال عملية جمع المعلومات وبعدها. ولن يكشف عن المعلومات عنك وما قلتَه في المقابلة إلاّ بإذن منك، إلاّ إذا نصّ القانون على غير ذلك.

(9) هل يمكنني أن أخبر آخرين عن الدراسة البحثية؟

نعم، يمكنك أن تخبر آخرين عن الدراسة البحثية، ولكن لا تكشف عن هوية أيّ من المشاركين فيها في حال طلبوا السرّية.

(10) ماذا لو رغبت في مزيد من المعلومات عن الدراسة؟

بعد أن تطّلع على هذه المعلومات، سيكون الباحث بيتر ماكاردل على استعداد لمناقشتها معك والإجابة عن أيّ أسئلة. وإن اردت أن تعرف المزيد في أي مرحلة من مراحل الدراسة، لا تتردّد بالاتصال ببيتر ماكاردل بالهاتف أو بواسطة الواتساب على الرقم 851124 438 61+ أو بالبريد الإلكتروني على العنوان pmca5084@uni.sydney.edu.au.

(11) هل سوف يتمّ إطلاعي على نتائج الدراسة؟

ورقة معلومات المشارك: دراسة حالة اليمن – مراجعة 3.2

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يحقّ لك تلقّي معلومات عن النتائج الشاملة للدراسة. ويمكنك إبلاغ بيتر ماكاردل عن رغبتك في الحصول على معلومات بوضع إشارة في الخانة ذات الصلة في استمارة الموافقة. وتعطى هذه المعلومات بشكل تقرير ملخّص يوجّه إلى الأطراف المعنيين تتلقّاه بعد انتهاء الدراسة وتحليل النتائج. ويمكنك مناقشة النتائج أكثر مع الباحث بعد تلقّيك التقرير.

(12) ماذا لو كان لدي شكوى أو أيّ مخاوف عن الدراسة؟

تقوم مجموعة مستقلّة من الأشخاص تسمّى لجنة أخلاقيات الأبحاث على البشر (HREC) بمراجعة أي أبحاث تتعلق ببشر تجري في أستراليا. وقد نالت الجوانب الأخلاقية لهذه الدراسة موافقة لجنة الـ HREC من جامعة سيدني، البروتوكول رقم xxxx/xxx. وفي إطار هذه العملية، تمّت هذه الدراسة وفقًا *للبيان الوطني حول السلوك الأخلاقي في الأبحاث البشرية* (2007). وُضعت هذه الورقة لحماية الأشخاص الذين يوافقون على المشاركة في الدراسات البحثية.

وإذا راودتك مشاغل بشأن طريقة خوض هذه الدراسة أو ترغب في التقدّم بشكوى لدى شخص مستقلّ عن الدراسة، يرجى الاتصال بالجامعة حسب التفاصيل الواردة أدناه. ويرجى ذكر عنوان الدراسة ورقم البروتوكول.

المدير، إدارة الشؤون الأخلاقية، جامعة سيدني:

- **رقم الهاتف:** 8176 8627 2 61+
- **البريد الإلكتروني:** human.ethics@sydney.edu.au
- **الفاكس:** 8177 8627 2 61+

أو بإمكانك الاتصال بالشخص المحلي التالي غير المعنيّ بالدراسة في حال راودتك مخاوف أو شكاوى بشأن البحث وطريقة خوضه:

- **الاسم:**
- **الهاتف / الواتساب:**
- **البريد الإلكتروني:**

ورقة المعلومات هذه هي لك

ورقة معلومات المشارك: دراسة حالة اليمن – مراجعة 3.2

Figure B.4: Participant consent form – English

THE UNIVERSITY OF SYDNEY

Department of Peace and Conflict Studies

ABN 15211513464

Mackie Building K01
University of Sydney
NSW 2006 Australia

Telephone +61 2 9036 9286
Facsimile +61 2 9660 0862
wendy.lambourne@sydney.edu.au
http://sydney.edu.au/arts/peace_conflict

Dr Wendy Lambourne, Senior Lecturer

Participant Consent Form

Water in Divided Societies: The Community Experience of Water Conflict

I, ... [PRINT NAME], agree to take part in this research study.

In giving my consent, I state that:

- I understand the purpose of the study, what I will be asked to do, and any risks/benefits involved.

- I have read the Participant Information Statement and have been able to discuss my involvement in the study with the researchers if I wished to do so.

- The researchers have answered any questions that I had about the study and I am happy with the answers.

- I understand that being in this study is completely voluntary and I do not have to take part. My decision whether to be in the study will not affect my relationship with the researchers or anyone else at the University of Sydney now or in the future.

- I understand that I can withdraw from the study at any time.

- I understand that I may stop the interview at any time if I do not wish to continue, and that unless I indicate otherwise any recordings will then be erased and the information provided will not be included in the study. I also understand that I may refuse to answer any questions I don't wish to answer.

