

---

# Equity, fairness and justice in water policy

—  
Literature review  
December 2024



**Watertrust  
Australia** Ltd

©Watertrust Australia 2024



Equity, fairness and justice in water policy is licenced for use under a Creative Commons Attribution 4.0 International licence with the exception of any logos and any content supplied by third parties. For licence conditions, see [creativecommons.org/licenses/by/4.0](https://creativecommons.org/licenses/by/4.0).

Watertrust Australia has made all reasonable efforts to identify and attribute content supplied by third parties that is not licensed for use under Creative Commons Attribution 4.0 International.

### **Citation**

Finley Watson, Nick Barry and Rod Marsh. *Equity, fairness and justice in water policy: literature review*. Canberra: Watertrust Australia, 2024.

### **Disclaimer**

Although reasonable efforts have been made to ensure that the contents of this publication are factually correct, Watertrust Australia does not accept responsibility for the accuracy or completeness of the contents, and shall not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on, the contents of this publication.

### **Disclosure statement**

This literature review was funded by Watertrust Australia as a knowledge input into Watertrust's Equity, Fairness and Justice in Water Policy research project.

### **Contribution statement**

Each listed author has made a significant intellectual contribution to the work, as follows: *Finley Watson*<sup>1</sup>, data acquisition with significant intellectual judgment, data analysis, report drafting, conception and design; *Nick Barry*<sup>1</sup> conception and design, contribution of knowledge, review; *Rod Marsh*<sup>2</sup>, conception and design, contribution of knowledge, report drafting, review.

Author affiliation: <sup>1</sup>La Trobe University; <sup>2</sup> marsh.eco.

Corresponding author: Finley Watson, [f.watson@latrobe.edu.au](mailto:f.watson@latrobe.edu.au)

### **Acknowledgements**

We would like to thank Professor Barry Hart, Dr Geoff Syme and Dr Kane Aldridge for commenting on earlier versions of this paper. As always, any remaining errors are our own.

*Watertrust Australia acknowledges the Traditional Owners of land, sea and waters across Australia and their continuing connection to culture and Country. We pay our respects to Elders past and present.*

---

# Table of contents

---

Summary .....	4
Observations .....	6
Introduction .....	8
Method .....	9
Searching and screening .....	9
Search criteria and terms .....	10
Literature review and analysis .....	12
Environmental water equity .....	12
Socio-economic water equity .....	14
Socio-cultural water equity .....	15
First Nations water equity .....	16
Citizens, markets, governments and water equity .....	18
Equity in global governance .....	20
Equity framing in Australian water policy .....	21
The social psychology of water equity .....	22
Normative theories of equity .....	24
The behavioural economics of fairness, justice and equity .....	25
Conclusion .....	27
References .....	29

# Summary

This literature review examines peer-reviewed, academic research on equity, fairness and justice in water policy. It looks at how these three concepts are included in discussions around access, allocations and rights to water across a wide range of fields of research. This review does not examine work that aims to primarily value water as a resource; it focuses on discussions of what makes water policy equitable, fair or just. We find that the literature does not provide an agreed definition of these concepts. Water policy makers who seek to address questions of equity, fairness and justice in water policy should recognise that this is a highly contested space likely to require difficult trade-offs and considerable deliberation and debate among and with stakeholders.

Following a standard literature review approach,<sup>1</sup> we undertook a broad, inductive survey of existing academic literature and found the following broad sets of perspectives in the literature on equity fairness and justice in water policy and management.

- **Environmental water equity:** Environmental water equity focuses on fair access to water resources and the protection of ecosystems from harm, particularly as climate change alters and shifts environmental risks. Policymakers face increasing pressure to balance current demands with the needs of future generations as well as ensure water access remains fair across socio-economic groups.

Research identifies three critical dimensions in environmental water equity: access to water as a life-sustaining resource, the intrinsic ecological value of natural systems, and the holistic management of human-environment relationships. Current water management practices often fall short of these ideals, with policies failing to integrate perspectives on distributive and procedural justice. A focus on distributive justice underscores the need for fair resource allocation, while procedural justice emphasises the importance of inclusive decision-making processes that account for both human and environmental interests.

- **Socio-economic water equity:** Socio-economic water equity examines how economic and social status shape people's access to water, with inequities exacerbated by the path dependency of past decisions on resource allocation and spatial planning, current economic trends and climate change. In regions facing water scarcity, these disparities become stark, influencing daily living conditions, health, and even food security. Addressing these inequities involves understanding and reducing barriers to water access for economically disadvantaged communities.

The Water Poverty Index (WPI) is a tool used to measure water-related socio-economic conditions, highlighting intersecting factors like resource availability, infrastructure, and environmental sustainability. In Australia, socio-economic water policies attempt to integrate these issues, but marginalised communities – particularly remote Indigenous communities – continue to face significant access challenges. Researchers suggest that policies incorporating socio-economic and circular economy principles, which emphasise resource reuse, can promote fairer, more resilient water management systems.

- **Socio-cultural water equity:** Socio-cultural water equity addresses the importance of water to communities beyond its economic value, recognizing its spiritual, recreational, and symbolic significance. Policymakers must consider local cultural needs and involve community voices in water management to ensure fairness and inclusivity.

The socio-cultural value of water often remains marginalised in economic assessments, leading to policies that overlook essential community needs. Greater community engagement is necessary to integrate socio-cultural perspectives, fostering trust and legitimacy in water policy. This approach is particularly relevant in communities where water scarcity unites or divides groups, and where equitable management of water resources can strengthen social cohesion.

- **First Nations water equity:** First Nations water equity highlights the historical exclusion of Indigenous communities from water rights and governance. Ensuring equitable water access for First Nations peoples re-

## Summary

quires policies that recognise the cultural, environmental, and economic significance of water for these communities.

Though some progress has been made, Indigenous water rights remain inadequately protected. Research supports an adaptive governance approach that centers Indigenous knowledge and community input, creating flexible, culturally sensitive frameworks. Policies that allow for Strategic Indigenous Reserves and greater Indigenous participation in water management are recommended for promoting equity and justice in water allocation.

- **Citizens, markets, governments, and water equity:** Researchers note that water markets are often used to allocate water efficiently, yet they frequently fail to achieve equitable outcomes. While market mechanisms support efficient water distribution, they may disregard social and environmental values, fostering mistrust between local stakeholders and government bodies.

The management of the Murray–Darling Basin exemplifies the tensions in using markets for water allocation. Government interventions aiming to balance environmental, social, and economic interests have faced criticism for exacerbating inequities. Policymakers are encouraged to improve regulatory frameworks and market design alongside incorporating consultation processes that respect both market efficiency and local needs, fostering a balance between fairness and economic goals.

- **Equity in global governance:** Researchers note global governance frameworks often approach water equity from a limited, efficiency-focused perspective, neglecting cultural and social dimensions essential to fair water management. This narrow focus has drawn criticism, especially from researchers advocating for Indigenous rights and holistic approaches that address water's multiple social values.

The dominant Integrated Water Resource Management (IWRM) approach, while widely implemented, is criticised by some researchers for perpetuating settler-colonial biases and lacking genuine equity considerations. A shift toward inclusive frameworks that engage communities and acknowledge diverse water needs is seen as essential for equitable international water policy.

- **Equity framing in Australian water policy:** Water policy in Australia reflects various perspectives, from socio-economic development to environmental protection. Researchers track the increasing dominance of neoliberal frameworks emphasizing efficiency and criticise neoliberal approaches to policy for marginalizing regional interests and traditional values associated with water.

Researchers outline how Australian water policy has shifted through three major periods, each with distinct framings: from developmental capacity to environmental resource protection, and finally, to sustainable management. They believe that understanding these different framings and their path dependency can help policymakers balance distributive and procedural justice to better reflect community values and achieve fair outcomes.

- **Social psychology of water equity:** Social psychology research shows that communities' perceptions of equity influence their acceptance of water policies. Policies that align with community values and environmental concerns are more likely to gain support, particularly when developed through inclusive, trust-building processes.

Researchers demonstrate how local engagement is crucial in implementing sustainable water policies. Studies in Australia's Murray–Darling Basin suggest that community trust in local authorities and adherence to fairness principles enhance public acceptance, especially when policies avoid market-driven allocations and prioritise procedural justice.

- **Normative theories of water equity:** Normative theories of water equity draw on social justice traditions, focusing on distributive and procedural justice as guiding principles. These theories emphasise consistent minimum access to water, fair decision-making processes, and the identification of inequities that disproportionately affect marginalised communities and the environment.

Few comprehensive normative theories exist, but those that do advocate for context-sensitive approaches that bridge multiple justice perspectives. A Social Justice Framework (SJF), proposed for Australian policy, supports policies that integrate fairness principles from various traditions, promoting equity in complex water management systems.

- **Behavioral economics of fairness, justice, and equity:** Behavioral economics challenges the assumption that self-interest drives decision-making in water policies. Research shows that people often act cooperatively and are willing to incur costs to enforce social norms, suggesting that fairness and community-oriented policies can be more effective than those based solely on self-interest.

This insight highlights the importance of designing policies that align with social norms and community expectations, as policies perceived as unfair may face significant resistance. Researchers suggest policymakers should prioritise procedural justice and fairness in policy frameworks to foster cooperation and achieve equitable water management outcomes.

## Observations

**Equity, fairness and justice are ‘essentially contested’ concepts. Given their rhetorical power and strong political salience, individuals and advocacy coalitions seek to build these concepts into narratives to mobilise supporters and influence policy to meet their own ends. However, these concepts and policy built on them will likely be subject to ongoing disagreement because of the difficulty in achieving a settled consensus on what constitutes equitable, fair or just processes or outcomes.**

Although equity, fairness and justice are widely shared goals, the lack of agreement among stakeholders on what they mean complicates discussions and creates challenges for consensus-building. Different actors may use the same terms to justify opposing positions, masking deeper conflicts in values and policy objectives. Our other reports in this project also find that stakeholders deploy these concepts strategically to advance their interests.<sup>2</sup>

The variety of ways in which the concept of equity can be invoked in water policy also creates conceptual ambiguity that can be exploited by stakeholders and advocacy coalitions, who draw on the language of equity and fairness to try to mask self-interested arguments. Given the power of these ideas, they can invoke this rhetoric to try to mobilise their supporters in a way that reshapes – to their advantage – the discursive “terrain” on which political struggles over water occur. Incorporating considerations of equity into the water policy-making process more systematically, and being aware of the variety of ways in which ideas of equity and fairness are understood and deployed in the scholarly literature, can improve policy makers engagement with these issues in policy development.

**Citizens care about issues of fairness, trust, participation and representation in policy making. Citizen concerns about these issues influence the legitimacy of policy decisions. Legitimacy matters more than technical competence for effective policy design and implementation.**

The academic literature examined in this review presents a diverse and complex set of views around equity, fairness and justice in water policy. The literature spans numerous debates, methodologies and conclusions. While there are no clear answers to the question of how to achieve water equity, there are some consistent positions on how we might be better able to consider equity, fairness and justice in water policy. The most widely agreed on perspective is that water equity is not an outcome but a process, which might be amenable to a set of guiding principles. Adequate consultation with local stakeholders and community members is a very important part of this process. Empowering those most affected by water resource decision-making, and incorporating them into such processes, contribute to the legitimacy of water policy by providing policy processes more likely to be seen by stakeholders as equitable and fair.

## Summary

**Researchers' values are a key driver of research themes and results in this area.**

A significant portion of research on equity, fairness, and justice in water policy and management serves as advocacy for specific viewpoints. These perspectives span from prevailing disciplinary frameworks to particular outcomes preferred by individual researchers and reflect the wide range of biases and priorities across the literature.

