Managing the Interface Between Humans and Nature: A Governance Perspective

Michael Spencer
BA (Melb), Grad Dip Public Policy (Melb), Grad Cert Management (AGSM)

Version 7.1 (submission copy)

January 2021

A thesis submitted for the degree of *Doctor of Philosophy* at

Monash University in *2021*

Faculty of Business & Economics (Monash Business School)

Department of Business Law & Taxation

Copyright notice

© Michael Spencer (*2020*).

I certify that I have made all reasonable efforts to secure copyright permissions for third-party content included in this thesis and have not knowingly added copyright content to my work without the owner's permission.

Abstract

This investigation is concerned with governance at the interface between humans and the environment. Starting from a belief that humans have failed to manage this interface in a manner that reflects stewardship of natural resources, the thesis explores the governance arrangements that manage this relationship, with a particular interest in the opportunity offered by collaborative governance. The thesis adopts a broad typology for forms of governance from Ostrom (1990), that is; Leviathan (command and control exercised by the state through regulation), private rights and markets (private legal ownership governed by competitive markets), and; collaborative governance (collective action).

The evolution, operation and success of environmental governance is investigated through three case studies involving different resources (forests and water) in two jurisdictions (Australia and China). After defining terms such as governance and stewardship, a multidisciplinary analytical framework is developed that adopts three perspectives or lenses; (1) a genealogical lens to understand the evolution of governance; (2) an institutional lens to understand the role of institutions, and; (3) a bounded rationality lens to consider how firms chose to participate or not participate in (water and forest) collaborative governance.

Each case study examines how governance arrangements evolve and their ability to achieve stewardship of nature. There is a particular focus on how collaborative governance emerges in the case studies and its ability to achieve stewardship. The case studies pay close attention to multi-stakeholder collaboration and, in the second and third case studies, an empirical analysis is used to understand impediments and opportunities for water stewardship in Australia and China. Results for each of the case studies are brought together and evaluated in an analysis and discussion chapter.

While recognising the limitations of case study research, the investigation seeks to add to the literature on collaboration through new exploratory research that is industry- and location-specific. It finds that collaboration offers a mechanism for achieving outcomes where there are conflicting stakeholder priorities. However, gaining participation of business requires alliances with supply chains and government agencies. In the long-term, cultural change will be needed starting with education and professional development programs for key professions such as foresters and engineers.

Declaration

This thesis is an original work of my research and contains no material which has been accepted for the award of any other degree or diploma at any university or equivalent institution and that, to the best of my knowledge and belief, this thesis contains no material previously published or written by another person, except where due reference is made in the text of the thesis.

Signature:.....

MICHAEL SPENCER

Date: 08 January 2021

Publications during enrolment

Spencer, M. (2021) The culture of water needs to change. In C. Davis & E. Rosenblum (Eds), *Sustainable Use of Water by Industry, Perspectives, Incentives and Tools.* International Water Association

Spencer, M. & Xu, Z. Z. (2021) Water stewardship: engaging business, civil society and government in China's freshwater challenges. In D. Guttman, Y. Jing & O. Young (Eds.) *Non-State Actors in China and Global Environmental Governance*. Palgrave

Acknowledgements

Without the encouragement, support and mentoring of Dr Alice de Jonge (Monash Business School) and Associate Professor Janet Stanley (Melbourne Sustainable Society Institute), over more than eight years, this project would not have would not have been completed. Along the way, Janet and Alice, who have been my supervisors from the beginning, have tried to keep me focused while I was being distracted by all manner of other activities. They have managed my enthusiasm as I charged down various rabbit holes and maintained a positive attitude despite, quite understandably wondering at times where the project was going. They were joined as supervisors by Professor David Griggs, during the early years of the project before he returned to the UK, and more recently, Dr Michael Duffy. Both contributed generously from their expertise and professional knowledge. I thank them all for their support and faith in me and the project.

Along the way, there have been numerous people who have offered support and provided insights that have benefited the project. From the Department of Business Law and Taxation at Monash; Dr Nicola Charwat, Dr Andrew Moshirnia, Professor Vince Morabito, Dr Anita Foerster, Wayne Gumley, Dr Petra Mahy and Angela Bott have all provided support and encouragement. I have benefited from discussion with fellow Monash Business School HDR students Joe Ren and Alice Gibson. Professor Dan Guttman from the University of New York Shanghai campus and Tianjin Law School has been a great support introducing me to people in his extensive network of contacts in China, helping with workshops in China and commenting on some aspect of the work. Professor James Guthrie and Associate Professor James Hazelton from Macquarie University have provided counsel and encouragement on some aspects of the project. Professor Greg Leslie and Leesa L'Episcopo from the University of New South Wales Global Water Institute provided an opportunity for me to test some of my ideas in a public forum at UNSW. Pavan Sukhdev also provided early support for the project by agreeing to lead a seminar held at the NAB offices in Melbourne.

The questionnaire described in Chapter 5 received support from a number of people. Zhenzhen Xu, Regional Manager Alliance for Water Stewardship Asia Pacific assisted with translation, preparation of the questionnaire, arranging interviews and support for conducting interviews. In Tianjin, Mr An Chen of TEDA EcoCentre provided support in reviewing the questionnaire, contacting respondents and supervising the interview process. Interviews in Tianjin were conducted by Xuejie Sheng (Ailsa) and in Kunshan by Ms Xu, Chang Ge (Sally) and the author. Assistant Professor Kathinka Furst, Duke Kunshan University, provided feedback on the questionnaire during the development and testing process. In Australia, Megan McLeod from the Alliance for Water Stewardship Asia Pacific provided assistance identifying interview subjects and arranging interviews. Dr Ian Hunt Manager of the Monash University Statistical Consulting Service

provided advice on statistical analysis and presentation. Some financial support was received from the Australian Government through the Australian Water Partnership for research in China.

In the final preparation, Megan McLeod kindly proofread early chapters and Ruth Fluhr (RK Editing) reviewed the final text. Ruth provided advice based on guidelines set by the Institute of Professional Editors including advice on language, spelling, punctuation and grammar. Suggestions were made based on the editor's professional opinion as to readability of the text however, decisions to accept or reject the editor's recommendation were at the discretion of the researcher. A copy of Ruth's Statement of Editorial Practice is attached at Appendix 5.

I would like to record my appreciation for the helpful and constructive comments of my examiners who offered differing, and insightful perspectives on the research from their different research, teaching, and professional backgrounds.

Finally, acknowledgements would not be complete without recognising the support, encouragement and forbearance of my family and particularly my partner, Penny Algar, who remained positive about the work despite the limitations it placed on our lifestyle. My daughters, Myra and Beatrix, have been a source of encouragement and inspiration throughout. My mother, Mary, who passed away during this project, provided support in her own way. Our extended family and friend group have all been politely interested and encouraging, some offering insights from their experience and reviewing early drafts of relevant chapters.

Of course, while recognising this support, the final product remains my responsibility.

Michael Spencer
May 2021

Summary Table of Contents

Table of Contents

Figures

Tables

Abbreviations

2030 WRG	2030 Water Resources Group
ACCC	Australian Competition and Consumer Commission
ACF	Australian Conservation Foundation
AFCS	Australian Forest Certification Scheme
AFS	Australian Forestry Standard
AWS	Alliance for Water Stewardship
AWS Asia-Pacific	Alliance for Water Stewardship Asia-Pacific
BCI	Better Cotton Initiative
BMP	Best Management Practice
CAB	Conformity Assessment Body
CBD	Convention on Biological Diversity
CCP	Chinese Communist Party
CEWH	Commonwealth Environmental Water Holder
CMT	Cut Make Trim
CMWP	Classic Modern Western Paradigm
CNIS	China National Institute of Standardisation
CNTAC	China National Textile and Apparel Council
CSR	Corporate Social Responsibility
CWR	China Water Risk
DairySAT	Dairy Australia Self-Assessment Tool
DFAT	Department of Foreign Affairs and Trade
ECC	Environment Conservation Council
ENGO	Environmental Non-Government Organisation
EPB	Environment Protection Bureau
ESS	Environmental Stewardship System
FSC	Forest Stewardship Council
GAN	Global Action Networks
GB CMA	Goulburn Broken Catchment Management Authority
HVP	Hancock Victorian Plantations
ISEAL	International Social and Environmental Accreditation and Labelling Alliance
KEDT	Kunshan Economic-Technical Development Zone
LCC	Land Conservation Council
MDBA	Murray-Darling Basin Authority
MDBC	Murray-Darling Basin Commission
MIS	Managed Investment Schemes
MMBW	Melbourne and Metropolitan Board of Works
NCC	National Competition Council
NEG	New Environmental Governance
NEPO	National Environment Protection Bureau
NGO	Non-Government Organisation
NMV	Net Market Value
NPM	New Public Sector Management

NPV	Net Present Value
NSW	New South Wales
NWC	National Water Commission
NWI	National Water Initiative
OECD	Organisation for Economic Co-operation and Development
PCB	Printed Circuit Board
PEFC	Program for the Endorsement of Forest Certification
PIMC	Primary Industries Ministerial Council
RFA	Regional Forest Agreement
RIT	Renmark Irrigation Trust
SA	South Australia
SAMI	South Australian Murray Irrigators
SEEA	System of Environmental-Economic Accounts
SEO	State-Owned Enterprise
SIR	Shepparton Irrigation Region
SLC	Societal Learning and Change matrix
SPSS	Statistical Package for the Social Sciences
SRWSC	State Rivers & Water Supply Commission
TEDA	Tianjin Economic-Technical Development Area
TMI	Tatura Milk Industries
UN	United Nations
UNEP	United Nations Environment Program
VAFI	Victorian Association of Forest Industries
VEWH	Victorian Environmental Water Holder
VPC	Victorian Plantations Corporation
WC&IB	Water Conservation and Irrigation Board
WFS	Wombat Forest Society
WRI	World Resources Institute
WSA	Water Stewardship Australia
WWF	World Wildlife Fund or World-Wide Fund for Nature

Note: all references to dollars ($) in this thesis are Australian dollars.

1 Introduction

1.1 The problem

This thesis is concerned with the relationship between humans and nature; a relationship that has evolved from one based on fear (Nash, 2014), spirituality and respect (Craig, Taonui, & Wild, 2012; Swineheart, 2013) and aesthetic appreciation (Berque, 2013), to one which has a contradictory focus on consumption and protection. It is this contradictory attitude to nature that gives rise to this study. On the one hand, humans see nature (its resources and services) as a source of wealth, growth and development; on the other, they have an appreciation of nature as a source of aesthetic and spiritual enrichment and a resource over which future generations also have a claim (Brundtland, 1987; N. Stern, 2007). This gives rise to a conflict between consumption and over-consumption and, conversely, a desire to preserve and protect nature from consumption. There is no guarantee this tension is resolvable (Engelman, 2013).

> *Without even speaking of the Good or the Beautiful, that is, of morality or aesthetics, we are incapable of reconciling the two dimensions according to which we conceive of the True today: the ecological and economic dimensions. The first tells us that our world is heading for a fall; the second, that we need to stay on course.* (Berque, 2013, p. 55)

The need to resolve these contradictory tendencies gained urgency throughout the industrial and post-industrial eras. The period starting from the first industrial revolution has been referred to as *the Anthropocene* (Crutzen & Stoermer, 2000), a geological epoch distinguished by the dominance of humans over nature with the aid of new technologies driven by engines (steam, internal combustion and electronic). The *great acceleration* refers to the post-World War 2 period when the rate of innovation increased, the capacity of machinery and technology to impact nature accelerated and population grew rapidly through improved health care and nutrition (Crutzen & Schwägerl, 2011). From this acceleration grew an awareness of the planet's limits (Meadows, Meadows, Randers, & Behrens, 1972). Adam Smith (1776) believed the day when nature would no longer be able to provide was so far in the future it was "too remote to call for serious analysis" (Barber, 1967, p. 23). By the 1970s there was an awareness that nature was a scarce resource in a closed system (Meadows, 2008). Yet, this awareness was unable to shift a belief in economic growth as the basic goal of human society.

The world came together in Stockholm in 1972, with a sense of urgency, for the first meeting of global leaders to address the interface between humans and the environment. Images of a fragile blue sphere set in dark space sent from the Apollo 8 space mission changed perceptions of our place in the universe and "fuelled environmental awareness around the world" (Torok et al., 2018).

The preparatory document, *Only One Earth*, described its purpose as being “to devise patterns of collective behaviour compatible with the continued flowering of civilisations” (Ward & Dubos, 1972). The conference considered the urgent need for “a common outlook and for common principles to inspire and guide the peoples of the world in the preservation and enhancement of the human environment” (UN, 1972). The Stockholm Declaration acknowledged humankind had reached a point where it needed to exercise more prudent care for environmental consequences; “to defend and improve the human environment for present and future generations has become an imperative goal” (UNEP, 1972).

Ten years later, the United Nations World Commission on Environment and Development identified the link between environmental and economic development arguing that the “interlocked ecological and economic threat with which people, institutions and governments now grapple” could not be solved by separating poverty and ecology. This, along with the importance of intergenerational equity, was reflected in Brundtland’s enduring definition of sustainable development: “Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (Brundtland, 1987).