- I understand that personal information about me that is collected over the course of this project will be stored securely and will only be used for purposes that I have agreed to. I understand that information about me will only be told to others with my permission, except as required by law.

- I understand that the results of this study may be published, but these publications will not contain my name or any identifiable information about me unless I consent to being identified using the 'Yes' checkbox below.

  ☐ **Yes**, I am happy to be identified.

  ☐ **No**, I don't want to be identified. Please keep my identity anonymous.

Participant Consent Form – Revision 1.0   Page 1 of 2

- I consent to audio-recording of my interview

  YES ☐   NO ☐

- I would like to receive feedback about the overall results of this study

  YES ☐   NO ☐

If you answered **YES**, please indicate your preferred form of feedback and address:

☐   Postal: _____

_____

☐   Email: _____

Signature

-------------- --
PRINT name

Date

Figure B.5: Participant consent form – Arabic

THE UNIVERSITY OF
SYDNEY

قسم دراسات السلام والنزاعات

| ABN 15211513464 | Mackie Building K01
University of Sydney
NSW 2006 Australia | Telephone +61 2 9036 9286
Facsimile +61 2 9660 0862
wendy.lambourne@sydney.edu.au
http://sydney.edu.au/arts/peace_conflict |

الدكتور وندي لامبورن، أستاذة محاضرة أساسية

استمارة موافقة المشارك

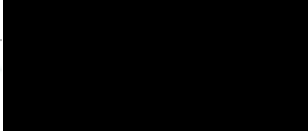### المياه في المجتمعات المقسَّمة: التجربة المجتمعية للنزاع على المياه

أنا الموقع أدناه،... [إطبع الاسم]، أوافق على المشاركة في هذه الدراسة البحثية.

ويمنحي الموافقة هذه أقرّ بما يلي:

- أنّي أفهم الغرض من الدراسة، ما سوف يطلَب منّي، وما هي المخاطر/المكاسب المعنية.
- أنّي اطَّلعت على ورقة معلومات المشارك وأنّي كنت قادرًا على مناقشة مشاركتي في الدراسة مع الباحثين إن رغبت في ذلك.
- أنّ الباحثين أجابوا عن أيّ أسئلة راودتني بشأن الدراسة وأنّي راضٍ عن الأجوبة.
- أنّي أفهم أنّ المشاركة في هذه الدراسة هي طوعية بالكامل وأنّي لست ملزمًا المشاركة. وإنّ قراري بالمشاركة أو عدمها لن يؤثّر على علاقتي بالباحثين أو بأيّ شخص آخر في جامعة سيدني الآن أو في المستقبل.
- أنّي أفهم أنني أستطيع أن أنسحب من الدراسة في أيّ لحظة.
- أنّي أفهم أنني بإمكاني إيقاف المقابلة في أيّ لحظة إن لم أكن راغبًا في الاستمرار، وأنّ أيّ تسجيلات سوف تُمحى ولن تتضمّن الدراسة المعلومات التي قدَّمتها إلاّ إذا أشرت إلى غير ذلك. كما أنّي أستطيع أن أرفض الإجابة عن أيّ أسئلة لا أرغب في الإجابة عنها.
- أنّي أفهم أنّ المعلومات الشخصية التي جُمعت عنّي خلال هذا المشروع سوف تخزَّن بشكل آمن ولن تستخدَم إلاّ لأغراض وافقت عليها. وأفهم أنّ المعلومات الخاصة بي لن يطَّلع عليها آخرون إلاّ بإذن منّي، إلاّ إذا نصّ القانون على غير ذلك.

- أفهم أنّ نتائج هذه الدراسة يمكن أن تُنشَر، لكنّ هذه المنشورات لن تحتوي على اسمي أو أي معلومات تشير إلى هويّتي إلاّ إذا وافقتُ على أن يشار إلى هويّتي باستخدام الخانة 'نعم' أدناه.

☐ **نعم،** أنا موافق على أن يشار إلى هويّتي

☐ **كلا،** أنا غير موافق على أن يشار إلى هويّتي. يرجى أن تُحفظ هويّتي سرّيّة.

- أوافق على أن تسجّل مقابلتي

نعم ☐   كلا ☐

- أودَّ الحصول على معلومات عن النتائج الشاملة لهذه الدراسة

نعم ☐   كلا ☐

إذا أجبت بنعم، يرجى أن تشير إلى الطريقة المفضّلة لديك لتلقّي المعلومات والعنوان:

☐

بالبريد:

_____

☐

بالبريد الإلكتروني:

_____

....

التوقيع

....