# Introduction

This literature review examines the meaning and role of equity, fairness and justice in existing peer-reviewed water policy literature and several additional areas. It aims to summarise the most prominent thematic fields of study, and the key theories, areas of focus and findings associated with each. The review contributes to a broader project, which will examine the diverse meanings and understandings of equity, fairness and justice held by stakeholders across the Murray-Darling Basin. The broader project aims to provide practical and robust advice to policy makers for considering these issues in policy development.

We provide detailed discussion relating to 112 peer-reviewed academic works in the following identified fields of research:

- environmental – examines the just distribution of environmental risks and benefits across social systems, the intrinsic value of ecological systems and the interdependence of the two
- socio-economic – concerns the role of socio-economic factors in shaping access to water and attitudes towards water use, and water as a resource for socio-economic development
- socio-cultural – attends to the recreational, spiritual and developmental features of water as a natural resource that is often seen as culturally important
- Indigenous – examines the socio-cultural and economic development dimensions of water associated with Indigenous peoples, their historical exclusion from decision-making processes and methods of integrating their perspectives and knowledge into policy
- citizens, markets and governance – attends to the role of markets and government regulation in managing the distribution of water, the underlying principles of the differing approaches and the impact on consumers
- global governance – examines definitions of water equity in global governance frameworks, the principles underneath those definitions and the outcomes when they are implemented in policy
- framing – examines both how water equity has been framed in policy and the objectives around which water policy has been framed more broadly
- social psychology – examines how equity is viewed in social contexts and the psychological indicators of how people perceive equitable outcomes
- normative theory – theorises just standards for fair decision-making and the identification of standards and outcomes that are not equitable.

The review highlights the most important or most cited perspectives in each category and then explains later responses and developments. In the review, we highlight key findings on equitable policy implementation. We also present important theoretical definitions of how to define and implement water equity in policy.

This review differs from previous assessments in that we are not concerned with how to value water as a resource. Instead, we are concerned with how equitable distributions of water have been defined. This means that we have looked at both specific and direct discussions of what makes water policy equitable or fair. We find that equity, fairness and justice in water policy are not easily defined and some definitions are contested. That said, equity, fairness and justice likely can be included in policy making in a more systematic way. This is particularly the case when equity and fairness are understood as pertaining to processes rather than outcomes.



# Method

The literature review uses a narrative synthesis or traditional review approach.<sup>1</sup> A narrative synthesis is useful because equity, fairness and justice are often implied in the literature, meaning peer-reviewed research is often framed around other areas of water politics, rather than specifically water equity, fairness or justice. Despite this, the research highlighted here is important in helping to define equity, fairness and justice. By presenting the research thematically, we are able to show how equity, fairness and justice have been interpreted in water policy making. Narrative approaches allow for broad mapping of a complex and disjointed literature. This is important because we are not examining a specific policy question or hypothesis.<sup>3</sup>

The narrative review process required us to develop broad search criteria to identify central themes and the most widely cited literature.<sup>2</sup> We refined these search criteria in accordance with our analytical observations. One hundred and twelve academic works were ultimately identified as within the scope of the research objectives. We organised these works into thematic categories, providing a map of the existing literature. We were then able to take the perspectives of these studies and synthesise and discuss them in terms of their relevance to broad themes and the findings of the other studies in the category.

---

## Narrative review

We developed broad search criteria, which we refined as we worked through the following three steps of the narrative review process:

- analysis
- synthesis
- mapping.

We further refined our search as we examined the relevant literature. We then identified, grouped and analysed the central themes from that literature to identify the ways in which equity, fairness and justice have been interpreted in relation to water policy.

## Searching and screening

The search and screening process involved searching Google Scholar using the broad search strings in Table 1. The top results were initially screened according to the inclusion criteria highlighted in Table 2. We then took these screened results and inductively catalogued them. This involved coding publications based on the papers' highlighted key words, their area of focus, and their concepts of water equity, fairness or justice. As a result of the cataloguing, we were able to identify emergent themes, which allowed us to define more finely detailed search strings. These emergent themes were then used to divide publications across the dataset into nine categories of water equity research.

Following this stage, the narrative review system was combined with a partial snowball approach. This approach meant that we reviewed subsequent, or additional, works of the most cited authors in the literature, adding layers upon the original sourced work.<sup>4</sup> We systematically searched Sage, Scopus, Taylor & Francis and Web of Science databases and then we reviewed the related articles for relevance. In this process, we aimed to include articles from a range of disciplines and methodologies. We also excluded articles that did not actively advance or engage with the concepts of water equity, fairness or justice. See Figure 1 for an outline of this approach.<sup>5</sup>

# Search criteria and terms

**Table 1: Search criteria and strings**

Broad search strings	Granular search strings
<p><b>Broad water equity:</b> (“water”) AND (“equity” OR “fairness” OR “justice”) AND (“water policy” OR “water governance” OR “water management”).</p>	<p><b>Water equity in Australia:</b> (“water”) AND (“equity” OR “fairness” OR “justice”) AND (“water policy” OR “water governance” OR “water management”) AND (“Australia” OR “Australian” OR “Victoria” OR “New South Wales” OR “Queensland” OR “Tasmania” OR “South Australia” OR “Western Australia” OR “Northern Territory” OR “Australian Capital Territory”).</p>
<p><b>Social water equity:</b> (“water”) AND (“equity” OR “fairness” OR “justice”) AND (“socio-economic” OR “cultural” OR “socio-cultural” OR “Indigenous” OR “community”).</p>	<p><b>Water equity in markets and governance:</b> (“water”) AND (“equity” OR “fairness” OR “justice”) AND (“markets” OR “governance” OR “economic” OR “efficiency” OR “sustainability” OR “allocation” OR “scarcity” OR “services”).</p>
	<p><b>Water equity and social psychology:</b> (“water”) AND (“equity” OR “fairness” OR “justice”) AND (“psychology” OR “social psychology” OR “psychosocial” OR “behaviour”).</p>

**Table 2: Inclusion and Exclusion Criteria**

	Inclusion	Exclusion
<b>Date range</b>	Any	N/A
<b>Relevance</b>	<ul style="list-style-type: none"> <li>Publications included direct or indirect discussion of the search terms</li> <li>Publications included a direct or secondary discussion of water as a political, economic or social commodity</li> <li>Publications had direct relevance to concepts of equity or fairness or justice</li> </ul>	<ul style="list-style-type: none"> <li>Publications did not provide direct or secondary discussion of water</li> <li>Publications did not relate to equity or fairness or justice</li> </ul>
<b>Study types</b>	Peer-reviewed journal articles, scholarly book chapters, empirical analysis, theoretical analysis, systematic reviews and meta-analysis	Non-peer reviewed or non-scholarly works
<b>Language</b>	English language publications	Non-English language publications
<b>Key words</b>	Water, equity, fairness, justice, water policy, water governance, water rights, water equity theory, water politics	N/A

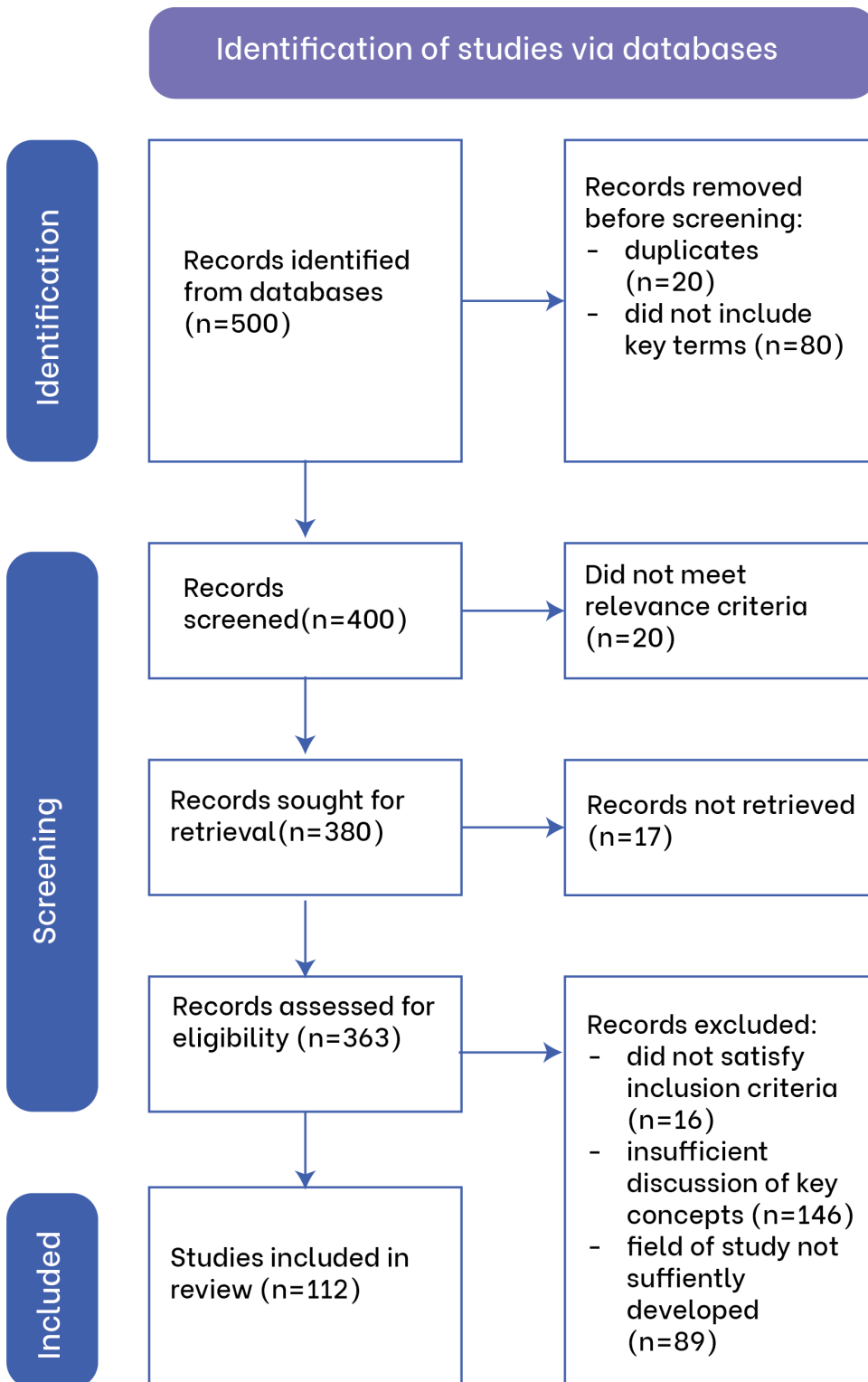


Figure 1: Identification and screening process

# Literature review and analysis

Presented below is the literature review analysis conducted through narrative synthesis. In the review, we present key theories and findings from a range of disciplines. We have organised and discussed these according to the following observed themes:

- Environmental
- Socio-economic
- Socio-cultural
- Indigenous
- Citizens, markets and governments
- Global governance
- Australian water policy
- Social-psychology
- Normative theories
- Behavioural economics.

## Environmental water equity

---

### Environmental water equity

Environmental equity, where everyone has fair access to the environment and its resources as well as protection from environmental hazards, is an ongoing challenge. The challenge is complicated by the increasing impacts of climate change. Managing trade-offs between current and future generations is also important. Research into environmental equity centres around three primary fields:

- access to water as an essential natural resource
- maintenance of environmental systems as valuable in themselves (called intrinsic value)
- management of the relationship between humans and the environment in an all-encompassing (or holistic) manner.

Research generally finds that management of water resources, both internationally and in Australia, has failed to successfully bring these perspectives on equity into policy.