Brundtland was convinced that change would have to go deeper than words, plans and strategies; “major changes were needed both in attitudes and in the way our societies are organised” (1987). Further international conferences followed: the Rio Earth Summit in 1992; the World Summit on Sustainable Development 2002, and; the Rio +20 Conference on Sustainable Development in 2012. New institutions were created, variously: at an international level (for example, the United Nations Environment Program or UNEP); at a national level (for example, Environment Protection Authorities), and; at provincial and municipal levels. These new institutions were complemented by a massive expansion in environmental laws (UNEP, 2019a). Yet the problems persisted.

Almost 50 years after Stockholm, the UNEP reported that global temperatures were rising 170 times faster than the natural rate, that more than 75 per cent of the planet’s land surface had been deliberately modified and that the flow of 93 per cent of the world’s rivers had been permanently altered (Msuya, 2019). The global outlook was that, while humans had benefited from improvements in technology, the planet’s environment continued to deteriorate, and that urgent action at an unprecedented scale was necessary to arrest and reverse the situation in order to protect human and environmental health and maintain the current and future integrity of global ecosystems (UNEP, 2019b). The prognosis for the planet continues to deteriorate with humans changing ecosystems more rapidly and extensively than at any comparable period as demand for food, fresh water, timber, fibre and fuel grow (MEA, 2005). It is argued (Barnosky et al., 2012; Rockström et al., 2009; Steffen et al., 2015) that human pressure is creating the possibility for a

state shift that would destabilise critical biophysical systems and trigger abrupt and irreversible change that could be catastrophic for human wellbeing.

There is no longer *one earth*, only a polarised, tribal planet. In 2019, a young woman, the future generation Brundtland identified as deserving consideration in 1987, addressed the United Nations. “This is all wrong” she started. “You have stolen my dreams and my childhood with your empty words”. She continued: “Entire ecosystems are collapsing. We are in the beginning of a mass extinction, and all you can talk about is money and fairy tales of eternal economic growth. How dare you!” (Thunberg, 2019). As she spoke, protests erupted under the banner of *Extinction Rebellion* and declarations of a *Climate Emergency* to stress the need for action. The rival tribe retorted: “This is not a time for pessimism; this is a time for optimism … to embrace the possibilities of tomorrow, we must reject the perennial prophets of doom and their predictions of the apocalypse. They are the heirs of yesterday’s foolish fortune-tellers” (Trump, 2020). One side berates leaders for failing to accept collective responsibility while the other believes problems will self-correct through “a growing and vibrant market economy …strong enough to overcome any challenge.” This group argues “alarmists” want to “eradicate our liberty” and “control every aspect of our lives” (Trump, 2020). Beliefs about individualism, freedom and markets became a counterpoint to notions of collective responsibility, stewardship and equity.

The image of a small blue island in a sea of black that brought on a spirit of collaboration and an urgency to protect what we had for today and future generations has faded. The failures of governments, markets, multilateral agreements, conferences and declarations to address over-exploitation of nature now sits within the context of a threatened, archaic, tribal and fragmented planet. The international community, having lost coherence and an ability to unite under a common banner - indeed with the institutions of multilateralism under attack - lacks the authority to bring nations together through the power of an idea. Science is at the centre of this conflict and a key to resolving the conflict, but it will not resolve the conflict by itself. This situation points to options for resolution being more fragmented, localised and bottom-up than Stockholm envisaged - hence, the interest of this investigation in seeing governance as a way to approach the problem.

1.2 A governance problem

Governance includes the mechanisms through which relations between humans and the environment can be mediated. In this investigation, it refers to institutional arrangements and institutional mechanisms for resolving contested priorities, values and power relations (Leach et al., 2007; Williamson, 1996). These concepts will be developed further in the literature review. For the moment, it is only necessary to observe that these institutional arrangements and mechanisms describe ways of managing human interactions with the environment. From Ostrom (1990), it is

noted that she outlines three forms of governance as relevant to managing *common pool resources* (non-private natural resources): Leviathan (command and control by the state through regulation); private rights (resolution of claims by private rights holders through markets), and; collaboration (*collective action* by stakeholders). Control by the state has been central to the formation of nations, competitive markets have been a core part of capitalist societies and Western liberal democracies (c.f., Macpherson, 1973). Collaboration has a history in traditional societies and more recent interest has developed in how it can be applied to *social dilemmas* such as conflict over common pool resources (Ostrom, 1990, 1998, 2010; E. Ostrom, R. Gardner, & J. Walker, 1994).

Ostrom's typology of three forms of governance provides a framework for this investigation. Based on evidence cited earlier, governance arrangements have failed to mediate relations between humans and the environment in a way that preserves the integrity of the planet. The interest of this investigation, however, is not to debate the science of whether or not the planet is failing. It is not to debate whether technology will develop solutions to over-consumption of resources or fail to do so; nor is it to attribute blame or responsibility to one tribe or the other. The interest is to understand the governance arrangements that manage this interface - how they emerge, the role they play, their successes and failures and whether there are options or combinations of governance arrangements that could be more successful. In particular, could collaboration play a greater role in mediating relationships to achieve better outcomes and, if so, what are the obstacles and how can they be overcome to better deal with social dilemmas? In adopting Ostrom's typology, it is accepted that this is not a complete list of options; the investigator is aware of the significance of traditional Indigenous governance and its success over thousands of years.

1.3 The investigation

To address these issues, the investigation will focus on four questions:

(1) how do different forms of governance emerge in the three case studies and what factors facilitate the emergence of collaborative governance?
(2) do the examples of collaborative governance offer opportunities for environmental stewardship that are better[1] than those offered by other forms of governance?
(3) if the answer to (2) is 'yes', what are the impediments to greater participation by business in collaborative forms of governance, and;
(4) how can these impediments be removed or overcome to achieve greater adoption of collaborative governance?

[1] "Stewardship" and "better" are articulated in the literature review

These questions are considered through three case studies selected on the basis of the investigator's personal experience as CEO of both the Forest Stewardship Council (FSC) in Australia and the Alliance for Water Stewardship (AWS) in the Asia-Pacific region. From a Heideggerian perspective, the participation of the investigator in the subject of the research recognises that people, including researchers, have no independent existence from the world in which they participate (Painter-Morland & ten Bos, 2016). If we are all *beings-in-the-world*, it represents an opportunity to collect, reflect and analyse these *lived experiences*. The three case studies are the management of:

(1) State forests in Victoria,
(2) water in the Murray-Darling Basin and,
(3) water in two regions of China.

The cases are fully described in each of the case study chapters.

Answering research question two (RQ2) requires defining successful environmental governance. Ideas of successful governance will be explored in the literature review through a review of the concepts of *sustainability, sustainable development* and *stewardship*, as well as the linked ideas of managing the planet as a closed system (Ison & Straw, 2020; Meadows, 2008; Meadows et al., 1972; Meadows, Randers, & Meadows, 2004) and equity of access to natural resources for both current and future generations (Brundtland, 1987; N. Stern, 2007). The investigation sees environmental governance as successful when it provides stewardship of natural capital. This concept of stewardship will be developed and defined.

In adopting a case study approach, the investigation accepts this form of inquiry does not provide generalisable findings. It accepts that findings will be more in the nature of intuitive generalisations (Starke, 2009) or working hypotheses (Lincoln & Guba, 2009) that may be applicable in similar circumstances to the case studies or may provide a basis for further research. Consistent with the phenomenological approach referred to earlier, the investigation does not set out to test a hypothesis but rather, to see what emerges from the cases. Nevertheless, as explained in Chapters 3 and 5, the mixed methods case study approach will include an element of empirical investigation through interviews with 54 water-using sites in China and Australia.

The investigation has been influenced by the critique of social science research that it is often too narrow, confined by a *reductionist* paradigm that separates knowledge and learning into isolated silos, each studied with increasing levels of abstraction and professional isolation (c.f. Costanza et al., 2015). The investigation adopts a broad multidisciplinary approach drawing from philosophy,

anthropology, political science, sociology, economics, law and behavioural psychology. This creates a somewhat grand and ambitious exercise but nevertheless, one that appeared more fruitful at the outset than other investigations. *Big questions* require breaking out of the fragmented disciplinary scholarship (c.f. Costanza et al., 2015; Marglin, 2008; Meadows, 2008).

The literature underpinning this analytic framework, as set out in the literature review, contains three elements or lenses:

(1) a social context lens to understand the evolution of governance,
(2) an institutional lens to understand the role of institutions and,
(3) a decision-making or choice lens to understand decisions to participate (or not) in collaborative governance.

The first lens relates to the *social context* in which governance develops and is maintained. It considers the evolution or *genealogy* of belief systems, power and the interaction between power and institutions to identify historical points that shape governance. The second lens draws on *institutional theory* to understand how institutions impact on and are impacted by governance. Concepts from historical and sociological institutionalism are relevant to understanding *lock-in* and the role of professions. The third lens is *bounded rationality* which acknowledges people, in most situations, are not capable of knowing and computing all possible information and therefore make decisions based on heuristics, rules of thumb and other short-cuts. Here the interest is in how external and internal factors can influence decisions to participate, or not, in collaborative governance. These lenses create a rounded, perhaps not complete, multi-disciplinary view on environmental governance.

The three lenses of the analytic framework, and the interrelationships between them, are illustrated in Figure 1. The three are shown as separate but interrelated concepts where, for example, choice decisions may be influenced by social context and institutions while social context may be influenced by institutions and the way in which decisions are made, etc. While direction flows may differ, the main point is to understand how governance is influenced by social context, institutions and choice decisions and simply accept that the three variables are likely to be interrelated. In other words, if this were a statistical experiment (which it is not), governance and, particularly, collaborative governance would be described as the *dependent variable* and social context, institutions and decision-making as independent variables. The interest is in how these variables influence governance in general and participation in collaborative governance in particular.

Figure 1: Three lenses of the analytical framework and their relationship with governance

The investigator is not aware of other instances where a multi-disciplinary analytical framework of this nature has been adopted for an investigation of three forms of environmental governance. There is considerable work that examines one or two forms of governance, but it is unusual for three to be examined in this way. It is hoped this will provide new insights.

1.4 Structure of the investigation

The investigation will proceed as follows: the next section will review relevant literature relating to concepts of governance and stewardship as well as to the analytical framework. That will be followed by a discussion of methodology. Three case studies will then be described and analysed using the analytic framework. The first examines evolution of forest policy in Victoria and the emergence of different forms of governance. A brief chapter then outlines the development of water stewardship and the empirical tool used to assess its adoption as a precursor to the next two water case studies. These case studies examine water management in the Murray-Darling Basin and water management in China. The findings of the case studies are analysed in the penultimate chapter using the questions posed at the outset of the investigation. The final chapter summarises the investigation, its findings and issues for further investigation.

2 Literature Review

This literature review will outline the theoretical basis for this investigation. It will first discuss the subject of the investigation – governance - and then the goal of governance: sustainability, sustainable development or stewardship. This will be followed by discussion of literature relevant to the three lenses of the analytical framework: social context and the development of governance; institutions and institutional theory, and; choice, decision-making and *bounded rationality*.

2.1 Governance

Governance was brought into contemporary usage by the World Bank (Pagden, 1998). The Bank introduced the term to a 1989 report on prospects for sustainable growth in Africa arguing a "failure of governance" necessitated a series of structural reforms (Lateef, 2016, p. 3). The Bank later defined governance as "the manner in which power is exercised in the management of a country's economic and social resources", including both the public sector and other institutions (World Bank, 1991, p. i). The word is derived from the Latin for 'steering' and is commonly associated with government, for example; "the act or process of governing or overseeing the control and direction of something (such as a country or an organisation)" (Mirriam-Webster, 2020). Following the World Bank report a "growth industry" emerged in the study of governance that was accompanied by "theoretical and conceptual confusion" (van Kersbergen & van Waarden, 2004, p. 144).

In economics, governance described the institutional setting for markets and the governance of transactions. In the public sector, it was associated with New Public Sector Management (NPM) and, as with the original World Bank report, good governance became a call to accept private sector practices and markets to minimise transaction costs and scope for political interference. (Leach et al., 2007; Pagden, 1998). In the corporate sector, governance developed a life when linked with the word 'corporate' to describe a framework of rules, relationships, systems and processes by which authority is exercised and controlled in a corporation including the mechanism through which companies are held to account (Owen, 2003, p. xxxiii). Governance can relate to both the public and private sector and both public and private goods.

Governance developed mixed meanings in the social science literature. Van Kersbergen and van Waarden (2004) identify nine new approaches to governance that emerged. Common features include that: they are pluricentric rather than unicentric; that networks (whether internal or external) play important roles; there is an emphasis on the process of governing rather than structures of government; there is an element of conflict resolution or building cooperation between actors, and; many are normative (although prescriptions are generally for an ideal or empirical reality). Where

governance is normative it is associated with a descriptor such as *good governance*, *corporate governance*, *multilevel governance* or *environmental governance*. It has moved beyond structural and institutional arrangements of government to include private, semi-private as well as public governance exhibiting different forms and mechanisms (Holley, Gunningham, & Shearing, 2012; Renckens, 2020; van Kersbergen & van Waarden, 2004).