الاسم مطبوعًا

....
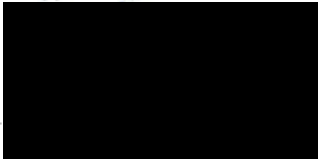
التاريخ

تمّت الترجمة من الإنكليزية إلى العربية انطلاقًا من نسخة غير مصدّقة وغير موقّعة؛ ديانا عمّون أبي عبّود، عضو في الاتحاد الدولي للمترجمين رقم 1330

Translation made based on English non authentic copy; Diana Ammoun ABI-ABBOUD, FIT No 1330

Appendix C: Example of interview coding

The following Figure C.1 shows a scanned copy of hand-written interview coding for the interview conducted with Mr McLaughlan (M-Aus.).

Figure C.1: Interview coding – Interview 06AT Mr McLaughlan

Appendix D: Sample IPA theme clusters

Table D.1: Sample IPA theme clusters – interviews 01AH and 10AH

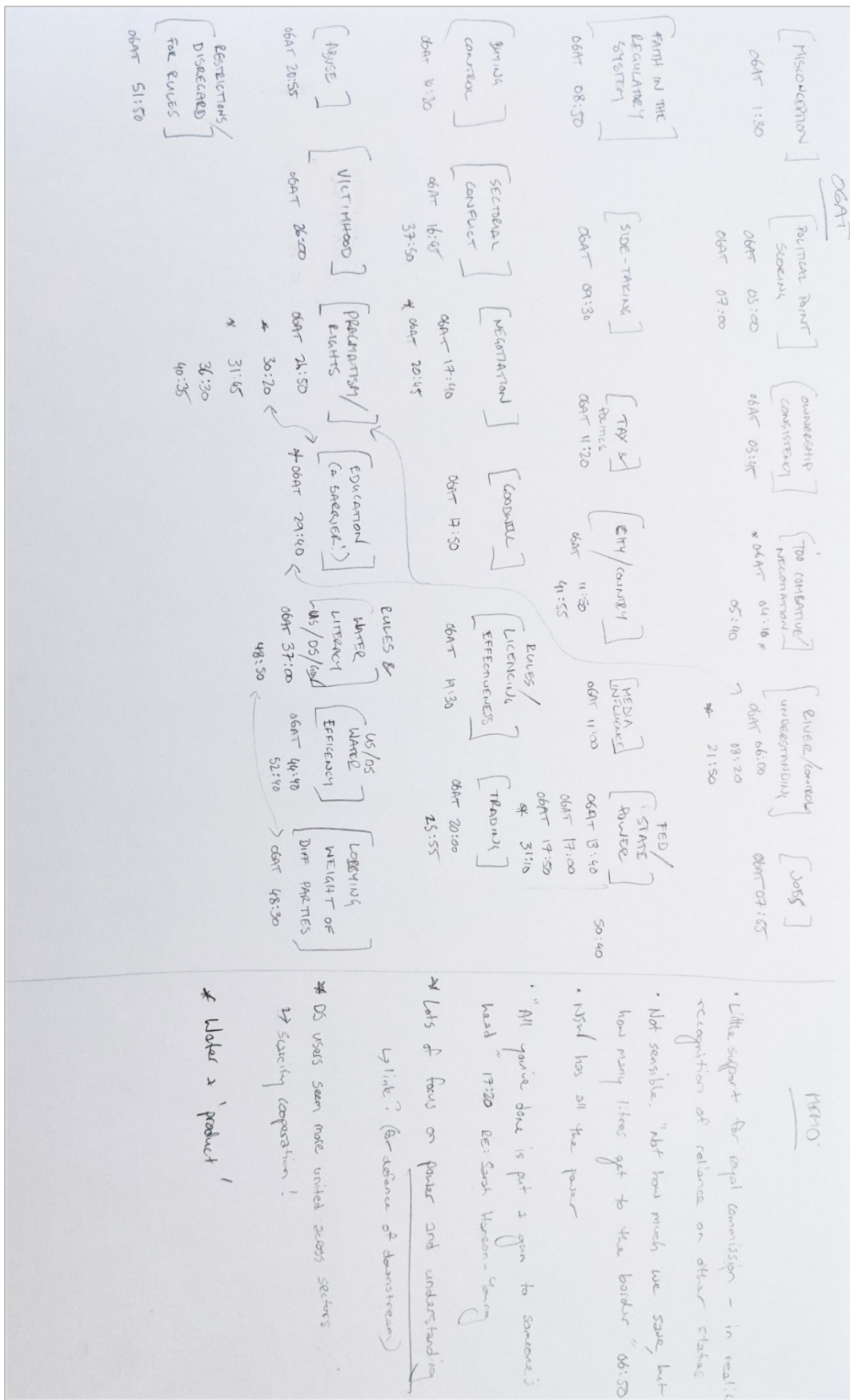| Initial themes			Clusters	Topic
	01AH	10AH		
1	Sustainability	Conflict in layers of gov	Governance, licencing & ownership frameworks	Experiential environment
2	Productivity	Complexity	Water scarcity, quality & access	
3	Environmental benefits	National identity	Economics, trade & commodification of water	
4	Balance	Environmental sustainability & livelihoods	Identity, culture, values & roles	Conflict dynamics
5	Nationhood	Balance, fairness & equity	Upstream-downstream dispute	
6	Win-win / lose-lose	Feeling of responsibility	Sectorial dispute	
7	Upstream-downstream	Lack of personal experience w/ scarcity	Political affiliation & difference	
8	Leadership	Water wars	Information, communication, prejudice & evidence	
9	Pragmatism	Livelihoods and loss	Power & authority	
10	Rules	Indigenous groups	Combativeness / animosity	
11	Culture / background	Complaining people	Security & predictability	
12	Relationship	Trust (and mistrust)	Relationship & trust	
13	Authority	Challenges	Negotiation & compromise	Conflict transformation process
14	Predictability / planning / security	Power disparity	Justice mechanisms	
15	(Mis)information / communication gaps	Cooperation amid scarcity	Change, adaptation & flexibility	
16	Water access / quantity	Difficulty to explain complexity	Goodwill	
17	Water quality	Democracy	Wellbeing & livelihoods	Peaceful outcomes
18	Survival	Change & reform	Environmental sustainability	
19	Wellbeing / mental health	Resolution, or the illusion of	Essentiality for water for life	
20	Water trading / water as commodity	Federal gov power / regions / licencing	Dignity & human worth	
21	Hope / confidence	Leadership and crisis	Rights	
22	Role defence	Transboundary cooperation across states		
23	Health and happiness	Power & vested interests		
24	People centredness / dignity	Public opinion		