**Environmental water equity is a central concern of current research, particularly as climate change increases environmental degradation and further complicate processes used to allocate water.**<sup>6</sup> Researchers

and government agencies generally define environmental water equity as the equal distribution of environmental risks and benefits across a population.<sup>7</sup> However, in the current global environmental context, this is an increasingly complex goal. A dominant theme within the research is sustainability and access across socio-economic groups.<sup>8</sup> Researchers face an important challenge in considering how to balance the conflicting goals of justice for current generations against those of future generations. This balance requires complex trade-offs.<sup>9</sup> In Australia, climate change has and will continue to create inequitable access to water, with socio-economically disadvantaged groups the most affected.<sup>10</sup> Similarly, water-intensive industries such as agriculture are likely to require effective strategies to respond to climate change.<sup>11</sup>

The principle of environmental justice allowing equal access to environmental resources is based on traditions of distributive justice, which is the socially just distribution of resources, goods and benefits across society. Environmental justice also considers how social, or in this case environmental, benefits and risks are distributed.<sup>12</sup> Researchers note how in recent years, concepts of distributive environmental equity have broadened to include a range of policy concerns and social movements relating to the environment. Environmental equity has also shifted from simply considering the individual and their personal allocation of positive and negative effects on the environment, to broader community implications. In particular, researchers have focused on the decision-making and governance processes that cause environmental injustices to continue. Environmental justice, therefore, also intersects with theories of procedural justice, which are concerned with fair processes and where the concepts of equality, proportionality and plurality are important.<sup>13</sup>

Increasingly however, such theories are critiqued for their crude methods of valuing environmental goods. Procedural and distributive theories of environmental water equity and ethics largely relate to either the value of the water resource or how the water resource creates value for the environment. Procedural theories are defined by applying (or denying) intrinsic value to particular aspects of the environment and water. Distributive theories consider water equity through its socio-ecological context.<sup>14</sup> In this way, theories of environmental and water equity are often highly human centred, though not without justification. The view that environmental justice is defined by the equitable distribution of natural resources has been essential in highlighting the vast web of inequalities related to water and the importance of sustainability. However, efforts have also been made in recent years to integrate the concepts of human-centred, environmental justice and eco-centric, ecological justice by drawing on research of Indigenous perspectives of humans and the environment as interrelated. In this view, justice is made up of a shared respect towards nature.<sup>14</sup> Understanding environmental justice as encompassing recognition, may also be a key aspect of this process. Justice as recognition highlights the fact that distributional justice may not be achieved without firstly acknowledging the deep structural differences and inequities among a range of social groups.<sup>15</sup>

This has led some researchers to argue for a “systemic-relational” or integrated approach to water equity. Such research shows that when individual aspects of equity are divided up using different ideas of intrinsic value, or relational relevance, other aspects of equity are weakened. As such, equity should be perceived as an integrated concept that takes into account the interdependence of humans and water.<sup>16</sup>

Such holistic approaches have also been considered in an Australian context. Researchers have noted that environmental planners in Australia have begun to view human and environmental health as interdependent. However, completely integrating this into policy is an ongoing challenge.<sup>17</sup> Others have sought to apply this theory to practice and have considered holistic concepts in studies of how streams may be rehabilitated. Drawing on both normative and social-psychological theory, one paper explores the idea that environmental equity involves fairness in distribution, procedures and relationships.<sup>15</sup> More commonly though, Australia is noted for its failure to adequately implement environmental equity into water policy. Australian policy development has often been defined by a lack of sufficient consultation with local communities, which has often generated backlash and mistrust in governments. Researchers have stressed the importance of adequate consultation and the need for cross-level coordination between local social movements and wider-reaching government and non-governmental organisations in achieving environmental equity.<sup>18</sup>

# Socio-economic water equity

## Socio-economic water equity

The ability of people to gain access to water to meet their needs is shaped by their social and economic (socio-economic) standing in the community. As these differences increase, the gap between those who have access to water and those who do not grows. Research has focused on finding answers to the following questions:

- How do socio-economic conditions create unequal and unfair access to safe water for drinking, sanitation and domestic use?
- What effect does access to water have on promoting socio-economic development?
- How do socio-economic conditions shape the attitudes of the general public and their responses to government measures?

Achieving fairer access to water involves the reduction of the unequal access to water caused by socio-economic factors. Understanding how such unequal access shapes social conditions can also help water managers ensure fairer access to water.

**Water is a fundamental aspect of socio-economic conditions across the globe.** Access to water shapes not only day-to-day living conditions but longer-term access to affordable foods and goods in developing nations.<sup>19</sup> Water infrastructure is essential to socio-economic development, particularly in arid regions.<sup>20</sup> Furthermore, existing inequalities due to differences in access to water are likely to be worsened by climate change alongside broader global economic trends.<sup>21</sup> This is the case not only across international borders, but increasingly within them, as unequal access to water because of economic reasons in developed nations changes access to water.<sup>22</sup>

Existing research in understanding socio-economic water equity has been enhanced by the establishment of a Water Poverty Index (WPI). The aim of a WPI is twofold:

- to provide a comparative measure of socio-economic conditions associated with water access
- to integrate the intersecting aspects of water access and poverty that are fundamentally linked and often burden women and children in developing countries.

Several approaches to calculating a WPI have been proposed, including one that incorporates five sub-indices of “Resource, Access, Capacity, Use, and Environment”.<sup>23</sup> The most widely acknowledged approach to the WPI takes into consideration the indicators of “water availability, access to safe water, clean sanitation, and time taken to collect domestic water”. Environmental sustainability and the interconnectedness of economic and environmental indicators are also crucial to this calculation.<sup>24</sup> Existing research frequently considers these indicators as the most important factors in understanding water poverty or socio-economic water equity. Other research has proposed additional factors, such as incorporating features of circular economy frameworks, which encourage the reuse of products, to form the concept of equity.<sup>25</sup>

Research into the socio-economics of water in Australia has followed a similar route. In the international context, those who determine water policy in Australia have often tried to integrate socio-economic concerns into governance frameworks. An example of this attempt at integration is the National Strategy of Ecologically Sustainable Development. Over the years, these policies have been associated with allocation policies that have directly shaped economic expansion or contraction across various regions in Australia.<sup>26</sup> Some researchers have suggested that the social value of water between Federation and 1962 was mainly located in its socio-economic developmental capabilities. This is therefore defined as the “pre-development” era, which came before a time when water came to be defined by its environmental value and then the need for sustainability.<sup>27</sup>

Socio-economic factors are often identified within existing research both as indicators of the behaviours that

determine water consumption and as a product of access to water. Access to water is an essential aspect of socio-economic development and social inclusion.<sup>28</sup> In Australia, socially disadvantaged consumers and communities are often unable to access water to satisfy minimal health and welfare needs. This is particularly true for remote Indigenous communities. On the other hand, comparatively advantaged communities are able to access water both for welfare and leisure.<sup>29</sup> Socio-economic factors also come into play in determining attitudes towards water reuse when the reuse does not incur further costs. For instance, women and low-income residents are more likely to reuse greywater in their gardens.<sup>30</sup> Lower income households, however, may be less willing or able to pay for more sustainable water systems that have high initial set-up costs.<sup>31</sup> These households are also usually seen as being more sensitive to priced water regulations compared to higher income households.<sup>32,33</sup>

Such research has led to the proposal of various methods for understanding the socio-economic dynamics of water use. Some examples of this include:

- input-output analysis, which looks at interdependent relationships, to better quantify water value and ensure socio-economic efficiency<sup>34</sup>
- the use of a residential demand index map to incorporate socio-economic aspects into water allocation policy.<sup>35</sup>

Research has finally highlighted, however, that socio-economic equity is difficult to conceptualise in isolation because it intersects with so many other aspects of water equity.<sup>36</sup>

## Socio-cultural water equity

### Socio-cultural water equity

One objective of water equity results from combining elements of the social and the cultural (socio-cultural) needs of communities. A main element of socio-cultural water equity is understanding that water is not just an essential commodity. Water also has recreational, spiritual and developmental features. Researchers agree on the following ideas:

- Water is an important cultural resource for many communities. Large bodies of water can be socially significant for some communities. A shared scarcity of water can serve to unite other communities.
- Government policy has largely failed to recognise this water equity objective.
- Attending to socio-cultural equity requires adequate consultation with local stakeholders and community members.

Socio-cultural water equity requires water managers to re-think attitudes towards water allocation. It also emphasises the need to think objectively about the importance of water sources for metropolitan and regional communities.

**Socio-cultural water equity remains an ongoing challenge in Australia and abroad. Research has consistently shown the need to ensure that the community is sufficiently involved and provides input in deliberating socio-cultural equity. Socio-cultural equity can also encompass some of the socio-economic concerns outlined in the preceding section, though it also includes recreational, spiritual, aesthetic and developmental features of water.** Water has a value for communities that extends beyond financial measurements. This value can be defined by water's emotional and symbolic significance.<sup>37</sup> These understandings of water have traditionally been marginalised when strict economic assessments are used, even though these values are essential to broader water equity. A greater level of community engagement to fully understand local concerns and integrate members of the community into decision-making processes is important in achieving greater socio-cultural equity. This should then encourage decision-makers to act on such concerns so that community-agreed models of socio-cultural fairness and sustainability can be applied.<sup>38</sup>

The continued lack of sufficient recognition of these aspects of water policy in Australia are seen to occur as a response to other changes in society. For instance, a widening of political and social differences in remote Australian towns that may have previously been unified by shared water scarcity may result in people suddenly disagreeing about the water resource. It may also result in increasing gaps in socio-economic status and more disagreement in attitudes towards water conservation. This lack of alignment is made worse by the increasing view of water as a commodity and regulatory interventions, such as in remote towns including Copley and Lyndhurst in South Australia.<sup>39</sup> Research which incorporates perspectives of interactional justice has further highlighted increasing differences among members of Australian communities subject to extreme environmental conditions. Interactional justice, or justice in the context of interpersonal relations across a range of community stakeholders, has been used to explain how some communities have become divided over working with governments in water planning processes. A strong sense of interactional justice has served to divide some and increase community participation in others.<sup>40</sup>

A primary challenge, however, is to first acknowledge the importance of water in the social and cultural needs of the community. Society's understandings of water have shifted away from its use in development to now centre around the importance of sustainability, yet its socio-cultural significance is still not generally recognised.<sup>28</sup> Managing what are often competing social value judgments regarding environmental resources can be just as complex as the technical management of such resources. It may also be just as, if not more important, than technical management. In this context, research emphasises the importance of lowering decision stakes, or the significance of losses and gains for community members.<sup>41</sup> However, this research has largely been neglected. This is especially true with regard to impacts on Australian river communities.<sup>42</sup>

## First Nations water equity

### First Nations water equity

In Australia, the rights of First Nations people to water resources have historically been seen as unimportant. They have often been excluded from policy decisions regarding water management. Current policy making has largely continued this trend. However, ways of fostering greater Indigenous water equity are being developed, including through:

- acknowledging the social and cultural dimensions of water in governance frameworks
- integrating these dimensions into a more well-rounded process, which means including the cultural, environmental and economic values of water sources in the processes
- ensuring appropriate consultation with First Nations people and incorporation their perspectives into a responsive and changing approach to water management
- improving water and sanitation access for Indigenous communities.

Governments have sometimes changed policies so that they are more equitable for First Nations people. There remains considerable room for including the key perspectives of First Nations people in governance frameworks.