2.1.1 General concept of governance

Williamson (1996) proposes that governance is "the means by which *order* is accomplished in relation to which potential *conflict* threatens to undo or upset opportunities to realise mutual gains" (p.12 emphasis in original). He sees governance as an institutional framework comprising two elements: the institutional environment (the *rules of the game* – rules and regulations as well as moral, ethical and behavioural norms) and the institutions of governance (the *mechanisms of governance*) for example, markets and hierarchies. Governance in this concept becomes a conceptual framework for resolving mutual problems through a set of norms and institutions.

Leach et al. (2007) provide a political perspective albeit reaching similar conclusions. For them, governance is the political and institutional relationships and processes central to the interactions between people, technology and environment. They see governance in the context of power relations between actors. It determines how policy problems are defined and addressed, how contested values and priorities are dealt with and, who wins and who loses from these contests: "to understand how and why social-technological-ecological dynamics unfold in particular ways, and their implications for sustainability, poverty reduction and social justice, then we need to understand the governance processes involved" (Leach et al., 2007, p. 2).

They are interested in what they describe as Foucault's *conduct of conduct*; activity that shapes, guides or affects the conduct of people (*governmentality*). In this conception, political processes and institutions are present throughout society, not just in formal government structures. Governance allows consideration of interactions at a multitude of levels between multiple actors across different scales involving power relations to resolve different values and priorities. Thus, they see governance as a tool for understanding the diversity of relationships that exist in networks and the inevitable non-linear, dynamic complexities of public policy.

Melding these elements gleaned from Williamson and Leach et al., governance has two elements: (1) rules of the game, and; (2) institutional structures of hierarchies, markets and networks (organisations). These elements are scattered throughout society at different levels acting as tools to manage relationships and resolve differences. For this investigation, governance provides a

mechanism through which conflict over *public goods* and *partial public goods* (not privately owned or for which a market does not exist) can be resolved.

2.1.2 Three forms of governance

The three forms of governance considered here – regulatory control, market-based and collaborative - have been present in the literature for decades, although not always referred to as governance. Dahl and Lindblom (1953) identified four central processes of politico-economic systems in the United States; the market, hierarchy, polyarchy (control from the bottom)[2] and bargaining between leaders. Through these systems, they argue humans can create their collective destiny (Wright Mills, 1954). Hayek in 1945 and Williamson in 1975 identified *markets* and *hierarchies* as alternative mechanisms for resolving conflict (Williamson, 1996). Powell (1990) argues this duality fails to capture a third organisational form he refers to as a *network* that is coordinated by trust and reciprocity and relies on neither administrative fiat nor market exchange (Ansell, 2019)[3]. Ostrom (1990) articulated a similar concept in her theory of collective action based on self-organising and self-governing to solve social dilemmas and conflicting interests.

A structural approach to the hierarchies-markets-networks typology can be found in work that relates governance to three sectors of society: government; business, and civil society (Coghill, 2002). This approach proposes that different *forms of governance* operate in the domains of the state, the market and the community, each with its own way of 'steering':

- Public governance depends initially on voluntary compliance but ultimately command and coercion for enforcement by state authority
- Corporate governance is primarily concerned with the rules of commerce and is ultimately enabled though markets, trade and exchange
- Civil society governance exists within entities as small as the family or as large as major religions and is enabled by shared values and commitments.

Bell and Park (2006) identify three *modes of governance*: top down control and regulation by the state (hierarchies); markets as a form of resource allocation, and; networks involving public-private collaboration. Waddell (2007) adds a further dimension by considering *drivers of change*. His *Societal Learning and Change* (SLC) matrix identifies three *drivers of change* that are associated with the three *modes of governance*: mentally centred change for political systems; physically

[2] The notion of *polyarchy* in Dahl and Lindblom describes a more traditional representative form of representative government than *polycentric governance* which is a form of collaborative governance.
[3] Due to COVID-19, it has not been possible to access hard copies of books from libraries. Ansell quotes Powell from Powell, W.W. (1990), 'Neither market nor hierarchy: network forms of organisation', in B. Straw and L.L Cummings (eds), *Research in Organizational Behaviour*, Greenwich, CT: JAI Press, 295-336

centred change for market systems, and; emotionally centred change for social systems. Each has a core dynamic: for government it is administering, developing, applying and enforcing rules and laws; for business it is managing, setting objectives and targets, and; for civil society, it is bringing people together in a community and creating visions and actions to realise them from the ground up. These descriptions create a sense of how, where and why each mode will be adopted.

Having defined some important principals associated with each form of governance, the following sections explore these in more detail, including how each seeks to manage the relationship between humans and the environment.

2.1.3 Leviathan, hierarchy, command-and-control

For Ostrom (1990) Hobbes' *theory of the state* (Hobbes, 1651) provides the foundation for regulatory governance; power exercised by a ruler who gains a monopoly over the use of force in a society and is thereby able to threaten subjects with sanctions if they do not cooperate in providing the resources the state requires for services such as defence. Hobbes sees this as a form of social contract:

> *The only way to erect such a common power, as may be able to defend [people] from the invasion of foreigners, and the injuries of one another, and thereby to secure them in such sort, as that by their own industry, and by the fruits of the earth, they may nourish themselves and live contentedly, is, to confer all their power and strength upon one man, or upon one assembly of men, that may reduce all their wills, by plurality of voices, unto one will.* (Hobbes, 1651, p. 89)

This Hobbes describes as *"that great Leviathan"* that has *"the use of so much power and strength … that by terror thereof, he is enabled to form the wills of them all, to peace at home, and mutual aid against their enemies abroad"* (p. 89-90). Government has evolved into different forms and different ways in which authority is established. In liberal-democratic countries, it is normally by election and in totalitarian countries often by revolution. In some cases, authority is still acquired through hereditary entitlement. Nevertheless, the general theory of the state remains relevant.

Governments manage the relationship between humans and the environment through laws and regulation. These laws generally impose costs such as fines, imprisonment or taxes for misuse (over-extraction, emissions and pollution), or rewards such as subsidies and payments to encourage less bad or better use of environmental services[4]. However, problems emerge such as: regulatory failure (poor laws, lack of enforcement or inadequate punishment); an inability to measure and account for the environment in a way that allows it to be considered equally with

[4] Originally outlined by Pigou (Pigou, 1932) and developed considerably in the field of environmental economics.

traded goods, and; a moral failure to account for the interests of future generations preferencing short-term economic benefit over longer-term stewardship.

Rosanvallon (2011) argues failures of regulatory governance in liberal democracies result from a power imbalance that provide some special interests disproportionate influence: “The initial idea [of representative democracy] – that of a temple of public reason in which representatives would debate the definition of the general interest – in practice devolved into a system of bargaining in thrall to special interests” (Rosanvallon, 2011, p. 9). As will be argued below and illustrated in the case studies that follow, these failures are not confined to liberal democracies and can be more broadly attributed to a failure within a regulatory governance regime.

Environmental law rests on the power and authority of the state regardless of the form (democratic, totalitarian etc.). All aspects are dependent on the state (Godden, Peel, & McDonald, 2019). The UNEP argues the goal of environmental governance should be to change behaviour toward sustainability “by creating an expectation of compliance” (2019a, p. 13). However, despite a massive expansion of environmental laws and institutions following the Stockholm Conference in 1972, the UNEP found that often environmental laws “exist mostly on paper because government implementation and enforcement is irregular, incomplete, and ineffective” (p. 3). The reasons are not technical but political and human due to a perception that environmental rules impede development and growth. “It has become increasingly apparent that failure to implement and enforce environmental law directly threatens environmental progress and sustainability” (p. 13). Environmental laws alone do not solve the problem.

Rosanvallon sees the failure of representative government to resolve *social dilemmas* as an explanation for growing interest in alternative governance arrangements. “The idea is that there is more than one way to act or speak ‘on behalf of society’ and to be representative” (Rosanvallon, 2011, p. 8). Reformulating democracy as a form of collective action, Lenoble and Maesschalck (2010) argue democratic theory should concern itself with conditions that allow collective action to produce a form of common life that meets the normative expectations of its members. They see the rise of new forms of participation since the 1990s as strengthening citizens’ participation in power. At its heart this is the question of power. Rosanvallon (2018, p. 11) points out “power is not a thing, but a relation” and it is the nature of that relationship that is key.

2.1.4 Markets and private rights

Markets have existed since humans first traded tools and food. It is only recently that markets have been viewed as an alternative to collectivism, particularly in relation to command and control by government. This extension of market governance had its origin in German literature following the

demise of the Austro-Hungarian empire, debates in Britain after the Great Depression and World War 2 about the role of government, the rise of national socialism in Germany and socialism in the USSR. The most recognisable voice of this early development was Friedrich Hayek; a life-long opponent of socialism and advocate for individual liberty and free markets (Caldwell, 1997). His opposition to a continuation of World War 2 central planning and post-Keynesian government intervention was based a commitment to individualism over collectivism.

> *Our generation has forgotten that the system of private property is the most important guarantee of freedom. It is only because the control of the means of production is divided among many people acting independently that we as individuals can decide what to do with ourselves.* (Hayek, 2005, p. 41)

Hayek's influential book, *The Road to* Serfdom, had a profound influence on generations of intellectuals and politicians (Caldwell, 1997; Grocott, 2015). His circle, that he assembled at Mont Pelerin in 1947 included many that would become leaders of the libertarian intellectual tradition: Milton Friedman, Ronald Coase, Gary Becker, James Buchanan and George Stigler (MPS, 2020) as well as Karl Popper. They would advocate free market solutions to complex social problems while railing against socialism and the role of the state. Their views would develop to a point where many argued that there was virtually no service that could not be provided in a superior manner by the private sector (Caldwell, 1997; Friedman, 1990, 1992; Posner, 2011).

For Hayek, markets were not merely mechanisms for the allocation of scarce goods and services between competing ends (Robbins, 1935), but a system of social order. Caldwell argues that he started from a view that the market system was an example of spontaneously organised complex social orders that "generate unintended beneficial consequences" – that is, a self-ordering system (Caldwell, 1997, p. 1871). Hayek believed these orders, in contrast to purposefully constructed socialist institutions, were products of human action even though they were not intentionally designed as such. He was critical of the *engineering mentality* that required constructed institutions and moral codes, and believed that human action could be coordinated in the absence of a central controlling authority – that is to say, markets as a form of governance.

Hayek opposed all forms of collectivism. "Almost all the traditions and institutions which have moulded the national character and the whole moral climate of England and America are those which the progress of collectivism and its centralistic tendencies are progressively destroying" (Hayek, 2005, pp. 56-57). Hayek saw the world in binaries: freedom versus totalitarianism; liberty versus control; markets versus planning; the state versus the market. Those who supported a liberal social order "must attack the intellectual foundations of collectivism" (Williams, 2005, p. 11).

Mainstreaming private rights

These ideas found a fertile base in the United States. Platt (2014) argues the framers of the U.S. Constitution were profoundly influenced by 17th century English liberal philosopher John Locke's view that people are naturally in "a state of perfect freedom". The role of government is confined to the preservation of mankind and the "preservation of their property (Locke, 1689). The right to be protected in the enjoyment of *life, liberty and property* (from government and by government) became a cornerstone in American constitutional thought in the second half of the 18th century (Heyman, 1991) . Burke (1775) believed the American colonists "emigrated from [England] when [respect and adoration of freedom] was most predominant" He believed they were "devoted to liberty" (p. 57). Hayek and his colleagues reunited these American liberal traditions with their European roots and this became a powerful intellectual force in the post-war period.

Coase (1960) disputed Pigou's (1932) *welfare economics* theory and the need for government intervention to resolve market failure that underpinned environmental economics. *Coase theorem* maintained that market failure was more efficiently resolved by bargaining between affected parties (for example a polluter and the party impacted by pollution), thereby lowering transaction costs, compared to government intervention, and producing an optimal solution. Friedman became an effective popularist of free-market economic thinking: "The way to achieve economic prosperity is through private market enterprise. Government enterprises everywhere are failures." (Friedman, 1992). His followers celebrate Milton Friedman days sharing quotes such as: "If you put the federal government in charge of the Sahara Desert, in 5 years there'd be a shortage of sand" (Reinis, 2015). By the end of the 20th century, the idea that market-based solutions were always superior to government intervention was embedded in basic American textbooks (c.f. Stiglitz & Walsh, 2006).

Coase articulated his theorem at the University of Virginia's Thomas Jefferson Centre for Political Economy founded by another member of the Mt Pelerin Society, James Buchanan (with Warren Nutter) "to preserve social order built on individual liberty" (Munger, 2018). It became the home and an important intellectual centre for the creation and early development of public choice theory (Magness, 2020). Public choice theory brought rational choice, homo economicus, to public policy considerations arguing that like private citizens, politicians made decisions to maximise their individual benefit rather than the Pigouvian concept of maximising social welfare. It provided the intellectual foundation for what became New Public Sector Management (NPM) that promoted private sector management techniques and market-based solutions to government administration with the aim of increasing efficiency, better targeting outputs and reducing rent-seeking behaviour (Buchanan & Musgrave, 1999; Kombat & Watzold, 2019; Schwartz, 1994).