25	Government legitimacy / approval / democracy	Perceived power & shared authority
26	Transboundary management	Interaction
27	Cooperation between parties	"Australian values" in interaction
28	Responsibility	Fair upstream-downstream management
29	Political difference	Listening & engagement
30	Human need	Geography re: trust-building / understanding
31	Equity / egalitarianism / hierarchy	Identity and circumstance differences
32	Opportunity	Trust deficit & protection
33	Barriers to cooperation	Short-termism
34	Efficiency	Lack of knowledge
35	Economic growth	Climate change
36	Technological change	Governance & funding distribution
37	Good governance frameworks	Conflict management
38	Adaptation / flexibility	
39	Science	
40	Climate change	
41	Risk	
42	Power	
43	Rights	
44	Water literacy	
45	Compromise	
46	Media	
47	Assumptions	
48	Negotiation / positions	
49	Trust / honesty	
50	Prejudice	

Appendix E: Participant excerpt statistics

Table E.1 compiles the number of quotes from each participant used in Chapters 4-6, not including any repeated references.

Table E.1: Participant excerpt statistics

Name	Chapter 4 (excerpts)	Chapter 5 (excerpts)	Chapter 6 (excerpts)	TOTAL (excerpts)
(H-Aus.)				
Mr Ruben Kelly *	4	4	5	13
Senator Sarah Hanson-Young	4	3	2	9
Mr Phillip Glyde	3	3	5	11
Mr James Murphey *	2	3	4	9
Mr Roy Butler MP	4	6	7	17
(M-Aus.)				
Cr Craig Davies	2	0	3	5
Mr Rene Woods	4	4	6	14
Hon. Kim McLaughlan MP *	0	4	2	6
Mr Mark Hall *	4	2	3	9
Mr Linton Besser	1	2	3	6
Hon. Karlene Maywald MP	3	3	5	11
(G-Aus.)				
Mr Glen Whittaker	2	4	11	17
Mr Robert Collins	2	5	9	16
Mr Theo Conti *	1	1	6	8
Mr Archer Taylor *	0	4	5	9
Mr Clancy Lee *	1	1	1	3
Cr Karlene Irving	3	2	2	7

(H-Yem.)				
Moh. Saleem Nader *	1	3	2	6
Mr Abdullah Al Saif *	2	4	0	6
Ms Tawakkol Karman	1	3	1	5
(M-Yem.)				
Mr Khaled Abadi *	3	1	2	6
Mr Saad Al Najar *	1	1	3	5
Moh. Haitham Hadid *	5	5	2	12
Mr Omar Ghanem *	6	4	1	11
Mr Rami Al Hassan *	2	4	2	8
Ms Noor Fakhoury *	3	2	15	20
(G-Yem.)				
Mr Sami Bashar *	2	2	3	7
Moh. Rafiq Al Shadi *	1	0	0	1
Ms Lina Alawadi *	1	0	2	3
Mr Farid Malik *	2	0	1	3
Mr Raja Ahmed *	2	2	1	5
Mr Eli Assaf *	0	4	0	4
Moh. Hosam Rashid *	0	0	0	0
Mr Sultan Faysal *	0	1	2	3

*Pseudonym