**For much of Australia's history, First Nations water rights have been marginalised.** The social, cultural, environmental or economic aspects of such rights have not been well recognised, particularly prior to the 1970s. State-based land rights legislation, introduced in the 1970s, and the Commonwealth *Native Title Act 1993* signalled major shifts in acknowledging the importance of equity. However, those legislative instruments, then and now, remain insufficient mechanisms for managing water rights.<sup>43</sup> In recent times it has led to further obstacles being created.<sup>44</sup> Indigenous water rights remain an important challenge from both a policy and research perspective. This is in part because water rights are, at a basic level, associated with socio-economic conditions faced by First Nations people, particularly those residing in remote communities.<sup>45</sup> First Nations people themselves have been and continue to be marginalised and prevented from engaging with water policy.<sup>46</sup> This marginalisation has been interpreted by some as an ongoing "water colonialism", which



encompasses the various political frameworks that continue to exclude Indigenous peoples from decision-making processes around water in settler-colonial countries.<sup>47</sup>

Researchers in Australia continue to critique policies relating to Indigenous water rights across the nation. These researchers argue that such policies perpetuate water colonialism and provide little social or economic benefit to Indigenous peoples. They also argue that these policies prevent sufficient acknowledgment of the social and cultural dimensions of water.<sup>48,49</sup> Existing systems of governance generally tend to regard Indigenous water rights and justice in the context of broader land and socio-economic development. This interpretation is particularly evident across northern Australia. In these states and territories, the primary goal of water equity is usually seen as economic independence for First Nations people.<sup>44</sup> Economic mechanisms are perceived as being useful and important aspects of Indigenous water rights. However, they are widely regarded as insufficient when pursued by themselves, and in the context of broader power imbalances.<sup>48</sup>

When cultural assessments of water are incorporated into systems of governance, they are often seen as very limited in scope. This is because there is often an overreliance on cultural heritage interpretations that are backed by simple archaeological principles. There is also insufficient acknowledgement of the complex, value-laden and procedural nature of cultural sustainability. Such frameworks have also served to separate the cultural from the material. In doing so, they fail to acknowledge how the cultural is interconnected with the material, and how a greater understanding of socio-cultural, procedural equity is needed to provide more sophisticated cultural assessments.<sup>38</sup> Victoria is one example of a state that has been particularly ambitious in terms of its plans for achieving Indigenous water equity. However, there have been criticisms aimed at Victoria because of its concentration on the cultural heritage perspective.<sup>44</sup>

Indigenous water equity is then generally considered a holistic, procedural process that encompasses socio-economic, socio-cultural and socio-ecological considerations.<sup>50,51</sup> These considerations are reflected across existing studies. One study of the significance of water for Indigenous peoples living in the Roper River region in the Northern Territory contends that Indigenous water equity depends upon recognising Indigenous value as encompassing “mythology, social identity, ethical conduct and ownership”. This research has brought about methods that allow a shift towards more equitable outcomes. One of these outcomes is the use of Strategic Indigenous Reserves, which allocate water for economic purposes and facilitate commercial development. Another is the promotion of a greater level of Indigenous engagement in decision-making concerned with water allocation.<sup>52</sup>

Another study, which examined the function of the Brewarrina Aboriginal Fish Traps in the context of water planning, found that the ability of water to act as a “connection” helped to define its Indigenous water value. Water connects past and present peoples with the environment through cultural heritages, which depend on sustainable flows. Justice and equity are therefore defined as the ongoing protection of benefits that are identified within an environmental system, including cultural benefits. Extending water value beyond its simple economic value and into policy considerations is also often linked to justice and equity.<sup>53</sup> Indigenous constituents, when surveyed, agreed with these processes. One study of Indigenous constituents’ attitudes to water markets across northern Australia found that although this constituency is less concerned with water “efficiency”, water markets were still seen as a useful way of preserving water values. Greater equity was able to be achieved through such water markets, assuming land and water rights were not “unbundled” and that environmental safeguards were effective and enforceable.<sup>54</sup>

In any case, there is still ongoing debate over exactly how to achieve Indigenous water equity across different jurisdictions and contexts. Some have proposed using adaptive governance regimes, where decision-making is decentralised and is addressed by collective actions at local levels, to integrate Indigenous values and knowledge into water management policies. This technique emphasises the importance of flexibility and fair processes in adapting to changing conditions. In this study, we found that local Indigenous decision-making has gained traction in some cases, such as the management of the Murray-Darling Basin (MDB). Unfortunately, limited water entitlements remain a major constraint in Indigenous contributions to water management in the MDB. Adaptive governance, however, presents a promising pathway towards greater equity because it allows for scientific and social perspectives to be integrated. This pathway also emphasises the importance of recognising cultural values and maintaining local level input into procedures.<sup>55</sup> Restorative and procedural justice and acknowledging the diversity of water values and policies for First Nations people is essential in achieving equity.<sup>56</sup>

# Citizens, markets, governments and water equity

## Citizens, markets and water equity

There is still debate about whether water markets, in Australia and abroad, can deliver equitable outcomes. There is also a question as to whether water markets are able to effectively respond to different environmental, social and economic interests. The most recognised reviews of whether water markets are fair talk about these ideas:

- There are trade-offs between efficiency and equity when water markets allocate water. These trade-offs make it difficult to value the social and environmental dimensions of water.
- Water markets are useful mechanisms for allocating water and for ensuring there are environmentally sustainable outcomes that benefit society.
- Both sides, however, agree that existing regulatory mechanisms are not good enough at achieving equitable outcomes. These mechanisms have led to growing mistrust between local stakeholders and government agencies.

Water markets overall require further development. However, debate continues as to whether a focus on efficiency can deliver equitable outcomes.

**In an international and Australian context, water markets are frequently used to control the allocation of water. These markets are often considered inequitable.** Perceptions of equity within the relationships between such markets, citizens and governments are complex. Research in Australia has consistently shown how local communities and irrigators are reluctant to agree with shifts in water allocation and the roles of markets. This is partially because water markets do not account for the socio-cultural complexities of managing water.<sup>57</sup> Such complexity is perhaps most obvious in the context of the management of the MDB. Federal government intervention and attempts to balance present and future environmental, social and economic interests has led to increased stakeholder distrust of governments. Researchers often point to the establishment of the Murray-Darling Basin Authority in 2007 as a governance decision that, although it addressed some environmental concerns, has further complicated understandings of social water equity and created new risks for stakeholders to manage.<sup>58</sup> Research has also suggested that there exists a major disconnect in perceptions of the Murray-Darling Basin Plan and its overriding goals. Surveyed government officials initially emphasised a focus on environmental outcomes. They then emphasised such outcomes as achievable through market mechanisms following the 2013 federal election. Furthermore, regional representatives suggested that such a focus, the complexity of reforms and a lack of adequate consultations, contributed to the neglect of local social concerns and underestimated the ability of the local community to adjust to changes. This has led to a fragmentation of governance processes and diminishing trust in federal authority from local and regional stakeholders.<sup>59</sup> Indeed, a lack of consultation at some stages in the Murray-Darling Basin Plan led to outright rejection by local constituents. The rejection was on the basis of perceived inequity, which appears to be made worse by disagreement between water authorities and communities.<sup>60</sup>

Research tends to suggest that water markets in Australia have led to a more efficient allocation of water.<sup>61</sup> However, such efficiency can potentially come at the cost of equity. This is not only the case in Australia, but globally. Evidence from multiple studies has shown that only a small number of water market studies support the idea that equity and efficiency are outcomes that can be achieved at the same time.<sup>61</sup> Such analysis reflects recent trends towards critiquing the main efficiency frameworks and water markets. Efficiency of water allocation is considered difficult to visualise on the basis that water as a public good has a social value that is hard to quantify. Efficiency is limited by time and generally does not take into account past or future investments. Because of this, value judgements in processes used to allocate water are often contestable.<sup>62</sup> Many people believe that when efficiency is used as a tool for measurement, it serves to make social inequities and political asymmetries worse because it does not make allowances for different social perspectives. Such arguments are supported by a range of studies that show that when the efficiency of markets is a primary aim of global and domestic water governance, it is a key obstacle to further equity.<sup>63</sup> There is also some evidence that supports this perspective in the Australian context. Researchers have noted

that in Australian water markets, water pricing during droughts tends to be the main cause of inequity at a local level.<sup>61</sup> Water markets also seem to be unable to capture elements of socio-cultural value, particularly for First Nations people.<sup>48</sup> Research has also suggested that Australian water markets may have substantial environmental consequences. One particular consequence is that governments are limited in their ability to restore natural flow regimes in many locations.<sup>64</sup>

Other researchers disagree with critiques of water markets. They emphasise that the social context in which water markets are implemented, and how the markets are regulated, are essential to their performance. When administered appropriately, water markets can prove an effective mechanism for achieving economically efficient water allocation. This is in addition to the ability of water markets to also allocate water in a socially and environmentally sustainable way. Market valuations may also serve as one of several available measurements for comparing and determining such allocations.<sup>65</sup> Australian water markets are widely regarded as setting a high standard for effective and equitable allocation. These markets provide an important model for developing nations.<sup>66</sup> In one study, researchers considered the performance of water markets in the MDB. They concluded that because the entitlements market was efficient and adaptable, it was able to successfully facilitate an equitable allocation of water for irrigators and maintain effective mechanisms for government to intervene to achieve environmental outcomes.<sup>67</sup> While the MDB is not an example of a perfect market and there are opportunities for further regulation to support effective competition, some researchers see criticisms of the MDB as exaggerated. They believe the market itself is unjustifiably blamed, rather than its regulatory features. Some researchers have suggested that such exaggerated perceptions of water markets as inequitable come from a range of myths and misunderstandings associated with such markets. These include, for instance, associating water markets with privatisation, and an overestimation of the public good aspects of water use. In this context water markets are seen as essential for managing water in an era of scarcity. This is particularly due to their ability to adapt to change, whether change is because of shifts in the allocation of water, uses of water or productivity of water use.<sup>68</sup> Water markets are, furthermore, seen as compatible both with equity and efficiency, assuming there is an appropriate amount of institutional support, the design of the market is effective and there is adequate regulation.<sup>69</sup> Furthermore, perceptions of procedural justice are essential to such processes. Procedurally robust frameworks are seen as genuinely able to regulate water allocations in the MDB in an equitable manner.<sup>70</sup>

Finally, the relationship between citizens, governments and private industry is also central in research into Public Private Partnerships (PPPs), which generally refer to mutually beneficial agreements between governments and the private sector in service delivery. PPPs have often been considered in the context of water infrastructure and as a way of enhancing its efficient allocation and risk management through long-term contractual partnerships between governments and the private sector. While potentially useful, the success of such partnerships can often be dependent on the strength of contractual arrangements or governance structures associated with the public partner.<sup>71</sup> In some regions, such as Asia, the use of PPPs to manage water projects has been met with a high degree of public mistrust and lack of sufficient regulation or oversight.<sup>72</sup> In others, the profit motivations of private partners have been seen as coming into conflict with the public interest.<sup>73</sup> The concept of public interest is then considered key to ensuring PPPs produce equitable outcomes in water policy, though it is often neglected. One study which examined the role of PPP in the construction of the Adelaide Desalination Plant, argued that the public interest was not sufficiently integrated into the PPP in this context, leading to a lack of transparency, accountability and inclusiveness and a broadly inequitable decision-making process, elements which are essential in the evaluation of public interest.<sup>74</sup> PPPs represent an additional area in which water management has been highlighted as inequitable and in which the relationship between citizens, governments and the private sector has not been successfully managed. There remains room firstly, for governments to define and manage matters of public interest more clearly. Secondly, there is room to further ensure an appropriate allocation of risks between public and private entities.<sup>75</sup>

# Equity in global governance

## Equity in global governance

Many researchers see frameworks for equity in managing water across several international institutions as very limited. This is because there are no clear definitions of what equity means. These researchers also remark on the poor understanding and engagement with water's many social values. Criticisms of equity in global water governance emphasise these points:

- Water equity frameworks adopted by international institutions, such as the United Nations and the Organisation for Economic Co-operation and Development, are seen as being based on settler-colonial politics. Settler-colonial politics underpin the oppression of a colonised group of people by another (the colonisers). These frameworks are also more concerned with efficiency rather than equity.
- These frameworks are claimed to be so unclear that they justify policy approaches that are incompatible with equity. They fail to account for the domestic and cultural dimensions of water. They also overlook the risks to human life that can be caused by exposure to contaminated water sources.
- International frameworks must adopt more holistic approaches to water management that create equity and adequate community engagement.