Private rights and environment

Posner (2011) built on Coase's theorem[5] to propose that private rights could resolve conflict between humans and the environment. He argued that as "rational maximizers of their satisfactions" (p. 5) humans could maximise value from their relationship with nature if three conditions were satisfied: (1) every valuable resource (scarce as well as desired) was owned by someone (universality); (2) ownership connoted unqualified power to exclude others from using it (exclusivity), and ; (3) ownership rights were freely transferable (transferability). Property rights, in this view, provide a basis for dealing with the problem of *public goods* by essentially making them private. By way of example, Posner offers a fishery that is over-exploited because no one has *exclusivity.* The ability to control how the fishery is used, would, he argues, be better managed by a private owner. Similarly, a forest would be better managed by a private owner maximising utility from the total resource than as a government-owned forest where trees are locked-up or over-exploited. Private owners of common resources would manage the resource more efficiently and in a way that would maximise individual liberty and utility. Posner became one of the most prolific and well known proponents of market-based approaches to the law (Honoroff, 1983).

Approaches to solving public sector challenges based on private rights became the instrument of choice for a new generation of rational university-educated public sector managers who entered government from the 1970s. Public Choice theory and New Public Sector Management (NPM) are built around the notion that the private sector is more efficient than government and that allocation of public resources is more efficient if market-based approaches are adopted. New approaches to environmental management emerged from this thinking such as pricing systems and payment for ecosystem services. Pricing systems involve creating a private entitlement to an environmental public good and a market through which this entitlement is traded. Scarcity or abundance of the good will be reflected in price such that abundance causes prices to fall and scarcity of the good causes prices to rise and demand to fall. The public interest in protecting the good from over exploitation is managed by placing a cap on the amount of the good (say water or wood) that can be extracted. Previous over-allocation can be resolved by government buying back the over-allocation on the open market.

Private rights approaches have evolved into a range of mechanisms. As well as cap-and-trade, described above, there is an evolving interest in legal personhood; that is, assigning legal personhood to nature that allow nature to exercise the same legal rights as humans (M. Davies, 2015; Godden et al., 2019; O'Donnell & Talbot-Jones, 2018; Stone, 1972). Rights-based approaches have been inserted into a range of situations with humans acting as custodians.

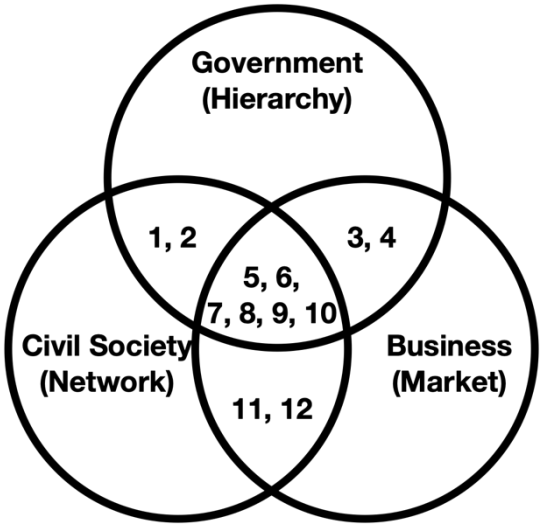
[5] Posner also acknowledges Guido Calabresi, *Some Thoughts on Risk Distribution and the Law of Torts*, 70 Yale L.J. 499 (1961) and Gary Becker. For example Gary S. Becker, The Economic Approach to Human Behaviour (1976)

However, what is apparent with these approaches, whether pure market-based or rights-based, is that they are dependent on government establishing a legal basis for the entity, the right and the market. Government in effect, retains a controlling interest in the market-based approach. The problem with this will be illustrated in the case studies.

2.1.5 Collaborative governance

Literature on collaborative governance is widely dispersed through a range of disciplines and different terms are used to describe similar (but not identical) forms of governance, such as; *network, private, non-state, new environmental, collective action, multi-stakeholder* and *stewardship governance*. These concepts all adopt the same fuzzy space in the typology adopted for this investigation: the space between state regulatory governance and market governance. In discussing the range of images of collaboration, Ansell (2019) stresses the distinction between *collaboration* and *collaborative governance*; the former being a descriptor of a relationship whereas the latter refers to a mode of governing. He argues that collaborative governance refers to a governing arrangement involving multiple stakeholders in collective decision-making. The decision-making process is inherently cooperative because participation is voluntary and lacking overarching authority. Ansell argues participants in collaborative governance have a desire to achieve joint outcomes providing the decisions made are consequential. It will be argued that this is only possible where power differences between participants, stakeholders, is equalised through the normative arrangements established (rules of the game).

Kekez, Howlett and Ramesh (2019) acknowledge the importance of power differences in their typology of modes of collaborative governance. They identify 12 modes based on different combinations of stakeholders and power relationships. While they approach this typology from the perspective of government service delivery, and include a wide range of approaches, including some better described as consultation, the typology is useful for this investigation.



Cell #	Governance Mechanism by Importance	Mode of Governance
1	Hierarchy – Network	Weak Civil Society Governance
2	Network – Hierarchy	Strong Civil Society Governance
3	Market – Hierarchy	Strong Market Governance
4	Hierarchy – Market	Weak Market Governance
5	Hierarchy – Market – Network	State Corporatist Governance
6	Hierarchy – Network – Market	Societal Corporatist Governance
7	Network – Market – Hierarchy	Various forms of private sector and civil society-led Network Governance
8	Network – Hierarchy – Market	
9	Market – Network – Hierarchy	
10	Market – Hierarchy – Network	
11	Market – Network	Strong Private Governance
12	Network – Market	Weak Private Governance

Figure 2: Modes of governance - variation by lead actor (Kekez et al., 2019, p. 7)

The Figure illustrates the wide range of approaches to and understanding of collaborative governance. However, each has a purpose whether it be lowering transaction costs minimising risk or maximising engagement. However, each is premised on a one set of actors being dominant. This study, for reason that will be explained, is interested in forms of governance that neutralise or remove power imbalance in a way that allows shared decision-making by parties who are equally able to influence outcomes. The following will consider various approaches to collaborative governance relevant to this investigation starting with consideration of Ostrom's contribution.

Collective action on common pool resources

Ostrom posed her contribution (Ostrom, 1990) as a refutation of the prevailing orthodoxy that utility-maximising individuals would only seek to maximise short-term self-interest. She rejected Hardin's (1968) *Tragedy of the Commons* argument that individuals pursuing their self-interest will inevitably contribute to degradation of *common pool resources*[6] (CPR) because individual benefit from over-consumption is greater than their share of collective loss from the over-consumed resource. She reviewed small-scale CPR situations such as in-shore fisheries, grazing areas, groundwater basins, irrigation systems and communal forests. Her interest was in how a group of principals in an interdependent situation (*social dilemma*[7]) can organise and govern themselves to obtain continuing joint benefits in the face of temptations to free ride, shirk or act opportunistically. She asked what would increase the likelihood of self-organisation, enhance capabilities to continue self-organisation over time, and solve CPR problems without external assistance.

Ostrom saw her work as supplementing theories of the firm (profit maximising entrepreneurs) and the state (protection in return for taxes) with a theory of collective action. She wanted to show that individuals can achieve solutions that are better than individual utility maximisation by building conditions where reciprocity, reputation, and trust can overcome short-term self-interest (Ostrom, 1998). This involved understanding "how individuals jointly using common pool resources might be able to achieve an effective form of governing and managing their own commons without having this imposed by a state" (Ostrom, 1990, p. 7). By examining what people do (E Ostrom, R Gardner, & J Walker, 1994), she found individuals do "systematically engage in collective action" to manage CPRs without external authority offering inducements or imposing sanctions (Ostrom, 1998, p. 2). This demonstrated individuals could choose to maximise collective welfare and were not trapped in inexorable tragedies (Arrow, Keohane, & Lewin, 2012). Through this work, she developed interconnected design principles for successful collective action that are evident in collaborative governance. Her eight principles were:

(1) Define the boundaries of the group
(2) Match rules governing the use of common good to local needs and conditions
(3) Ensure that those affected by the rules can participate in modifying the rules
(4) Make sure the rule-making rights of community members are respected by outside authorities
(5) Develop a system, carried out by community members, for monitoring members' behaviour

[6] Ostrom's concept of *common pool resources* was not the same as the term more commonly accepted in economics of *public good*. Public goods will be discussed later but for now it is noted that *common pool resources* is a sub-set of *public goods* that include mainly shared environmental goods and services.
[7] *Social dilemmas* occur whenever individuals in interdependent situations face choices in which the maximization of short-term self-interest yields outcomes leaving all participants worse off than feasible alternatives.

(6) Use graduated sanctions for rule violators
(7) Provide accessible, low-cost means for dispute resolution, and
(8) Build responsibility for governing the common resource in nested tiers from the lowest level up to the entire interconnected system.

Three relationships are central to explaining successful collective action; *reputation, trust and reciprocity* (Ostrom, 1998, 2010). In this explanation, the *reputation* of a participant for *reciprocity* in past collective action influences the level of *trust* other participants have for them. Trust influences both the likelihood of using reciprocity and the level of cooperation which in turn, influences outcomes (net benefits from cooperation). However, these relationships are influenced by a range of structural variables such as: heterogeneity of participants; whether they use face-to-face communication; the size of the group; whether benefits are subtractive or fully shared (i.e. public goods versus common pool resources); information about past actions (reputation); how individuals are linked (networks), and; whether individuals can enter or exit voluntarily. These factors provide some context for individuals participating or not participating in collective action.

After two decades of empirically testing her theories using game theory experiments, she warns: "There is no way that one can analyse the entire "spaghetti plate" of variables that have been identified and their interdependencies in a single empirical analysis" (Ostrom, 2010, p. 164). She encouraged a return to where she started; case study field work such as this investigation.

Network collaboration as a new form of governance

While Ostrom sought to understand drivers for and the mechanics of collaborative governance, others were drawn to the emergence of networks and civil society as important actors in managing natural resources. For example, Leach et al. (2007) see a range of new actors filling the spaces either vacated or not filled by the state or markets (citizen science, compliance monitoring, standards and labelling). They warn that moving attention from government to what they refer to as *networked governance* involves dealing with different types of actors whose status and boundaries are often fuzzy (p. 24). Networks will need to deal with self-reinforcing *myths* or pre-conceptions of governance created by the same powerful institutions that the study of governance should critically examine. In this context, the study of governance, particularly these new forms of governance[8], becomes a study of change rather than the status quo.

[8] Governance through networks appears in the literature under a number of banners; network governance, collaborative action, private governance, polycentric governance, new environmental governance, soft law and more.

Holley, Gunningham and Shearing (2012) discuss what they refer to as *New Environmental Governance* (NEG) arising where the state is retreating from regulatory functions and hierarchical control. They identify a shift from representative democracy, singular authority, centralised and hierarchical command rigidity and uniform rules to an innovative experience in public governance that is less rigid, less prescriptive, less hierarchical and less committed to uniform outcomes. Its strength is that it recognises complex political, economic and social systems cannot be readily governed either by the state or markets and that an experimental polycentric and adaptive approach may fare better (p. 179). They argue this is not a matter of substituting NEG for the state; the two may work as a hybrid with different roles.

Other scholars have focused on the role of collaborative governance as offering new democratic forms, different ways of making decisions and as agents of change. Waddell (2007, 2018) refers to these networks as *Global Action Network*s (GANs). His work with Khagram (2007) studied 20 GANs such as Transparency International, the Forest Stewardship Council and, the Global Reporting Initiative and identified seven principles for success: (1) they are multi-stakeholder; (2) they aggregate sectors (sometimes referred to as *chambers* of interest) to accommodate different sense-making logics; (3) they open individuals to societal change (often leading to personal transformation); (4) learning and development is a core value; (5) self-organising is a critical capacity to build complex systems; (6) they organise for third-order change (how organisations and people relate to one another), and; (7) they think in terms of development stages. In addition, GAN's must be trusted, legitimate agents among diverse stakeholders through transparency, accountability and effectiveness.

Obstacles to collaborative governance

Trust, legitimacy, transparency, accountability and effectiveness are themes through much of the literature. Nielsen (2007) points to difficulties securing compliance through a network, in comparison with legal sanctions available to government and fear of economic loss in a market-based system. Compliance needs to be secured through trust based on common knowledge, experience and normative orientation. Jessop (2003) argues a key issue is to ensure the system is simple and provides for actors who have diverse expectations and ways of operating to work together toward a common goal. He points to three potential sources of failure: structural asymmetries that already exist in market-based economies (power); conflict with existing political (government) forms of organisation, and whether the object of the governance system is 'governable' due to the problematic relationships that already exist.

Christensen and Butler (2019) address the issue of resistance from regulators, pointing out that collaborative governance is criticised because it operates outside legal and bureaucratic systems

that hold public servants to account for protecting the public interest and “therefore holds risks for public accountability” (p. 59). This creates a source of tension between agency staff and stakeholder groups, particularly where there is regulatory and bureaucratic pressure on the process. Tension over accountability can be amplified by limited capacity of both stakeholder groups and agency staff resulting in pressure on agency staff from within their organisations and on stakeholder representatives from their constituents. Informal relationships are important for providing the “grease” that enables networks to work through the inevitable rough spots (Romzek, LeRoux, & Blackmar, 2012). Trust is “critical” to collaboration (M. J. Stern & Coleman, 2019).

Stewardship systems

Stewardship has a long history in environmental thought with its antecedents identified in the Old Testament - holding land in trust for God - and Indigenous societies - the land and other resources belonging to ancestors (Worrell & Appleby, 2000). More recent use has been in the context of a shift away from techno-managerial, control-oriented approaches to those that prioritise participatory, cross-scale, trans-disciplinary engagements linked to shared values (Enqvist et al., 2018). For some, the term promotes localism through the engagement of individuals, groups and networks of actors, with different motivations and capacity, to protect, care and responsibly use environmental resources for outcomes in diverse contexts (Bennett et al., 2018). These authors agree the term is poorly defined in the literature (or defined variously to fit the circumstances), common themes relevant to this research are that it implies management on behalf of (or in trust for) a higher authority (God in a religious context, society and/or future generations otherwise), and that stewardship requires a reconciliation between competing interests and values. Thus stewardship has a strong governance requirements “to address trade-offs between potentially competing interests” (Worrell & Appleby, 2000, p. 268).

This researcher has previously described stewardship systems as managing trade-offs between competing interests to achieve outcomes that include public and private benefits and recognise shared interests. Stewardship as a governance system is a form of multi-stakeholder collaboration to address shared social or environmental dilemmas. In this investigation, they are regarded as a specific form of collaborative governance that, as will be described in the case studies, offer a clear distinction from market and regulatory governance of human interaction with nature.

These systems create an opportunity for customers (whether businesses-to-business or business-to-consumer) to support products that respect stewardship outcomes articulated in multi-stakeholder endorsed standards. Systems are characterised by: (1) a set of rules, referred to as a standard or requirements intended to achieve environmental, social and/or economic outcomes and impacts through participants complying with those rules; (2) a process for verifying compliance

with those rules by organisations participating in the system; (3) governance arrangement for managing the system and its rules, and; (4) brand recognition that rewards organisations complying with the system rules (M. Spencer & Xu, 2021). Systems vary depending on the objectives, scope and theory of change[9], the stringency of the rules and verification processes and, the nature of the governance arrangement.

Stewardship systems represent a form of collaborative governance in that they bring multiple stakeholders together in an institutional structure with clear *rules of the game*. They emerge where there are gaps in public authority, information asymmetries in markets regarding environmental performance of firms; and where stakeholders see government and markets as failing to deliver the type, quality and levels of environmental public goods they desire (G Auld, 2014; Potoski & Prakash, 2013; Prakash & Potoski, 2007). Cashore et al (2007) argue stewardship systems take their authority from customers in the marketplace rather than the state. Potoski and Prakash (2013) argue these systems sit beyond the state and the market but can harness the strengths of both. They see these systems as a form of club, after Buchanan's club theory (1965), where companies join the club in order to share mutual benefits such as enhanced reputation as a result of complying with club rules (Potoski & Prakash, 2005, 2013; Prakash & Potoski, 2007).

Scholars have identified a range of benefits from stewardship systems: they are better able to engage stakeholders than regulatory governance; they are more flexible to evolving needs; they can adapt to evolving science and technology, cross jurisdictions, and; they reward best practice rather than punish non-compliance (Abbott & Snidal, 2009; G Auld, 2014; Dupuy, 1991; Green & Auld, 2017; Guzman & Myer, 2010; Kirton & Trebilcock, 2004). However, as already discussed, they are without the financial authority of markets or the political authority of regulation. As a result, they rely on the moral authority of civil society and networks unless they can link with markets, as Cashore and others have identified (Cashore, Auld, & Newsom, 2004).

Stewardship systems are not without critics who believe they limit potential for radical change, *greenwash* because they fail to deliver benefits anticipated by environmentalists and maintain the centrality of humans reinforcing the anthropocentric relationship between humans and nature (Enqvist et al., 2018). To some extent, these issues are addressed in later discussion however, for now, it is sufficient to note these systems will be an important focus for this investigation.

2.1.6 Connections and interdependencies

[9] *Theory of Change* is used by organisations involved in transformation, such as development agencies, as part of a critical and evidence-based attempt to unpack the causality between inputs, outputs and outcomes (Valters, 2015).

The three forms of governance discussed do not exist as silos but have inevitable interdependencies as illustrated by Kekez et al. (2019). For example, private rights and markets do not exist independently of the state but require a regulatory basis provided by the state. There has been very little work on connections between collaborative governance and the state (Renckens, 2020). Some argue it takes place within the shadow of the state (Guttman et al., 2018; Holley et al., 2012) while others point to a dependence on markets (G Auld, 2014; Cashore et al., 2004; Cashore et al., 2007). For Renckens, collaborative governance "does not operate outside of the boundaries of governments' sovereign authority" (p. 192). These interdependencies are evident in the case studies considered.

2.2 Defining outcomes

Building on this review of governance literature, which sees collaborative governance as either a mechanism for resolving otherwise unresolved social dilemmas or a mechanism for change, the next question becomes, to what end? What are the problems that need to be overcome and what outcomes need to be achieved? The problem has been outlined in the introductory chapter. The desired outcome from interactions between humans and the environment starts with the previously quoted Brundtland definition of sustainable development (Brundtland, 1987). That is, being able to meet the needs of the current generation for a good life without compromising the ability of future generations to achieve the same. The passage of time since Brundtland has revealed problems with the definition and its application, as discussed below.

2.2.1 Sustainability and sustainable development

Elements of the Brundtland definition are still used by international organisations. For example, the International Organisation for Standardisation (ISO) defines *sustainability* as: [the] state of the global system, including environmental, social and economic aspects, in which the needs of the present are met without compromising the ability of future generations to meet their own needs. *(ISO, 2014, p. 7)*

The concept of *sustainability* has become widely used. It has also shifted the focus from equitable access, both intra and intergenerationally, to a balance of economic, social and environmental outcomes. For example, in the following explanation by the United Nations of the 17 Sustainable Development Goals: "For sustainable development to be achieved, it is crucial to harmonize three core elements: economic growth, social inclusion and environmental protection. These elements are interconnected and all are crucial for the well-being of individuals and societies" (UN, 2020).

This characterisation fails to consider power relations between the notional *owners* of the three systems (community, business and nature): nor does it provide a voice for future generations. Achieving sustainability becomes a tug of war (power contest) between human-based systems (community and business) and nature, represented only by proxy in the discussion via environmentalists and academics. Future generations receive only scant attention. The Australian Panel of Experts in Environmental Law (APEEL) argues the term sustainability has insufficient legal certainty to guarantee standards and procedures for environmental protection.

Farley and Smith (2020), who seek to rescue the term sustainability through the concept of *neo-sustainability*, argue that the term sustainability is over-used, lacking clarity and vulnerable to co-option by interest groups identifying with one or other of its dimensions allowing the term to be *everything to everyone*. “The only irrefutable aspect of the term *sustainability* is that there is no universally accepted definition” (p. 6). The *triple bottom line* of economy, environment and social outcomes allows the three pillars to be treated independently, where powerful interests choose what suits them, rather than as part of an interconnected system. It is human-centric and designed to meet human needs rather than manage the planet as a closed ecological system. Ison and Straw (2020) see the failure of the sustainability paradigm as a systemic failure where environmental considerations are bolted-on to a system driven by economic priorities and the accumulation of private wealth - a system maintained by beliefs, power and outdated governance.

Similarly, it is argued *sustainable development* is based on assumptions of an underlying growth paradigm where, generally, economic prevails over environment (for example, APEEL, 2017; Farley & Smith, 2020). The latter argue that the triple bottom line promotes an expectation that technological innovation will resolve conflict between economy and ecology (*eco-innovation*) allowing economic growth to continue indefinitely. In part, they draw on Jevon’s paradox (increased efficiency will increase consumption) and in part, acknowledge the impact of growing populations and consumption. Sukhdev (2012) argues the problem lies with the modern limited liability company that has become too powerful, often too big to fail and able to hold communities to ransom. Restoring balance between humans and nature requires new forms of corporate organisations. Despite persistent and widespread use, sustainability and sustainable development provide little analytical value or use as a driver of change (Farley & Smith, 2020).

2.2.2 A search for alternative approaches

Dissatisfaction with sustainable development and the triple bottom line have led to proposals for alternative approaches to balancing humans and nature. Some depend on creating new governance arrangements. Gale (2018), for example, proposes a two-dimensional tetrahedron (pyramid-type structure) based on four sources of value: (1) economic based on exchange value;

(2) environment based on function value; (3) worker based on labour value, and; (4) national based on national use value. He defines sustainability through a process for reconciling power imbalance. In Gale's model, activities with an implication for nature are required to find a balance of the four sources of value through deep deliberation and pragmatic negotiation between stakeholders to arrive at a consensus. It removes the centrality of exchange value that favours economic outcomes and encourages protagonists to find a position based on the four conceptions of value.

From a critical accounting perspective, Rambaud and Richard (2015) propose a triple depreciation line that tracks and reports a company's impact on natural, social and human capital in the same way a Balance Sheet tracks impacts on financial capital. They recognise that the value of natural, social and human capital are social constructs that rely on societal assumptions to establish value. Just as the value of financial capital is established by financial institutions, natural and human capital need to be represented (for example, by civil society) to understand the value in use. As with Gale, Rambaud and Richard's approach requires creation of new institutional arrangements to give voice to nature and equalise stakeholder power. Other approaches such as integrated accounting (IIRC, 2013b) and the Natural Capital Protocol (Natural Capital Coalition, 2015) seek to address this by creating greater transparency and visibility for nature and other sources of wealth creation.

Political science and legal literature focus on normative approaches that require conceptual clarity to establish rules for sustainability. Both Farley and Smith and APEEL adopt a systems view[10]; the planet as an interconnected system with a range of subsystems where an alteration in one subsystem needs to consider impacts in other parts of the system. APEEL (2017) draws from Heinberg's five axioms of societal and ecological sustainability (2015) while Farley and Smith (2020) make systems-thinking explicit in their concept of *neo-sustainability*; "the ability of an activity to sustain a system by improving its quality and operating within limits" (p. 174). Neo-sustainability has three rules:

- **Limits**: there are natural limits to growth
- **Environmental primacy**: these limits are dictated by the environment, and therefore actions in any system must adhere to the carrying capacity of the earth's natural systems

[10] "System: A set of elements or parts that is coherently organised and interconnected in a pattern or structure that produces a characteristic set of behaviours, often classified as its 'function' or 'purpose'" (Meadows, 2008, p. 188) "A system is a perceived whole whose elements are 'interconnected'. Someone who pays particular attention to interconnections is said to be systemic. The whole may be made up of institutions, government bodies, ministers, staff, and assets, all in a complex network of relationships functioning to varying effect. […] Systemic thinking and practice are about understanding what this whole is there for, how it works and embarking on its reform". (Ison & Straw, 2020, p. 14)

- **Systems-thinking**: because environmental, economic and social systems are nested systems, actions must be based on systems-thinking that accounts for multi-level impacts and influences that generate impacts.

They seek to replace the process of trade-offs between systems by insisting on system improvement, adherence to limits, environmental primacy and systems-thinking.

Ison and Straw (2020) argue systems-thinking needs to overcome *lock-in* of current institutions, organisation and structure. Reform will need to be driven by civil society. Their new governance model places the biosphere at the centre of a decision framework that also considers *social purpose* and a *technosphere* representing human-made structures that interact with the biosphere. Crucial to implementation of this model are new modes of governing that reconfigure power relations, practices and relational dynamics. This includes creating social learning institutions in contrast to the regulatory institutions that currently exist. These learning institutions recognise place-based appreciation of systemic complexity and design, or co-design through action inquiry. In short, rethinking the framework and philosophy of collective decision-making.

2.2.3 Redefining sustainability as stewardship

Given the problematic nature of terms such as *sustainability* and *sustainable development*, rather than attempt to rescue these terms, this research will simply walk away from them. The term *stewardship* will describe the outcome against which the success or otherwise of environmental governance will be judged. Enqvist et al. (2018) would describe this as the ethical dimension of the stewardship concept; the moral obligations humans have to nature and future generations. For Worrell and Appleby (2000) stewardship requires taking full and balanced account of the interests of society, future generations, and other species, as well as private needs, and is answerable to society (p. 269). One dictionary defines it as: “careful and responsible management of something entrusted to one’s care” or caring for something on behalf of someone else (Mirriam-Webster, 2020). This recognises that the current generation has been entrusted by past generations to care for nature on behalf of future generations (intergenerational equity). Systemic thinking sits comfortably with this approach if it sees what the current generation has inherited as an integrated whole (Ison & Straw, 2020; Meadows, 2008; Meadows et al., 1972).