Research is highly critical of frameworks for equity in global governance, both from historical and current perspectives. There remains substantial room for development.

**The concepts of water equity in global governance have been consistently critiqued and perceived as inadequate, particularly over the past decade.** Research has highlighted how existing frameworks remain limited in focus. For example, frameworks tend to consider only drinking water and its quantity and whether it is safe to drink. This narrow focus has avoided considerations of the broader social and domestic requirements for water, including to maintain a household and raise children.<sup>76</sup> There has also been limited engagement with water equity in terms of risks associated with contaminated water, which may be dangerous to humans and the environment. These risks raise questions of exposure, rather than access.<sup>77</sup> Researchers argue that there should be a more holistic approach to international water management, and that there should also be greater public education and civic action with the intersecting demands of water.<sup>78</sup>

Research has also consistently highlighted the inadequacies of the global Integrated Water Resource Management (IWRM) approach. This approach is widely adopted and implemented in global governance, in particular by the United Nations Educational, Scientific and Cultural Organization (UNESCO). It has been argued that the IWRM approach is based on settler-colonial politics, which is incompatible with equitable advancement, particularly for Indigenous peoples.<sup>79</sup> The approach is also so malleable that it can justify a range of unsuitable policy approaches.<sup>80</sup> The United Nations Sustainable Development Goal (SDG) 6, Clean Water and Sanitation, has also been shown to have only a vague concept of equity. SDG 6 is criticised as having contributed little to equitable water policy, with management of the Nile Basin a prominent example of this.<sup>81</sup> The 2010 expert report reviewed by the United Nations leading up to its acknowledgment of the Human Right to Water and Sanitation, was similarly vague on equity and instead promoted “sufficiency” of water access.<sup>82</sup> Such broad uses of equity in international governance have been shown to hinder the ability of policy makers to engage sufficiently with communities. These uses of equity also seem to make efficient outcomes across contexts more difficult to achieve.<sup>64</sup> Such critiques are reflected across a range of international governance principles, which are considered to reinforce water colonialism and reinforce political asymmetries.<sup>83</sup> The governance principles adopted by the Organisation for Economic Co-operation and Development (OECD) provide another example of these problems. Making water governance more equitable will require both national governments and international institutions to come to terms with these existing deficiencies. It will also require these actors to support the involvement of less wealthy states, and to ensure they are not economically disadvantaged as a result of their involvement.<sup>84</sup>

## Equity framing in Australian water policy

### Framings of equity in Australian water policy

Legislators and the media have interpreted equity in water policy in different ways. There is a long history of research supporting these concepts. Researchers have also highlighted that there are many different understandings of water equity. Prominent framings of water in Australian policy include:

- the developmental capacity of water as an essential resource and a means to create better socio-economic conditions
- neoliberal framings, which view water as an economic good that should be divided up in an efficient way, often ignoring regional interests
- anthropocentric framings, which emphasise the main value of water and associated natural resources is its benefit to human life and activity.

Concepts of water equity have often changed in Australian policy. Different framings of equity have often been deployed in the interests of particular political positions or advocacy coalitions.

**Water policy in Australia has tended to be examined through the lens of how policy makers and advocates justify their decisions. Neoliberal, or market-oriented, concepts are some of the main ones that shape discussion about water policy.** Researchers have noted three consecutive periods with distinct framings for water policy in Australian media since Federation. Researchers take these different framings as indicating three dominant perspectives on the social value of water. During the first period from Federation to the 1960s, water was predominantly framed by media outlets and legislators according to its use value when harnessed to contribute to national socio-economic development and agricultural expansion. Between the mid-1960s and 1980, the dominance of this development ethos began to be challenged by a framing of water as an environmental resource requiring societal protection. However, the increase in environmental awareness was not yet sufficient to drive major policy reform. From the 1980s, the dominant framing for water policy and management was provided by the idea of sustainable resource management. The dominance of the sustainable development narrative was accelerated and reinforced by the Millennium Drought.<sup>28</sup> Other studies have noted a shift in narratives around water policy from water resources development as a necessary response to climate variability to water policy reform required as a result of previous mismanagement of water resources.<sup>85</sup>

Some argue that these changes result from a “neoliberalisation” of water policy in Australia, where water management reforms improve on prior water policy by deploying water markets with significant private sector involvement. More recent studies suggest that a shift to market-based solutions have isolated and excluded traditional family rural interests.<sup>86</sup> Researchers have also suggested that the concepts of economic efficiency and consumers as customers dominant in neoliberal reforms led to water policy treating diverse perspectives as unimportant or insignificant, including the perspectives of those who were advocating for greater social and environmental equity.<sup>87</sup> However understood, Australia’s water reforms of the last decades, particularly the reframing of the relationships between governments, markets and citizens, remain contested by some stakeholders. In a study of the management of the Lowbidgee and Chowilla floodplains, researchers highlighted how assessments of environmental risks and sustainability varied not only between regulators, landholders, and scientists, but within each community. This was due to the tendency of regulators and scientists to separate individual aspects of the environment and of landholders to separate their economic activities from negative environmental impacts in their respective social constructions. This highlights the importance of policy makers improving their understanding of the different ways in which stakeholders understand and relate to water and the environment and the direction of reform.<sup>88</sup>

Research has identified that both distributive and procedural justice have been central concerns of stakeholders, although there are no clearly shared definitions of these ideas. In a study of several key Australian water policy documents produced between 1994 and 2008, researchers demonstrated how distribution ac-

ording to need and procedural fairness were important to the way policies were framed. However, these principles were often not sufficiently defined and may have facilitated a shift away from equitable outcomes.<sup>89</sup> Other scholars have suggested that ideas of fairness and equity have been used to justify a “basic needs plus market” framework. This has seen policy makers intervene in water allocation to ensure basic needs are met. At the same time, policy makers have allowed the remaining water to be managed by markets. To some extent, these actions are likely to allow policy makers to avoid engaging with the difficult politics of water and frame the outcomes of reform as the result of the workings of the “free market”.<sup>90</sup> Other literature is more concerned with whether such concepts of justice and equity resonate with both constituents and policy makers. Central to such research is the idea that different framings of justice will be perceived differently depending on how and to what extent they are used. Research has suggested that while “collective action” framing at a local level can support the perception of justice, justice itself is a concept that evolves and changes, and that it exists arises as much out of the process of reform as it does the outcomes.<sup>91</sup>

Other researchers have examined the anthropocentrism of Australian water policy. Recent studies into Australian coastal management plans, for instance, have highlighted how such a framing of water can lead to local and federal policy responses that are created to regulate human safety and hazard management as dominant objectives. In doing so, researchers suggest that these responses shift discussion away from the problems of environmental degradation that are linked to immediate human activity as well as the longer-term impacts of climate change.<sup>92</sup> “Security”, meanwhile, is a final framing of water policy that has been examined within existing research. Such research has demonstrated that security can be used to justify a range of policy decisions across levels of government. These policy decisions can sometimes be in opposition to each other. For example, policy makers can define security against climate change to justify policy decisions at some levels, but then use security as an argument against inefficient irrigation in others.<sup>93</sup>

## The social psychology of water equity

### Social psychology of water equity

Social psychological water equity examines questions about how equity should be interpreted. Social psychological assessments continue to find and emphasise consistent aspects of water equity, shared between stakeholders and policy makers, such as:

- the association between how people perceive equity and their communal identity. Individuals are more receptive to policy if it is seen as being in line with or arising from local interests, including environmental interests
- universal fairness principles, which define equity, including procedural justice and communal interests that are often at odds with water allocations that are based on the outcomes of market forces
- inherent psychological conflicts, such as between ensuring the welfare of all beings (universalism) versus close contacts (benevolence). Trade-offs arising from these conflicts presents challenges to defining equitable outcomes.

At its core, social psychological equity focuses on understanding the psychological basis for community, stakeholder and policy maker perspectives.

**Social-psychological research demonstrates not just what equity should be but how it is understood by communities and policy makers.** Such approaches vary, which shows how complex this research area is. Researchers have consistently identified characteristics of both environmental and water equity when the question of fairness is framed around individual situations as well as more generic or universal situations. Studies into what water equity means for local community members usually highlight that including the local community in the policy making process is of critical importance.

The social psychology of equity is important to successful policy implementation, particularly at a local level as has been suggested by case studies into the MDB. This area of research is not always straightforward and

is particularly prone to outcomes that may conflict with stated objectives. For instance, a situation where changes need to be made to adapt to climate change but other factors make such adaptation more difficult for local communities.<sup>94</sup> However, existing research continues to highlight that how people perceive equitable procedures and processes is important. These perceptions are often based on common features. Local communities are generally receptive to sustainable policy reforms because the individuals within these communities are not only driven by personal preference but also by concern for their communal identity, which includes the environment.<sup>95</sup> More specifically, research into how water equity is understood across Australian communities has highlighted some universal fairness principles. In several studies that considered the perspectives of communities in areas where the allocation of groundwater was an important issue, researchers identified that those principles included valuing the rights of the environment, the importance of community consultation and representation in decision-making processes. Economic perspectives were observed as being less important and market allocations of water were considered to conflict with equity.<sup>96</sup> Later research considered potential differences between “universal” and “situational” fairness principles. The studies found that these universal principles remain robust in community interpretations of fairness. The researchers also noted that situational perceptions were often at odds with market allocations of water.<sup>97</sup> Research highlights the importance of improved understanding of issues of fairness for governments maintaining stakeholder trust and being able to effectively implement policy.<sup>98</sup>

The way in which such fairness principles are discussed and communicated within local communities is also important. Some research has highlighted that community members may find it difficult to define equity and fairness principles abstractly, though they are often well equipped to identify or define them within clear contexts. As such, researchers have emphasised the importance of transdisciplinary, holistic, and adaptive approaches to investigating the social psychology of equity. One such approach was outlined in a study of Deniliquin residents in 2007, where the integration of contextual specifics and an understanding of the diverse ways of communicating about fairness were central to the research method.<sup>99</sup> The findings of the research were then more easily applied to theories of equity and fairness.<sup>100</sup>

On the other hand, others have used social psychology to highlight the challenges in managing conflict between certain choices about water use where equity can be defined in different ways. These include, for instance, conflicts between universalism and benevolence, where universalism is an understanding and care for all, and benevolence is concern only with the welfare of people within a defined group. Other difficult psychological conflicts include those between power and security, both of which are essential in water management. Research highlights the importance of recognising such conflicts and finding ways to address the trade-offs they present in decisions about water allocation and use.<sup>101</sup> Recognising and better understanding stakeholders' psychological responses to water policy decisions is crucial to considering issues of equity and working with communities to resolve conflicts over water management. For instance, some researchers highlight “mortality salience” or concerns over physical safety and death, which prove highly motivational in political decision-making around water.<sup>102</sup>

Recent research is characterised by considerations of procedural justice and community trust in policy making processes and policy makers. One paper examined trust in the context of a potable wastewater reuse scheme in Toowoomba and found that as a result of the local council being identifiable as part of the community, residents were more likely to trust this authority. An important aspect of this research is the idea that adequate local government consultation, and demonstrating commitment to local interests, can greatly improve how the public responds to water management policies.<sup>97</sup> This is also the case for similar international research. An example of this is one paper that found farmers are more likely to adopt more sustainable agricultural practices through formal personal interventions as opposed to impersonal interventions. Formal personal interventions included farmer associations and training courses where farmers are able to communicate with community members in a more direct personal manner, compared to impersonal information dispersed through media sources.<sup>103</sup>

Overall, social-psychological research continues to demonstrate the importance of personal, community engagement in policy making using local officials to build and maintain trust. Community members generally agree to changes that are sustainable and environmentally conscientious, so long as they feel that appropriate consultation and communication has taken place. People are less likely to be convinced by markets and less personal interventions.