Building on this understanding, reference points for a definition of stewardship are:

- Future generations are entitled to the same environmental benefits as the present and past generations; the current generation is merely a trustee

- Nature is an interconnected and connected whole of which humans are part, thus requiring systemic management, not a catalogue of separate items
- Trustees of the planet and its environmental systems are all the individuals that comprise the current generation and all are entitled to share its benefits

This definition will be used throughout the investigation as a benchmark for the success of environmental governance.

2.3 Analytical framework for the investigation

The introduction to this investigation provided a brief outline of the research framework being adopted and the three lenses through which the case studies will be viewed. That is:

(1) a social context lens to understand the evolution of governance,
(2) an institutional lens to understand the role of institutions and,
(3) a decision-making lens to understand choice decisions by firms to participate in voluntary collaborative governance.

The first lens is interested in social context and evolution of governance and how it is shaped through belief systems, power and the interaction between power and institutions. The second lens draws on institutional theory to understand the role of institutions, *institutional lock-in* and the role of experts. The third lens acknowledges that in most cases people are not capable of knowing and computing all possible information and employ decision-making short-cuts. This lens is interested in identifying and understanding internal and external factors that influence decision-making. Figure 1 illustrates that these lenses are interrelated. The investigation is interested in how they explain governance, particularly collaborative governance.

2.3.1 Social context

Social context creates the boundaries within which governance is created; neither the rules of the game nor the institutional structures can be understood in isolation from social context. For example, it was impossible for invading Europeans in Australia to understand the belief and governance systems of Indigenous peoples' and, equally, Indigenous people could not understand European governance. In a similar way, there is acceptance in modern Western countries of certain ways of thinking – what Berque (2013) refers to as the Contemporary Modern Western Paradigm (CMWP) - and difficulty accepting alternative conceptions.

Concepts such as stewardship exist and have meaning in a social context as *socio-ecological* concepts (Moberg & Simonsen, 2014; B Walker & Salt, 2006; B Walker & Salt, 2012). Ostrom (2010) notes concepts central to her work. such as reciprocity, are influenced by "norms individuals learn from socialisation and life's experiences" (Ostrom, 1998, p. 14). Institutional theory is concerned with interaction between society and its institutions and the interaction between social and political institutions (March & Olsen, 1983; Peters, 1999). Simon (1955, 1956), in outlining the theory of *bounded rationality*, observed that choice does not occur in isolation, but in an environment that has relevance to the *life space* of the individual or organism. Social context is a foundation on which governance exists and governance options are available.

Belief systems

Framing this social context is the underlying belief system of a society. This can be illustrated by contrasting European Christian societies and traditional societies. Christian societies, for example, are strongly anthropocentric. Christianity talks of nature being mankind's servant and of man ruling over nature. In the Book of Genesis God said: "Let us make mankind in our image, in our likeness, so that they may rule over the fish in the sea and the birds in the sky, over the livestock and all the wild animals, and over all the creatures that move along the ground" (Biblica, 1979, Genesis 1:26). Once He created mankind, God said to them: "… be fruitful and increase in number; fill the earth and subdue it. Rule over the fish in the sea and the birds in the sky and over every living creature that moves on the ground" (Biblica, 1979, Genesis 1:27).

Berry (2018) argues Christianity's belief system was amplified by seventeenth century scholars who treated the history of the earth as if it were human history: "For them, the non-human world was little more than the setting for the human story" (p. 70). Christianity spread through the Roman Empire and became the dominant source of moral guidance in Europe and the colonies of Europe over the past two millennia.

In contrast, Indigenous traditional societies see nature and humans as entwined. There is a danger in romanticising Indigenous management of nature and overlooking the impact, for example, of burning to develop grasslands on tree cover and megafauna (c.f. Gammage, 2011, Bird et al. 2013). Nevertheless, the point here is to stress that Indigenous culture sees people and land as bound; law and spirituality are entwined with land while land and water are central to culture. "Land is the mother, it is steeped in their culture but also gives responsibility to care for it" (Korff, 2020). Prentice Hall's American history textbook makes the point that Indigenous Americans did not trade land.

> *They believed that people had a right to use land and grant others the right to use it too. To buy and sell land, as other peoples have done throughout history, was unthinkable to them. Land like all nature deserved respect.* (quoted in Swineheart, 2013).

Maori culture includes a belief that resources are gifts from the gods and ancestors for which current generations are responsible stewards. It emphasizes guardianship over ownership, collective and co-operative rights over individualism, obligations towards future generations, and the need to manage resources sustainably (Craig et al., 2012).

Post-Enlightenment intellectuals attempted to redefine European attitudes to reflect similar ideas of stewardship. Ruskin, for example, wrote:

> *God has lent us this earth for our life; it is a great entail. It belongs as much to those who come after us and whose names are already written in the book of creation, as to us; and we have no right by anything we do or neglect to do to involve them in unnecessary penalties, or deprive them of benefits which it was in our power to bequeath.* (Ruskin, 1989).

However, Ruskin's views were overwhelmed by an infectious utilitarianism. Berque (2013) illustrates the utilitarian nature of everyday life by drawing on Cézanne's observations of French peasants while walking behind a group in the countryside.

> *They know what has been sown, here or there, along the road, what the weather will be tomorrow … but that a tree is green and that this green is a tree and the earth red and that those red heaps are hills, I don't think they feel it, or know it outside of their utilitarian unconscious.* (Berque, 2013, p. 41).

Modern belief systems

Berry (2018) sees the transition from hunter gatherers to farmers, and the greater security this provides, as marking a change in the relationship between humans and nature. Morton (2018) argues farming was the start of a slow-motion mass extinction; closer settlement "eventually required industrial processes to maintain themselves, hence fossil fuels, hence global warming, hence mass extinction" (p. 48). Humans were not paying attention. Science normalised nature as 'universal', allowing technocratic managers to see it as a 'resource' while marginalising 'non-resource' elements (such as biodiversity) and disregarding indigenous flora and fauna in favor of global crops and animals (Weir, 2009). From a pre-Enlightenment fear of wilderness, science provided the means for humans to realise the Bible's view of nature in the service of human-kind (Nash, 2014). *Modernity* saw the world in binaries, separating nature and society and creating a view of the world in which people change the natural order of things without consequences for

social order (Latour, 1993). Berque (2013) argues the modern paradigm abstracts nature from everyday existence and locks humans into endless consumerism.

The modern paradigm was consolidated in the post-World War 2 period as a world view based on a commitment to freedom and liberty, disdain for the role of the state, centrality of *homo economicus* (rational utility-maximising individuals) and, an epistemological model based on scientific method; a set of beliefs that coalesced around the Mont Pelerin group of intellectuals seeking to stem the drift toward collectivism and central control. As well as economists, the group included Karl Popper, whose advocacy for empirical epistemology in the social sciences (Popper, 1959) had a profound influence. He saw methods adopted by social scientists to that point (*historicism*) as motivated by dissatisfaction with a world that did not and could not live up to moral ideals and dreams of perfection (Popper, 1943). His epistemology became a cornerstone of modern social science research.

Olssen argues the foundations of this paradigm are anti-utopian and resist critical analysis to achieve social change because they stem from a belief that society cannot be designed to improve the human condition. If utopia is built from a distinction between the way things are and the way they should be, “utopia implies an ideal society created by deliberate human endeavour” (Olssen, 2003, p. 526). Hayek (2005) regarded this as a *fatal conceit* arguing change should be left to the market. The defeatism of the modern paradigm and its inability to address human over-consumption of nature has led some to question its premise, freedom and liberty.

This has caused some to question the foundations of modern liberal democratic societies and, for this project, creates an interesting, although somewhat unresolved contrast between totalitarian China and liberal democratic Australia. Critics of the modern paradigm argue *liberal rationalism*, rooted in atomistic individualistic conceptions of self, needs to be tested against the needs of the Anthropocene. They propose *ecological liberty* that creates freedom through relational transactions, ties, agreements, communities, caring and sharing. They reject the notion that an individual can be abstracted from social being and ecological place (Jennings, Kish, & Orr, 2020). Their emphasis on relationships starts to build a case for collaborative governance. This de-centring of democracy presents an interesting contrast with a de-centring of the state in China.

Ontological foundations

Concepts such as *ecological liberty* that challenge the prevailing modern paradigm align with the thinking of Heidegger and Nietzsche to challenge the *scientism* in the human sciences (Besley, 2011) and draw modern society back closer to governance found in traditional societies. Heidegger did not accept the premise of *instrumentalism* (the world as an instrument) which separates the

subject (humans) from the object (environment) (Painter-Morland & ten Bos, 2016). His phenomenology saw human existence as *Dasein* or being-in-the world (bound up with the world in which humans exist). His critique of technology argues that it separates humans from nature, translates everything to a mere resource and focuses human attention on devices that disconnect people from nature so they become oblivious to how end-products are derived (Paul, 2017).

Tension between modern instrumentalism and traditional *Daisein* sets up a contrast between modernism, with its reliance on technicians and experts and alternatives that see technicians and experts as part of an interconnected community. Heidegger argues that when instrumentalism is replaced by interconnectedness it allows people and things to be revealed on their terms rather than needing to conform to preconceived notions. He invites humans to draw closer, to de-distance from the world. This is at the heart of alternative governance. "Thinking about our relationship with the world in terms of relational ecology, rather than one of detached instrumentality, may offer a better way forward" (Painter-Morland & ten Bos, 2016, p. 558).

This focus on relationships rather than a preoccupation with facts and figures to make a business case for stewardship provides a better foundation for *ecological citizenship* (Crane, Matten, & Moon, 2008). For companies, this means re-localising within communities through activities that engage in the world outside of the corporate office. Painter-Morland & ten Bos (2016) argue this means accepting difference and that some communities may opt for alternative relationships that may need to be renegotiated through decentralised discussion with groups (*relational responsiveness*). They argue this would be of greater value than instrumentalist assurances. How this develops in totalitarian China will be different to how it develops in liberal democratic societies.

2.3.2 Institutional context

Institutions are central to the definition of governance and play a dominant role in contemporary life, in particular, through the determination of social and political outcomes and resolution of conflict between groups in society (Hall & Taylor, 1996; March & Olsen, 1983; Peters, 1999). While Hechter (2018) argues that no consensual definition of the term *institution* has emerged, there are a number of common characteristics in the literature that suffice for this investigation. There are formal institutions such as a legislature, an agency in the bureaucracy or a legal framework and, there are informal institutions such as networks (Peters, 1999). While much of the literature focuses on institutions as part of government or the state, they can also include non-state groups such as trade unions, industry associations, professional associations and environmental organisations (Hall & Taylor, 1996). Peters offers the following: "*… an institution transcends individuals to involve groups of individuals in some sort of patterned interactions that are predictable based upon specified relationships among the actors*" (Peters, 1999, p. 18).

Institutions then, are the structures around which governance mechanisms are created; as such, they can both contribute to and undermine the success of those governance mechanisms due to their role in influencing social outcomes.

Institutional theory

The study of institutions has a long history from the time of Aristotle with much of its early analysis focusing on the relationship between structures and individuals. In the post-World War 2 era, with the rise of Hayek and neo-liberal economic thinking, institutions became the sum of individual choices made by *rational egoists*, such that the state was a product of society and institutional theory gave little weight to the state influencing society (Peters, 1999). Subsequent development of *new institutionalism* de-emphasised the dependence of the institutions on society in favour of interdependence between relatively autonomous social and political institutions. “The state is not only affected by society but also affects it” (March & Olsen, 1983, p. 738).

New institutionalism is particularly relevant to this investigation because it sees institutions as areas of conflict between contending social forces. They scope and define the understanding of political issues and available solutions while affecting the distribution of resources which, in turn, affects the power of political actors and, in a political loop, affects institutions (March & Olsen, 1983, p. 739). At the same time, they maintain *standard operating procedures* and structures that define and defend their interests. Hall and Taylor (1996) argue institutions structure conflict in such a way as to “privilege some interests while demobilizing others”. *New institutionalism* no longer saw the state as a neutral broker “but as a complex of institutions capable of structuring the character and outcomes of group conflict” (p. 938).

Within the broad church of *new institutionalism*, two schools are of interest; *historical institutionalism* and *sociological institutionalism*. The investigation selected these forms of institutional theory because it is interested in factors that may advance or retard the uptake of new ideas and approaches to resolving conflict. They were both appropriate and *critical* in the sense that the investigator was interested in why the current paradigm is unable to address conflict between humans and nature in a way that offers stewardship of natural capital.

Historical institutionalism

Historical institutionalism is concerned with the processes by which institutions become locked-in to ways of being (*path dependence*) and mediate asymmetries of power. It recognises institutions can provide enforcement mechanisms and penalties for defection (*calculus approach*) or they can

provide moral and cognitive templates for interpretation and action; "they affect the very identities, self-images and preferences of actors" (*cultural approach*) (Hall & Taylor, 1996, p. 939). The *calculus approach* has its roots in economics, where an initial choice of a path is reinforced through material benefit such as returns to scale, network externalities, etc. Once an institution is constituted, actors and structures become mutually reinforcing because the benefits of remaining the same are greater than the benefits from change or adaptation (Kasner, 2009; Pierson, 2000).

The *cultural approach* argues that institutions resist re-design because they structure the choices about reform that individuals are likely to make: "… strategies induced by a given institutional setting may ossify over time into world views, which are propagated by formal organisations and ultimately shape even the self-images and basic preferences of actors involved in them*"* (Hall & Taylor, 1996). The stable mind-set of an institution will only support a limited range of possibilities and members will have a difficult time *thinking outside the box* of the dominant ideas of the institution. The course set by previous generations is essential to understand the current trajectory (Peters, 1999).

Mahoney (2000) argues that *path dependence* characterises historical sequences in which contingent events set in motion institutional patterns or event chains that have deterministic properties. He identifies two types of path dependence; a self-reinforcing sequence driven by the adoption of a particular institutional arrangement that results in stable reproduction of the institution over time and, a reactive sequence driven by a key breakpoint in history with a series of reactions that follow from this breakpoint (p. 535). Path dependency explains an organisation's lack of adaptive capability to changes in its operating environment caused by "organisational reproduction" (Kuipers & Boin, 2009, p. 52). This has implications for the distribution of power and resources creating groups and individuals with disproportionate access to decision-making (Hall & Taylor, 1996).

Power relationships are amplified when combined with *capture theory* or regulatory capture. This theory argues that, within institutional processes, systems of power exist that can overcome and defeat different or new mechanisms. For example, the ability of an industry to capture (or undermine the independence of) a regulatory body intended to protect the public interest. In this case, "the survival of the regulatory body over a period of time often depends of satisfying the expectations of those parties or groups being regulated" (Deegan, 2014, p. 81). While *capture theory* suggest a pro-active program by industry to capture a regulatory agency, *path dependency* is a more passive mechanism where an organisation is locked-in to a certain way of operating.

How ideas emerge, are adopted or influence institutions is also of interest. March and Olsen (1983) point to a role of institutions as gate-keepers of ideas. Béland (2009) argues ideas: (1) participate

in the construction of issues and problems that enter the policy agenda and its priorities, (2) are the assumptions that either legitimise or challenge existing institutions or policies (policy paradigms) and, (3) become ideological weapons to challenge the framing process and to help convince that change is necessary. He notes the relationship to social value systems and the use by political actors of *value amplification* and the *perversity thesis*. For example, political actors promoting private rights market-based approaches appeal to liberty and freedom (*value amplification*) while claiming state intervention brings bad results that undermine social and political order (*perversity thesis*). The importance of this interaction with values, Béland argues, is that where ideas have low salience with the social belief system, they will have low mobilising potential whereas strong relevance to what he refers to as the *cultural repertoire* will increase effectiveness.

The interaction between ideas, values and institutions also has relevance to transnational reform processes. Béland points out that transnational change programs are received through existing national institutional and ideological legacies, including the *cultural repertoire*. This includes cultural assumptions about political behaviour, policy decisions and rhetorical frames that are part of storytelling and argument in policy debate. Ideas need to be 'translated' and framed within this repertoire to engage the public and key interest groups. National institutions and repertoires can filter the influence of transnational actors on country-level policy change. Therefore, transnational actors must collaborate with national bureaucrats and politicians to secure adoption and successful implementation of policy ideas. While he sees this as a fruitful area of future research, Béland argues transnational change agents need to be conscious of national institutions and repertoires as central to the politics of policy change (Béland, 2009, pp. 711-712)

Sociological institutionalism

Sociological institutionalism is related to those parts of *historical institutionalism* that are interested in the culture of institutions. Sociology draws from Weber in trying to understand the evolution and dynamics of organisations, particularly the creation of meaning and the relevance of values. It too is interested in how organisations defend their core values and existence even when confronted with evidence that might negate their utility (Peters, 1999). For Peters, sociology emphasises the cognitive nature of organisational theory and sees organisations as both task-orientated and having an element that is not rational "in the usual sense of that term" (p. 102). *Sociological institutionalism*, emphasises what individuals see as *rational action*, is socially constructed. Institutions confer legitimacy or social appropriateness on some arrangements but not others. They become sources of cultural authority with shared cognitive maps embodying a sense of institutional practice that is widely deployed. Professionalisation creates professional communities with cultural authority to press certain standards on their members (Hall & Taylor, 1996).

DiMaggio and Powell (1983) revisit Weber (2002) who argued the rationalist order[11] had become an *iron cage* that imprisoned humanity. Bureaucracy he argued, was the rationalist order's organisational manifestation and was so efficient and powerful that its momentum was irreversible (DiMaggio & Powell, 1983, p. 147). DiMaggio and Powell contend that in the late 20th century bureaucratisation resulted from making organisations more similar without making them more efficient. Homogenisation is driven by the state and the professions who create organisations that are similar in structure, culture and output. Once an organisational field[12] becomes well established "there is an inexorable push towards homogenization" (p. 148). Powerful forces emerge that lead them to become similar and while goals may change and new practices develop, organisational actors construct around themselves an environment that constrains their ability to change.

To describe this process of homogenization, DiMaggio and Powell (1983) use the concept of *institutional isomorphism*; forces compelling organisations to compete for resources, political power and legitimacy. They identify three mechanisms of institutional isomorphism:

- *coercive* isomorphism stemming from political influence and the problem of legitimacy,
- *mimetic* isomorphism resulting from uncertainty and the security of modelling on other organisations and,
- *normative* isomorphism associated with professionalisation and the desire for members of an occupation to establish a cognitive base for legitimation.

While the three intermingle, they derive from different conditions and may lead to different outcomes.

The professions

DiMaggio and Powell invite a consideration of the role of professions. Weber (2002), concerned about bureaucracy taking on a life of its own and acting like an *iron cage*, saw positives and negatives in the growth of professions. On the one hand they contributed to the efficiency and rationality of bureaucracy, providing governance to counter dysfunction; on the other, Weber was concerned that, as rational management spread to most activities, the world might one day be filled by these small cogwheels pursuing their own self-interest, "small men clinging to small jobs and thirsting for the biggest" (Weber, cit. in Serpa & Ferreira, 2019). Professionals are both important parts of institutions and, as members of professional organisations, constitute their own institution. They can take on the identity and self-image provided by their professional association and

[11] The application of the general principles of reason to the conduct of human problems, fostering the ability to respond to unstable environments and to manage inherent complexity (Serpa & Ferreira, 2019).

[12] By organisational field, they mean those organisations that, in aggregate, constitute a recognised are of institutional life: key suppliers, resource and product consumers, regulatory agencies, and other organisations that produce similar products or services. (DiMaggio & Powell, 1983, p. 148)

become the policy experts within the political system who develop and shape the understanding of policy issues and alternatives (March & Olsen, 1983).

Professions live in a world of their own: “The language spoken by the inhabitants, the landmarks familiar to them, their customs and conventions can only be learnt by those who reside there” (Carr-Saunders & Wilson, 1933, p. iii). In this way they become a source of fragmentation in thinking and in approaches to problems (Costanza et al., 2015). Universities play an important role. Academic disciplines operate within boundaries where they have developed their unique language, culture and ways of looking at the world (Costanza et al., 2015). Yet complex problems arise at boundaries (Meadows, 2008). This can lead to a lack of flexibility and adaptability as professionals are comfortable working within boundaries established through their education. Ylönen (2018), writing about efforts to foster cross disciplinary work on risk and resilience observed: “Even though the chances for a fruitful cross-fertilization of the social sciences with engineering sciences exist, … in practice, there remain difficulties in bridging gaps brought about by different orientations and ontological assumptions regarding humans and society” (p. 90).

Professional associations can reinforce fragmentation through their efforts to promote, protect and differentiate their profession (members) from others. This fragmentation flows through into professional development activities undertaken by associations and into the hold certain professions have on key positions within institutions. Both contribute to path dependency and institutional lock-in.

Criticism of institutional theory

Institutional theory has been criticised by scholars seeking more traditional explanations of organisational behaviour and difference and, by critical scholars concerned it glosses over the importance of power and therefore that it lacks an ability to contribute to change. Greenwood et al. (2014) for example, argue that institutional theory has strayed too far from its basic purpose in the comparative study of organisations. It has become overly concerned with explaining institutions and institutional processes, and treating organisations as though they are homogenous, rather than understanding how organisations are different, how they are structured and managed. They argue institutional theory needs a stronger positivist epistemology testing hypotheses on organisational differences and subjecting theories to falsification tests to establish the limits of applicability (Greenwood et al., 2014).

Adopting a critical perspective, Willmott (2015) argues institutional theory has been captivated by neo-positivist epistemology that attempts to be impartial, detached and values-free science but robs it of the ability to engage in critical analysis and contribute to change. He argues the theory

suffers from a blinkeredness that prioritises complexities of meaning (myths and logics) over the role of power. Referring to DiMaggio and Powell's isomorphic analysis (1983) Willmott argues that while power is acknowledged in the role of coercive isomorphism, this is overshadowed by consideration of mimetic and normative isomorphism. Consideration of inequality "is conveniently airbrushed out" (Willmott, 2015, p. 107) as the theory focuses on meaning rather than the effect of power or medium of domination. The superficiality of institutional theory is reflected in its neglect of theorists such as Foucault whose concept of *governability* would "upend" many of its assumptions.

The remedy suggested by Willmott following his tirade of criticism is not a total abandonment of institutional theory. Rather, he proposes as this investigation has attempted, to begin with a critical form of analysis – post-feminist, post-structural, post-colonial and so on – "and then perhaps consider how elements of institutional theory might be adapted and reworked to enrich that analysis" (Willmott, 2015, p. 110). In analysing the social context of environmental governance, this investigation draws on the contributions of theorists such as Foucault to understand the relationship between power and forms of governance.

Significance of institutions

Institutions are described in similar terms to forms of governance to include hierarchies, markets and networks and, more broadly, any patterned interactions that are predictable based on relationships between actors. *New institutionalism* sees institutions not as passive structures but as active players that privilege some actors and influence outcomes of social conflict. Institutions are difficult to change and can become *locked-in* to ways of operating, supressing alternatives through their world view and self-image or self-interest. They have difficulty thinking outside the box and are prone to capture by vested interests. They are gatekeepers of new ideas controlling the framing through which ideas are viewed. This is particularly evident where ideas are introduced from outside (international transfer). Even where institutions may start off differently, the forces of *institutional isomorphism* may gradually squeeze them into homogeneity. Professionals play an important role as members of professional institutions and managers and leaders in institutions. Criticism of institutional theory can be mitigated through a combination with other approaches.

2.3.3 Choice and decision-making

Ultimately, individuals and organisations must choose to participate in collaborative governance. Under regulatory governance, governments have the option of imposing their will through the authority of the state. Markets provide an opportunity for individuals to pursue their self-interest (utility maximisation) through trade. Collaboration generally involves individuals choosing to forgo private benefit for collective welfare. Human choice between competing ends is the subject of

economics; it offers both “a technique for rational action” and choices that can be “achieved harmoniously” (Robbins, 1935, p. 157). Robbins defines economics as “the science which studies human behaviour as a relationship between ends and scarce means which have alternative uses” (p. 16). Economics has a role where choice is involved in how humans interact with the environment and whether they will participate in a collaborative governance arrangement.

The following section briefly considers the origin of the economic problem of scarcity and its relevance to the problem of *the commons* (Hardin, 1968; Lloyd, 1832; Ostrom, 1990); it then considers approaches to resolving the commons problem including the theory of bounded rationality (Simon, 1955, 1956, 1986).

Scarcity and the tragedy of the commons

As the industrial revolution was building momentum (a period since described as the beginning of the Anthropocene), Adam Smith acknowledged “natural scarcity arising from soil and climate” (A. Smith, 1776, p. 456), but he did not concern himself with the need to choose between alternative uses of natural resources beyond what was most suitable for the soil and climate conditions. The day when nature would no longer be able to provide was so far in the future it was “too remote to call for serious analysis” (Barber, 1967, p. 23). The dissenting voice of Malthus (1798) anticipated that *the stinginess of nature* would result in humans being on a treadmill of feast and famine. Barber observes that for Malthus, the growth-inhibited “stationary state” was “less distant” than for Smith (1967, p. 35). Hardin (1998) argues Malthus’s detractors shared “a tightly held denial of limits in the supply of terrestrial resources” (p. 182).