# Normative theories of equity

## Normative theories of water equity

Normative theories of water equity, which criticise existing standards or values, are usually proposed by schools of distributive and procedural justice. However, comprehensive accounts and sets of guiding normative principles are becoming more common. Normative theories of equity primarily:

- centre on equity in specific policy areas. These areas can include Indigenous justice or water infrastructure. They follow the distributive or procedural schools of thought in supporting consistent minimum access or a requirement to provide a service to all users
- support the identification of unfair outcomes, particularly those that impact the environment, cultural or social systems, and those that make power imbalances worse
- consider equity as a set of guiding principles and as a broader dynamic process rather than as just a single outcome.

There are not many broad theories of water equity. However, when existing research is studied, it provides an acceptable range of necessary principles.

### **Many claims about water equity relevant to policy intersect, come into conflict, or present difficult trade-offs. These are sometimes seen in outcomes, and are at other times seen in decision-making processes.**

As such, normative theories of water equity, which criticise existing standards or values, most often come from existing social justice traditions. These traditions, where trade-offs are given a distinct justification, include utilitarian (focusing on outcomes), distributive (focusing on socially just distribution of benefits) and procedural (focusing on fair processes) justice schools. There are few normative theories that extend beyond these traditions, though researchers have increasingly supported comprehensive approaches to addressing a range of identified water injustices. These may provide a contribution to policy makers considering how to include issues of equity and fairness in decisions about water policy.

Although stakeholders often ask for more inclusive and comprehensive approaches, most normative approaches to water equity are derived from distributive or procedural justice traditions. Fewer authors try to comprehensively explain how implementing policy consistent with an integrated normative approach to equity that bridges these traditions might work in practice.<sup>104</sup> Some holistic theories suggest resolving conflict over eco-centric or anthropocentric justice through an integrated approach.<sup>8</sup> Other researchers have tried to develop whole-system approaches to water equity that might incorporate important past and current perspectives into analysis.<sup>105</sup> More commonly, however, theories of normative water equity are highly contextual and limit their analysis to the expression of a single conception of justice.<sup>66</sup> This means that normative theories primarily emerge with relation to specific policy areas, including Indigenous water equity,<sup>106</sup> or water infrastructure. For example, one definition of equity, relating to water infrastructure, is presented as “the provision of a consistent minimum quality and quantity, determined at the local level, of water services to all end-users”.<sup>107</sup>

One prominent framework which has built on the traditions of distributive and procedural justice and has been used to analyse water policy in Australia, is the Social Justice Framework (SJF). The SJF incorporates distributive, procedural, and interactive justice alongside a range of analytical tools drawn from the field to support the design of equitable policy and for its subsequent evaluation.<sup>88</sup> This framework is outlined as adaptive and applicable depending on context, though firm in its emphasis on the normative principles of each form of justice. This means that the design and evaluation of equitable water policy through the framework places equal emphasis on all three components in principle, though some will ultimately be privileged to a greater extent than others and trade-offs will still need to be addressed.<sup>108</sup>

Other researchers focus on the differences between broader traditions of normative justice to consider what might make water policy equitable. This is particularly so in evaluating philosophies about water in the context of equity. This is the process that one paper uses to differentiate between the equitability of different



principles used to determine water access. These include the riparian doctrine, whereby land ownership bordering a body of water allows access, the doctrine of prior appropriation, which sees water access determined by “chronological possession” or regulated succession from a first use case, and the non-priority permit doctrine, where access is regulated by state authorities. This research concludes with the theory that the non-priority permit doctrine, which gives governing bodies authority over distributing water entitlements and can then allocate such entitlements depending on supply, may be the most equitable in the context of broader social justice traditions.<sup>109</sup>

Comprehensive normative theories of water equity are uncommon. Those that are most recognised emphasise acknowledging the varied and relational nature of water equity and avoid the idea that one approach can solve all equity problems. Using a grounded, critical approach, some researchers have suggested a relational theory of water equity that focuses on the identification of water inequity and how to then resolve each instance of inequity. Water equity can then be described as a response to “water-based forms of material dispossession, cultural discrimination, political exclusion and ecological destruction, as rooted in particular contexts”.<sup>110</sup> Rather than working towards a complete understanding of humans and ecosystems, or how water can be used to develop communities, relational justice focuses on examining how a political-ecological viewpoint can create uneven results within water policy and the ecological and social divisions that result from such inequalities.<sup>111</sup>

In a similar vein, some researchers have proposed a set of guiding normative principles for addressing equity, fairness and justice in water policy. These include:

- water as a common good
- ecological justice
- inclusive and procedural justice
- shared benefits and risks
- the meaningful resolution of imbalances of power.<sup>64</sup>

These principles may conflict in the formulation or implementation of water policy and difficult trade-offs may need to be made. However, they provide a set of pathways that could be usefully explored by policy makers and stakeholders.

## The behavioural economics of fairness, justice and equity

### Behavioural economics of fairness, justice and equity

Behavioural economists have explored models of human behaviour that can provide insights into fairness, cooperation and equity relevant to policy makers. In particular, the traditional economic assumption of self-interested behaviour is not consistent with available evidence. People are often more cooperative and more willing to incur costs to punish those they perceive as breaking social norms than a traditional model of self-interest would predict. Similarly, the context in which people make decisions has a significant influence on behaviour in ways that cannot be understood if pure self-interest is assumed.

**The traditional economic assumption of self-interested behaviour is not consistent with available evidence.** Behavioural economics research shows that economic models built on the assumption of self-interested behaviour do not represent human behaviour well. People are often more cooperative than the traditional

model of self-interest would predict; however, they are also willing to incur considerable costs to punish those they consider to have transgressed social norms (e.g. by free-riding in an otherwise cooperative setting).<sup>112</sup> This research subject extends to include the psychology of altruistic punishment. Some research suggests that altruistic punishment, alongside social cooperation, is important to small as well as large groups and may have been essential to social cohesion and cultural evolution. As communities expand on the basis of cooperation and by punishing those who violate social norms, even when such punishment incurs a cost, rule breakers become a smaller percentage of the population.<sup>113</sup> Research has also shown how those who punish rule breakers may be driven by a psychological imperative – the prospect of punishment carries an anticipated satisfaction for those carrying out the punishment.<sup>114</sup>

A strong, policy-relevant conclusion that can be drawn from this research is the extent to which cooperative collective action can be motivated by social norms in some institutional settings.<sup>113</sup> Conversely, “under certain conditions for the provision of a public good, a single selfish player is capable of inducing all other players to contribute nothing to the public good, although the others may care a lot about equity.”<sup>115</sup> It also suggests mechanisms by which poor policy and institutional design may lead to considerable resistance from stakeholders if they are widely perceived as unfair. Incentives to cooperate and participate in policy reform may depend on the design of policy processes as well as policy reform outcomes. This research suggests that it is likely policies focusing on financial incentives and an assumption of self-interested behaviour may not achieve expected objectives if they conflict with social expectations or are widely perceived as unfair.<sup>116</sup>

# Conclusion

This literature review has examined a wide range of academic research on equity, fairness and justice in water policy. Through a narrative review approach and a search criterion which focused on academic works engaging specifically with the concept of water equity, we were able to highlight ten thematic areas of study. These ten themes through which equity was considered were: environmental, socio-economic, socio-cultural, First Nations, citizens, markets and governance, global governance, Australian water policy, social psychology, normative theory and behavioural economics. These ten themes were developed from a synthesis of over 100 academic works, and each provide a perspective on how equity has been understood with relation to water policy.

Overall, we conclude that the literature does not provide widely agreed definitions for equity, fairness and justice in water policy. We find that even within individual fields there is much disagreement around how equity, fairness and justice should be defined or what would make policy development processes or policy outcomes equitable. Despite the need to acknowledge the diverse perspectives on equity, fairness and justice, we suggest that it is likely to be possible to develop a set of useful principles for policy makers. Some key lessons for policy makers can be drawn from the literature and will be further developed by Watertrust through this project. These key lessons include: the importance of context and understanding that equity, fairness and justice relate as much to policy processes as outcomes. Given policy will usually be made in contexts where ideas about equity, fairness and justice are not shared by all stakeholders, “clumsy”<sup>117</sup> solutions that “muddle through” are more likely to be effective over the long term than attempts to “optimise” based on a limited set of assumptions about human behaviour or a limited definitions of equity, fairness and justice.<sup>118</sup> To develop effective and implementable policy, policy makers need to understand and learn to incorporate conflicting perspectives on what is equitable, fair or just into the policy making process alongside the technical components of water management.<sup>42</sup>

Research into environmental water equity calls for a more holistic approach which acknowledges the intrinsic value of natural resources, their interdependence with human life and the current threats posed by climate change and broader economic shifts. These economic shifts are important for equity considerations as they can determine both access to water and how it is used by different segments of the population. Socio-cultural perspectives have historically been and continue to be neglected by policy makers, though water holds cultural significance for many communities. The views of First Nations people capture some of this cultural significance in addition to subsequent spiritual, historical, and economic valuations of water. These perspectives have not been incorporated into policy making processes historically and they are still not adequately incorporated. There remain significant opportunities for policy makers to improve their consideration of these approaches to considering equity, fairness and justice.

Methods and principles currently used to allocate water are contested on fairness and equity grounds with research often highly critical of the focus on efficiency through market mechanisms which defines many government programs domestically and internationally. Others argue that with effective regulation, water markets can be effective mechanisms for allocation. Critiques of efficiency frameworks also extend to frameworks for global governance, which are largely viewed as incompatible with substantial equity, or at least require greater development and specificity. In Australia, water policy is often seen as framed in terms of its capacity to shape socio-economic conditions or in terms of neoliberal policy interests.

Finally, social-psychological perspectives and normative theories of equity both highlight the importance of community consultation in the development of water policy. Social-psychological approaches note that water policy is most likely to be viewed as equitable by community members when it aligns with a communal identity and adheres to certain universal fairness principles. Normative theory, meanwhile, explains equity as a contextually dependent process, rather than an outcome, which might be better implemented by adhering to certain guiding principles. Behavioural economics research suggests that risks to effective policy design and implementation arise from policy making processes dominated by economic framings that assume self-

interested behaviour by stakeholders.

Policy makers across Australian and international institutions have not realised the potential benefits of more equitable policy making. While a range of approaches to better integrate the perspectives highlighted here exists, adequate consultation with stakeholders and a clear integration of their perspectives into policy making is essential. So too is understanding the contextual nature of equity and the extent to which ideas about equity and fairness can be mobilised towards political ends by stakeholder groups and advocacy coalitions to change the “terrain” for political struggles over water policy.<sup>119</sup>

# References

- <sup>1</sup>Grant, M. J. & Booth, A. A typology of reviews: an analysis of 14 review types and associated methodologies. *Health Info Libraries J* 26, 91–108 (2009).
- <sup>2</sup>Hames, S. and Marsh, R. 2024. *Equity, Fairness and Justice Concepts in Public Inquiry Submissions and Social Media*. Canberra: Watertrust Australia; Barry, N. and Marsh, R. 2024. *Equity, fairness and justice in water policy: a conceptual map*. Canberra: Watertrust Australia.
- <sup>3</sup>Hammersley, M. On “systematic” reviews of research literatures: a “narrative” response to Evans & Benefield. *British Educational Research Journal* 27, 543–554 (2001).
- <sup>4</sup>Lecy, J. & Beatty, K. Structured Literature Reviews Using Constrained Snowball Sampling and Citation Network Analysis. *Social Science Research Network*. SSRN Scholarly Paper No. ID 1992601, 1–15 (2012).
- <sup>5</sup>Page, M. J. et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ* n71 (2021).
- <sup>6</sup>Whetton, P. & Chiew, F. Climate change in the Murray–Darling Basin. In *Murray–Darling Basin, Australia* (eds Hart, B., Byron, N., Bond, N., Pollino, C. & Stewardson, M.) 253–274 (Elsevier, 2021).
- <sup>7</sup>Lee, S. & Jamal, T. Environmental justice and environmental equity in tourism: missing links to sustainability. *Journal of Eco-tourism* 7, 44–67 (2008).
- <sup>8</sup>Harris, L. M., McKenzie, S., Rodina, L., Shah, S. H. & Wilson, N. J. Key concepts, debates and research agendas. In *The Routledge Handbook of Environmental Justice* (eds Holifield, R., Chakraborty, J. & Walker, G.) 338–349 (Taylor & Francis Group, 2017).
- <sup>9</sup>Agyeman, J., Bullard, R. D. & Evans, B. Exploring the nexus: bringing together sustainability, environmental justice and equity. *Space and Polity* 6, 77–90 (2002).
- <sup>10</sup>Tokar, B. On the evolution and continuing development of the climate justice movement. In *Routledge Handbook of Climate Justice* (ed Tahseen Jafry) 13–25 (Taylor & Francis Group, 2018).
- <sup>11</sup>Quiggin, J., Adamson, D., Chambers, S. & Schrobback, P. Climate change, uncertainty, and adaptation: the case of irrigated agriculture in the Murray–Darling Basin in Australia. *Canadian Journal of Agricultural Economics* 58, 531–554 (2010).
- <sup>12</sup>Lee, S. & Jamal, T. Environmental justice and environmental equity in tourism: missing links to sustainability. *Journal of Eco-tourism* 7, 44–67 (2008).
- <sup>13</sup>Bell, D. & Carrick, J. Procedural environmental justice. In *The Routledge Handbook of Environmental Justice* (eds Holifield, R., Chakraborty, J. & Walker, G.) 101–112 (Taylor & Francis Group, 2017).
- <sup>14</sup>Hillman, M. The importance of environmental justice in stream rehabilitation. *Ethics, Place & Environment* 7, 19–43 (2004).
- <sup>15</sup>Schlosberg, D. *Defining Environmental Justice* (Oxford University Press, 2007).
- <sup>16</sup>De Wet, C. & Odume, O. N. Developing a systemic–relational approach to environmental ethics in water resource management. *Environmental Science & Policy* 93, 139–145 (2019).
- <sup>17</sup>Byrne, J. & Houston, D. Environmental equity/justice. In *Australian Environmental Planning: Challenges and Future Prospects* (eds Byrne, J., Sipe, N. & Dodson, J.) 206–217 (Taylor & Francis Group, 2014).
- <sup>18</sup>Hillman, M. Environmental justice: a crucial link between environmentalism and community development? *Community Development Journal* 37, 349–360 (2002).
- <sup>19</sup>Seckler, D., Barker, R. & Amarasinghe, U. Water scarcity in the twenty–first century. *International Journal of Water Resources Development* 15, 29–42 (1999).
- <sup>20</sup>Kumar, M. D., Shah, Z., Mukherjee, S. & Mudgerikar, A. Water, human development and economic growth: some international perspectives. *Proceedings of the 7th IWMI–Tata Annual Partners meeting on Managing Water in the Face of Growing Scarcity, Inequity and Declining Returns: Exploring Fresh Approaches*, 842–858 (2008).
- <sup>21</sup>O’Connell, E. Towards adaptation of water resource systems to climatic and socio–economic change. *Water Resource Management* 31, 2965–2984 (2017).

- <sup>22</sup>Clark, C. Race, austerity and water justice in the United States. In *Water Politics* (eds Sultana, F. & Loftus, A.) 175–188 (Routledge, 2019).
- <sup>23</sup>Salameh, E. Redefining the Water Poverty Index. *Water International* 25, 469–473 (2000).
- <sup>24</sup>Sullivan, C. Calculating a Water Poverty Index. *World Development* 30, 1195–1210 (2002).
- <sup>25</sup>Balata, E. E., Pinto, H. & Moreira Da Silva, M. Latent dimensions between water use and socio-economic development: a global exploratory statistical analysis. *Regional Sustainability* 3, 269–280 (2022).
- <sup>26</sup>Water markets and the food-energy-water nexus in Australia. In *Food, Energy and Water Sustainability: Emergent Governance Strategies* (eds Pereira, L. M. et al.) 111–132 (Taylor & Francis Group, 2017).
- <sup>27</sup>Wei, J., Wei, Y. & Western, A. Evolution of the societal value of water resources for economic development versus environmental sustainability in Australia from 1843 to 2011. *Global Environmental Change* 42, 82–92 (2017).
- <sup>28</sup>Lacey, J. Utilising diversity to achieve water equity. *Rural Society* 18, 244–254 (2008).
- <sup>29</sup>Satur, P. & Lindsay, J. Social inequality and water use in Australian cities: the social gradient in domestic water use. *Local Environment* 25, 351–364 (2020).
- <sup>30</sup>Ryan, A. M., Spash, C. L. & Measham, T. G. Socio-economic and psychological predictors of domestic greywater and rainwater collection: evidence from Australia. *Journal of Hydrology* 379, 164–171 (2009).
- <sup>31</sup>Mankad, A. & Tapsuwan, S. Review of socio-economic drivers of community acceptance and adoption of decentralised water systems. *Journal of Environmental Management* 92, 380–391 (2011).
- <sup>32</sup>Wichman, C. J., Taylor, L. O. & Von Haefen, R. H. Conservation policies: who responds to price and who responds to prescription? *Journal of Environmental Economics and Management* 79, 114–134 (2016).
- <sup>33</sup>Abu-Bakar, H. (Halid), Williams, L. & Hallett, S. H. Contextualising household water consumption patterns in England: a socio-economic and socio-demographic narrative. *Cleaner and Responsible Consumption* 8, 100104 (2023).
- <sup>34</sup>Chanan, A. A role for input-output analysis in urban water policy decisions in Australia. *Proceedings of the 8th International Input Output Meeting on Managing the Environment* (2008).
- <sup>35</sup>Jayarathna, L. et al. A GIS based spatial decision support system for analysing residential water demand: a case study in Australia. *Sustainable Cities and Society* 32, 67–77 (2017).
- <sup>36</sup>Nikolakis, W. Providing for social equity in water markets: the case for an Indigenous reserve in northern Australia. In *Water Resources Planning and Management* (eds Grafton, R. Q. & Hussey, K.) 629–646 (Cambridge University Press, 2011).
- <sup>37</sup>Brown, F. L. & Ingram, H. *Water and Poverty in the Southwest* (University of Arizona Press, 1987).
- <sup>38</sup>Syme, G. J. & Nancarrow, B. E. The Social and Cultural Aspects of Sustainable Water Use. in *Water Policy in Australia: The Impact of Change and Uncertainty* (ed Crase, L.) 230–247 (Taylor & Francis Group, 2008).
- <sup>39</sup>Wadham, B., Boyd, R., Willis, E. & Pierce, M. Reconstituting Water? *Climate Change, Water Policy Reform and Community Relations in South Australian Remote Towns. Human Geography* 6, 89–104 (2013).
- <sup>40</sup>Baldwin, C. Justice in water resource management. In *Resources and Environmental Justice: Australian Perspectives* (eds Lukaszewicz, A. et al.) 143–154 (CSIRO Publishing, 2017).
- <sup>41</sup>Rayner, S. A Conceptual Map of Human Values for Climate Change Decision Making. In *Equity and social considerations related to climate change* 57–73 (IPCC, 1995).
- <sup>42</sup>Downey, H., Spelten, E., Holmes, K. & Van Vuuren, J. A rapid review of recreational, cultural, and environmental meanings of water for Australian river communities. *Society & Natural Resources* 35, 556–574 (2022).
- <sup>43</sup>Macpherson, E. Lessons from Australian water reforms: Indigenous and environmental values in market-based water regulation. In *Reforming Water Law and Governance* (eds Holley, C. & Sinclair, D.) 213–234 (Springer, 2018).
- <sup>44</sup>Poirier, R. & Schartmueller, D. Indigenous water rights in Australia. *The Social Science Journal* 49, 317–324 (2012).
- <sup>45</sup>Nikolakis, W. Providing for social equity in water markets: the case for an Indigenous reserve in northern Australia. In *Water Resources Planning and Management* (eds Grafton, R. Q. & Hussey, K.) 629–646 (Cambridge University Press, 2011).
- <sup>46</sup>Jackson, S. & Langton, M. Trends in the recognition of Indigenous water needs in Australian water reform: the limitations of “cultural” entitlements in achieving water equity. *Journal of Water Law* 22, 109–123 (2011).
- <sup>47</sup>Hartwig, L. D., Jackson, S., Markham, F. & Osborne, N. Water colonialism and Indigenous water justice in south-eastern Aus-

## References

tralia. *International Journal of Water Resources Development* 1–34 (2021).

<sup>48</sup>Jackson, S. Compartmentalising culture: the articulation and consideration of Indigenous values in water resource management. *Australian Geographer* 37, 19–31 (2010).

<sup>49</sup>Jackson, S., Hatton MacDonald, D. & Bark, R. H. Public attitudes to inequality in water distribution: insights from preferences for water reallocation from irrigators to Aboriginal Australians. *Water Resour. Res.* 55, 6033–6048 (2019).

<sup>50</sup>Nikolakis, W. & Grafton, R. Q. Law versus justice: the Strategic Aboriginal Water Reserve in the Northern Territory, Australia. *International Journal of Water Resources Development* 38, 11–29 (2022).

<sup>51</sup>Bates, W. B. (Badger) et al. A tale of two rivers – Baaka and Martuwarra, Australia: shared voices and art towards water justice. *The Anthropocene Review* 0, 1–34 (2023).

<sup>52</sup>Jackson, S. & Barber, M. Recognition of Indigenous water values in Australia's Northern Territory: current progress and ongoing challenges for social justice in water planning. *Planning Theory & Practice* 14, 435–454 (2013).

<sup>53</sup>Bark, R. H. et al. Operationalising the ecosystem services approach in water planning: a case study of Indigenous cultural values from the Murray–Darling Basin, Australia. *International Journal of Biodiversity Science, Ecosystem Services & Management* 11, 239–249 (2015).

<sup>54</sup>Nikolakis, W. D., Grafton, R. Q. & To, H. Indigenous values and water markets: survey insights from northern Australia. *Journal of Hydrology* 500, 12–20 (2013).

<sup>55</sup>Bark, R. H., Garrick, D. E., Robinson, C. J. & Jackson, S. Adaptive basin governance and the prospects for meeting Indigenous water claims. *Environmental Science & Policy* 19–20, 169–177 (2012).

<sup>56</sup>Taylor, K. S., Moggridge, B. J. & Poelina, A. Australian Indigenous water policy and the impacts of the ever-changing political cycle. *Australasian Journal of Water Resources* 20, 132–147 (2016).

<sup>57</sup>Tisdell, J. G. & Ward, J. R. Attitudes toward water markets: an Australian case study. *Society & Natural Resources* 16, 61–75 (2003).

<sup>58</sup>Gale, M., Edwards, M., Wilson, L. & Greig, A. The boomerang effect: a case study of the Murray–Darling Basin Plan. *Australian Journal of Public Administration* 73, 153–163 (2014).

<sup>59</sup>Alston, M., Whittenbury, K., Western, D. & Gosling, A. Water policy, trust and governance in the Murray–Darling Basin. *Australian Geographer* 47, 49–64 (2016).

<sup>60</sup>Hussey, K. Using markets to achieve environmental ends: reconciling social equity issues in contemporary water policy in Australia. In *International Handbook on Social Policy and the Environment* (ed Fitzpatrick, T.) 300–326 (Edward Elgar Publishing, 2014).

<sup>61</sup>Bajaj, A., Singh, S. P. & Nayak, D. Impact of water markets on equity and efficiency in irrigation water use: a systematic review and meta-analysis. *Agricultural Water Management* 259, 1–15 (2022).

<sup>62</sup>Ingram, H., Whiteley, J. M. & Perry, R. The Importance of Equity and the Limits of Efficiency in Water Resources. In *Water, Place, and Equity* (eds Whiteley, J., Ingram, H. & Perry, R. W.) 1–32 (MIT Press, 2008).

<sup>63</sup>Wilder, M. & Ingram, H. Knowing Equity When We See It. In *Water Justice* (eds Conca, K. & Weinthal, E.) 49–75 (Oxford University Press, 2016).

<sup>64</sup>Tisdell, J. G. The environmental impact of water markets: an Australian case-study. *Journal of Environmental Management* 62, 113–120 (2001).

<sup>65</sup>Robison, J. & Kenney, D. Equity and the Colorado River Compact. *Environmental Law* 42, 1157–1209 (2012).

<sup>66</sup>Bjornlund, H. & McKay, J. Aspects of water markets for developing countries: experiences from Australia, Chile, and the U.S. *Environmental Development Economics* 7, 769–795 (2002).

<sup>67</sup>Grafton, Q., Horne, J. & Wheeler, S. A. On the marketisation of water: evidence from the Murray–Darling Basin, Australia. *Water Resource Management* 30, 913–926 (2016).

<sup>68</sup>Wheeler, S. A. Debunking Murray–Darling Basin water trade myths. *Aus J Agri & Res Econ* 66, 797–821 (2022).

<sup>69</sup>Grafton, R. Q., Libecap, G., McGlennon, S., Landry, C. & O'Brien, B. An integrated assessment of water markets: a cross-country comparison. *Review of Environmental Economics and Policy* 5, 219–239 (2011).

<sup>70</sup>Abel, N. et al. Building resilient pathways to transformation when “no one is in charge”: insights from Australia's Murray–Darling Basin. *Ecology and Society* 21, (2016).

<sup>71</sup>Lima, S., Brochado, A. & Marques, R. C. Public-private partnerships in the water sector: A review. *Utilities Policy* 69, 101182 (2021).

<sup>72</sup>Jensen, O. Public-private partnerships for water in Asia: a review of two decades of experience. *International Journal of Water Resources Development* 33, 4–30 (2017).

<sup>73</sup>Nizkorodov, E. Evaluating risk allocation and project impacts of sustainability-oriented water public-private partnerships in Southern California: A comparative case analysis. *World Development* 140, 105232 (2021).

<sup>74</sup>Ettehad, E., McKay, J. & Keremane, G. Justice in water resource management. In *Resources and Environmental Justice: Australian Perspectives* (eds Lukaszewicz, A. et al.) 61–78 (CSIRO Publishing, 2017).

<sup>75</sup>Greer, R. A., Lee, K., Fencl, A. & Sneegas, G. Public-Private Partnerships in the Water Sector: The Case of Desalination. *Water Resource Management* 35, 3497–3511 (2021).

<sup>76</sup>Goff, M. & Crow, B. What is water equity? The unfortunate consequences of a global focus on “drinking water”. *Water International* 39, 159–171 (2014).

<sup>77</sup>Perreault, T. What kind of governance for what kind of equity? Towards a theorization of justice in water governance. *Water International* 39, 233–245 (2014).

<sup>78</sup>Sultana, F. Water justice: why it matters and how to achieve it. *Water International* 43, 483–493 (2018).

<sup>79</sup>Schmidt, J. J. From integration to intersectionality: a review of water ethics. *Water Alternatives* 16, 321–345 (2023).

<sup>80</sup>Conca, K. *Governing Water: Contentious Transnational Politics and Global Institution Building* (MIT Press, 2006).

<sup>81</sup>Yalew, S. G., Kwakkel, J. & Doorn, N. Distributive justice and sustainability goals in transboundary rivers: case of the Nile Basin. *Front. Environ. Sci.* 8, 590954 (2021).

<sup>82</sup>Schmidt, J. J. Rights, resilience, and the UN High-Level Panel on Water. In *Water Politics* (eds Sultana, F. & Loftus, A.) 175–188 (Routledge, 2019).

<sup>83</sup>Taylor, K. S., Longboat, S. & Grafton, R. Q. Whose rules? A water justice critique of the OECD’s 12 Principles on Water Governance. *Water* 11, 809 (2019).

<sup>84</sup>Rose, A. Reducing conflict in global warming policy. *Energy Policy* 18, 927–935 (1990).

<sup>85</sup>Edwards, G. A. S. Shifting constructions of scarcity and the neoliberalization of Australian water governance. *Environ Plan A* 45, 1873–1890 (2013).

<sup>86</sup>Downey, H. & Clune, T. How does the discourse surrounding the Murray-Darling Basin manage the concept of entitlement to water? *Critical Social Policy* 40, 108–129 (2020).

<sup>87</sup>Miller, F. et al. A plan to push limits? Investigating the ecologically sustainable development dimensions of Melbourne’s Central Region sustainable water strategy. *Australian Geographer* 45, 19–35 (2014).

<sup>88</sup>Lukaszewicz, A., Davidson, P., Syme, G. J. & Bowmer, K. H. How the social construction of the environment affects people’s reactions to water policy. *Australasian Journal of Environmental Management* 20, 179–192 (2013).

<sup>89</sup>Lukaszewicz, A., Bowmer, K., Syme, G. J. & Davidson, P. Assessing Government Intentions for Australian Water Reform Using a Social Justice Framework. *Society & Natural Resources* 26, 1314–1329 (2013).

<sup>90</sup>Edwards, G. A. S. Justice, neoliberal natures, and Australia’s water reforms. *Transactions of the Institute of British Geographers* 40, 479–493 (2015).

<sup>91</sup>Patrick, M. J., Syme, G. J. & Horwitz, P. How reframing a water management issue across scales and levels impacts on perceptions of justice and injustice. *Journal of Hydrology* 519, 2475–2482 (2014).

<sup>92</sup>Elrick-Barr, C. E. & Smith, T. F. Problem framing for Australian coastal management. *Environmental Science & Policy* 127, 218–227 (2022).

<sup>93</sup>Taylor, K. S. Australian water security framings across administrative levels. *Water Security* 12, 2–5 (2021).

<sup>94</sup>Browne, A. L. & Bishop, B. J. Chasing our tails: psychological, institutional and societal paradoxes in natural resource management, sustainability, and climate change in Australia. *American Journal of Community Psychology* 47, 354–361 (2011).

<sup>95</sup>Vugt, M. V. Averting the tragedy of the commons: using social psychological science to protect the environment. *Current Directions in Psychological Science* 18, 169–173 (2009).

<sup>96</sup>Syme, G. J., Nancarrow, B. E. & McCreddin, J. A. Defining the components of fairness in the allocation of water to environmental



## References

and human uses. *Journal of Environmental Management* 57, 51–70 (1999).

<sup>97</sup>Syme, G. J. & Nancarrow, B. Fairness and its implementation in the allocation of water. *Proceedings of the 10th World Water Congress: Water, the World's Most Important Resource*, 105–113 (2000).

<sup>98</sup>Ross, V. L., Fielding, K. S. & Louis, W. R. Social trust, risk perceptions and public acceptance of recycled water: testing a social-psychological model. *Journal of Environmental Management* 137, 61–68 (2014).

<sup>99</sup>Gross, C. A Measure of Fairness: An Investigative Framework to Explore Perceptions of Fairness and Justice in a Real-Life Social Conflict. *Human Ecology Review* 15, (2008).

<sup>100</sup>Mikula, G. On the Experience of Injustice. *European Review of Social Psychology* 4, 223–244 (1993).

<sup>101</sup>Marini, D. et al. Socio-psychological perspectives on the potential for serious games to promote transcendental values in IWRM decision-making. *Water* 10, 1097 (2018).

<sup>102</sup>Wolfe, S. E. & Brooks, D. B. Mortality awareness and water decisions: a social psychological analysis of supply-management, demand-management and soft-path paradigms. *Water International* 42, 1–17 (2017).

<sup>103</sup>Caffaro, F., Roccato, M., Micheletti Cremasco, M. & Cavallo, E. An ergonomic approach to sustainable development: the role of information environment and social-psychological variables in the adoption of agri-environmental innovations. *Sustainable Development* 27, 1049–1062 (2019).

<sup>104</sup>Coggins, S. et al. Empirical assessment of equity and justice in climate adaptation literature: a systematic map. *Environmental Research* 16, 073003 (2021).

<sup>105</sup>Gerlak, A. K., Louder, E. & Ingram, H. Viewpoint: an intersectional approach to water equity in the U.S. *Water Alternatives* 15, 1–12 (2022).

<sup>106</sup>Robison, J., Cosens, B. A., Jackson, S., Leonard, K. & McCool, D. Indigenous water justice. *Lewis & Clark Law Review* 22, 841–921 (2017).

<sup>107</sup>Osman, K. K. & Faust, K. M. Toward operationalizing equity in water infrastructure services: developing a definition of water equity. *ACS EST Water* 1, 1849–1858 (2021).

<sup>108</sup>Lukasiewicz, A. & Baldwin, C. Voice, power, and history: ensuring social justice for all stakeholders in water decision-making. *Local Environment* 22, 1042–1060 (2017).

<sup>109</sup>Tisdell, J. G. Equity and social justice in water doctrines. *Social Justice Research* 16, 401–416 (2003).

<sup>110</sup>Boelens, R. *Water Justice in Latin America: The Politics of Difference, Equality, and Indifference* (University of Amsterdam, 2015).

<sup>111</sup>Boelens, R., Vos, J. & Perreault, T. Introduction: the multiple challenges and layers of water justice struggles. In *Water Justice* (eds Boelens, R., Perreault, T. & Vos, J.) 1–32 (Cambridge University Press, 2018).

<sup>112</sup>Fehr, E. & Gächter, S. Fairness and retaliation: the economics of reciprocity. *The Journal of Economic Perspectives* 14, 159–181 (2000).

<sup>113</sup>Boyd, R., Gintis, H., Bowles, S. & Richerson, P. Evolution of altruistic punishment. *Proceedings of the National Academy of Sciences* 100, 3531–3535 (2003).

<sup>114</sup>De Quervain, D. J.-F. et al. The neural basis of altruistic punishment. *Science* 305, 1254–1258 (2004).

<sup>115</sup>Fehr, E. & Schmidt, K. M. A theory of fairness, competition, and cooperation. *The Quarterly Journal of Economics* 114, 817–868 (1999).

<sup>116</sup>Bowles, S. & Polanía-Reyes, S. Economic incentives and social preferences: substitutes or complements? *Journal of Economic Literature* 50, 368–425 (2012).

<sup>117</sup>Verweij, M. Clumsy solutions and climate change: A retrospective. *WIREs Climate Change* 14, e804 (2023).

<sup>118</sup>Lindblom, C.E. The Science of “Muddling Through.” *Public Administration Review* 19, 79 (1959).

<sup>119</sup>Hacker, J.S., Pierson, P. After the “Master Theory”: Downs, Schattschneider, and the Rebirth of Policy-Focused Analysis. *Perspectives on Politics* 12:3, 645–662 (2014).



**Watertrust  
Australia** Ltd