William Foster Lloyd addressed the issue of common or public property in two lectures at Oxford in 1832. He asked: “Why are the cattle on the common so puny and stunted? Why is the common itself so bare-worn and cropped so differently from adjoining enclosures? No inequality in respect of nature or acquired fertility will account for the phenomena” (Lloyd, 1832, p. 30). In answering his own questions, he observed that the benefit to individuals of adding cattle to the commons beyond its sustainable capacity, belonged to the owner of the cattle, whereas all users of the common shared the cost of over-grazing (lower productivity). As a result, the point of saturation in a common grazing pasture would be higher than the point of saturation in a private pasture (or enclosure). In 1968 Hardin, who had edited a collection of essays on population that included parts of Lloyd’s lecture, rephrased this dilemma as *The Tragedy of the Commons* (Hardin, 1968):

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

The sub-title of Hardin's article was that technology and rational choice would not solve the commons dilemma: "The population problem has no technical solution; it requires a fundamental extension of moralities." He argued the moral dilemma of the commons needed to be resolved at the level of values and governance. Left to their own devices, humans would not deal with commons problems in the brutal manner in which nature deals with overpopulation of other species. He cites cultural and institutional constraints such as religion, class and the welfare state. The commons dilemma would require *mutual coercion*: "The social arrangements that produce responsibility are arrangements that create coercion of some sort". For Hardin the solution was a form of Hobbes' Leviathan, government by assembly (Russell, 1961) or private ownership.

Public goods, externalities and market failure

Pigou (1932) argued Adam Smith's *invisible hand* of self-interested individuals did not automatically lead to the maximisation of collective welfare. While Smith had argued that the pursuit of an individual's "own advantage naturally, or rather necessarily, leads him to prefer that employment which is most advantageous to the society" (p. 443), Pigou believed Smith had not fully realised "the extent to which the System of Natural Liberty needs to be qualified and guarded by special laws, before it will promote the most productive employment of a country's resources" (p. 128). Pigou's recognition that the action of one actor, in pursuit of their own self-interest, could have a negative impact on the utility of another actor is credited as the origin of the concept of *economic externalities* (Cornes & Sandler, 1996). Externalities are situations where the effect of production and consumption of goods and services imposes costs or benefits on others that are not reflected in the prices charged for those goods and services (Khemani & Shapiro, 1993).

Discussion of externalities quickly leads to discussion of the concept of *public goods*. Economics differentiates between private goods and public goods. The terms *non-rivalry of consumption* and *indivisibility of benefits* (*non-excludability*) are used to differentiate public and private goods (Cornes & Sandler, 1996). Differentiation is based not on the nature of the good itself but on the structure of incentives for production and/or consumption. For example, a loaf of bread baked in a cooperative may be a public good while a broadcast using public airwaves (but scrambled) may be a private good. Between the two are various forms of *impure* public-private goods that have elements of both and may be partially private (rival) and partially public (excludable). In this investigation the interest is in a sub-set of public goods Ostrom (1990) referred to as *common pool resources* or more colloquially as the commons.

Pigou believed government should influence choices made by individuals, through taxes and subsidies, to achieve an optimal social outcome; taxes to discourage bad social outcomes and

subsidies to encourage better outcomes. Pigou's *welfare economics* is contested by economists such as Coase, who disagreed that government intervention was needed to resolve market failure (Coase, 1960). The *Coase theorem* held that the mere existence of an externality was not a sufficient reason for government intervention (Cornes & Sandler, 1996). Nevertheless, welfare economics became a foundation for the subsequent development of environmental economics.

Buchanan (1965), one of the founders of public choice theory, addressed the problem of partial public-private goods through his *economic theory of clubs*. Clubs in this theory are sharing arrangements between individuals searching for an economic benefit that would not be achievable by a single member acting alone ("co-operative membership" (p. 1))". Club members share access to a club good or service through "co-operative-collective sharing arrangements" (p.7). *Club goods* are goods and services whose benefits are excludable (non-members are excluded) and partially non-rival (Cornes & Sandler, 1996). Potoski and Prakash (2005; 2007) use club theory to understand voluntary environmental programs where companies join for the *excludable* reputational benefits of membership that is subject to compliance with club rules. The size of the club will influence the level of benefit; either costs become lower as the club grows (spread across more members) or value diminishes if too many members are attempting to share a good with finite benefits.

Not all situations involve a single good or service and nature, in particular, produces combinations of public and private goods that collectively provide a net social benefit. The Millennium Ecosystem Assessment (MEA, 2005) identified benefits of nature, *ecosystem services*: as *provisioning* services (food, water, wood and fuel); *regulating* services (climate, flood, disease and water management); *cultural* (aesthetic, spiritual, educational, recreational), and; *supporting* (nutrient cycling, soil formation, primary production). Baumgärtner et al. (2001) argue that the trade-offs from consumption of these benefits, and the disbenefits (e.g. pollution) that may result from consumption, can be evaluated using the concept of *joint production*. That is, where: (a) all joint products are desired goods (marketable), or (b) at least one output is undesired while at least one other is desired. However, understanding how this range of goods, particularly non-market goods, is valued and evaluated is a challenge and the subject of environmental economics.

Environmental economics

Economic evaluation of environmental issues gained currency following modelling by Massachusetts Institute of Technology (MIT) which warned *business as usual* was unsustainable and the planet faced major repercussions by the middle of the 21st century as key resources were exhausted (Meadows et al., 1972). With choice between alternative uses for scarce resources being the business of economics (Robbins, 1935) and economic concepts such as externalities

applied to problems such as pollution, environmental economics emerged as a sub-discipline in the 1970s (D. W. Pearce & Turner, 1990). Barkley and Seckler (1972) argue economics is a reasonable place to start consideration of the 'growth versus environment' debate however, they anticipated problems because a number of economic considerations excluded or diminished the environment. For example, how nature was measured accounted for and future value calculated.

Through the application of Pigouvian taxes and subsidies, environmental economists could address issues involving choice at a point in time (a factory releasing pollutants into a waterway) but struggled with externalities that could not be clearly valued or involved long periods of time (intergenerational equity). These involved moral or ethical choices (D. W. Pearce & Turner, 1990). The concept of *natural capital,* to indicate the stock of environmental benefits available to a society from nature, created a basis for consideration of future generations insofar as stewardship required that this stock should be maintained. This involved trade-offs between the interest of the living and preservation of nature for the future (D. W. Pearce, 1991). Pearce argued that trade-off was traditionally biased in favour of eliminating or degrading natural assets to consume the proceeds or invest in man-made assets because nature was undervalued or not valued at all.

The conceptual notion of seeing the stock of nature's assets as *natural capital* and the flow of nature's services to humankind as *ecosystem services* had its origin in the 1970s (Raffaelli, 2016). Valuing nature was seen as giving nature a voice in a world dominated by economics. Pearce's *Blueprint for a Green Economy* translated environmental economics into a free market conceptual framework by creating an economic value for nature that could drive environmental remediation in a more efficient way than regulatory approaches (D. W. Pearce, 1991). Critics such as Foster (1997) argued placing monetary value on nature was merely the thin end of a wedge: "Is it a genuine recognition of nature as valuable or a further, more insidious stage in progressive de-valuing of nature?" (p.2). Some argued putting a price tag on nature would see it "sold off to the highest bidder" (R. Spencer, 2013). Foster argued allowing nature to become embroiled in the day-to-day *economic calculus* of consumption and production as just another good or service devalued and over-simplified nature with potentially dire consequences (Foster, 1997).

Viewing nature in economic terms, as natural capital and ecosystem services, fitted the evolving modern paradigm and the associated New Public Sector Management, with its emphasis on markets and efficient allocation of resources. The *Convention on Biodiversity* (CBD) recognised that "economic valuation of biodiversity and biological resources is an important tool for well-targeted and calibrated economic incentive measures" (CBD, 1998). The OECD produced a handbook on biodiversity valuation arguing that valuation should be a key requirement for devising conservation plans and a basis for conservation and sustainable use (OECD, 2002b). The United Nations began developing integrated Environment and Economic Accounts (1993) to stand

alongside the System of National Accounts and track changes in natural capital and consumption of ecosystems. By 2017, more than 80 countries had implemented some form of the System of Environmental-Economic Accounts (SEEA) (UNSD, 2014) (Obst & Eigenraam, 2017). Valuation was also persued by non-government programs such as: the Natural Capital project at Stanford University (Kareiva, Tallis, Ricketts, Daily, & Polasky, 2011); the TEEB for Business project (Bishop, 2011); the Natural Capital Protocol (Natural Capital Coalition, 2015); integrated accounting for the six capitals[13] (IIRC, 2013b); and many others.

With economists engaged, there was currency in economic solutions particularly, market-based solutions. Markets could achieve optimal outcomes; ecosystem services could be allocated to the highest value use, while nature could be protected by placing caps on the amount of nature that could be withdrawn (or impacted) to maintain the value of natural capital. However, the appealing rationalist logic left unresolved the matter of governance and power. These markets relied on the state for their operating rules, the state remained subject to political pressure and retained its ability to influence allocation outcomes and resource caps.

Bounded rationality and behaviour

Economic theories of choice are generally based on the assumption that people are rational utility maximising individuals, so-called *homo economicus*. This was extended into public sector decision-making with public choice theory. *Behavioural economics* is differentiated from neo-liberal theories through its linkage with behavioural psychology and argument that rational choice does not explain most decision-making (see for example, Jolls, Sunstein, & Thaler, 1998). Ostrom (1998) found that neither rational choice nor structural theories satisfactorily explained why individuals and groups engaged in collective action to solve social dilemmas. Complete rationality, she argued, should be seen as just one member "of a family of rationality models rather than the only way to model human behaviour" (Ostrom, 1998, p. 3). To overcome this limitation, she drew on theories of *bounded rationality* articulated initially by Simon (1955, 1956, 1986). Sufficient work had been undertaken on the use of heuristics and norms of behaviour, Ostrom argued, to provide a behavioural foundation for the study of collective action as a response to social dilemmas.

Simon's key papers on *bounded rationality* (Simon, 1955, 1956) argue that the economic concept of a rational choice exercising *homo economicus* was in need of "drastic revision" (Simon, 1955, p. 239) and that the answer would come from the intersection of psychological and economic theory. Psychology had been developing rapidly. German-American social psychologist Kurt Lewin had

[13] The six capitals are: financial capital, manufactured capital, human capital, social and relationship capital, intellectual capital and natural capital. "Together they represent stores of value that are the basis of an organisation's value creation." (IIRC, 2013a)

emphasised the importance of an individual's perceived reality (the whole configuration of forces) in explaining behaviour (Fiske & Taylor, 2021). Lewin argued the state of a person and that of the person's environment were not independent; "the state of a person depends upon his [sic] environment". For example, he argues factors such as ideology, values and attitudes of an individual depend on the culture in which the individual is reared, whether belonging to a privileged or underprivileged group: "In other words, to understand or to predict behaviour, the person and his environment have to be considered as one constellation of interdependent factors". (Lewin, 1946)

The value of psychological theories to understanding choice was apparent to Simon who argued theories of rational *homo economicus* needed to be replaced with theories of behaviour compatible with the access individuals have to information and their ability to compute that information. Simon believed this would be influenced by two considerations: the properties of the choosing organisation or individual and/or the environment in which choice is being exercised. Choice between a set of alternatives would be constrained by relationships that determine payoffs such as satisfaction and goal attainment and, the preference-ordering of those payoffs. Instead of an infinitely knowledgeable and rational individual, Simon proposed substituting an organisation of limited knowledge and ability, simplifying the real world for the purpose of choice. The kinds of simplifications used by an entity will depend on internal considerations and the environment in which it exists (Simon, 1956):

> *Hence, we might hope to discover, by careful examination of some of the fundamental structural characteristics of the environment, some further clues as to the nature of the approximating mechanisms used in decision-making.* (Simon, 1956, p. 260)

For Simon, the environment was not a physically objective world but those aspects of the world relevant to the *life space* of the *organism* being considered. What he referred to as environment, would depend on the needs, drivers and goals of the organisation and its perceptual apparatus. What Lewin had referred to as the *psychological field*; the social environment perceived by the individual (Fiske & Taylor, 2021).

Simon challenged the cause-and-effect decision-making process and assumptions of traditional economics as not having any empirical and, therefore, analytical validity (Altman, 2015). Bounded rationality incorporated constraints on the information processing capacity of the actors, such as risk and uncertainty about consequences, incomplete information about alternatives and, constraints that prevent calculating the best course of action (Simon, 1986). Arrow (1986), in developing theory of behaviour under conditions of uncertainty, notes the "influence of experience on beliefs is of utmost importance for a rational theory of behaviour under uncertainty" (p. 21).

However, Ostrom (1998) noted the difficulty in developing a consistent behavioural theory relevant to collective action is both lateral (the range of situations to be considered) and vertical (attitudes change over time).

Behavioural economics claims to increase the explanatory power of economics by providing it with more realistic psychological foundations than neoclassical rational actor theory. That is not to suggest it rejects the neoclassical approach; rather, for the most part, behavioural economists start from a neoclassical perspective and relax or modify simplifying assumptions. However, there is nothing inherent in behavioural economics that requires one to embrace the neoclassical economic model (Camerer & Loewenstein, 2004). The difference is in the context of decision-making and the institutional environment within which decisions are made (Altman, 2015). Others see the challenge to rational actor theory as fundamental. Jolls, Sunstein and Thaler (1998) argue that behavioural economics, with its core assumption of bounded rationality in the face of uncertainty, is superior to traditional economics in its ability to develop predictions for human behaviour. They argue that if *homo economicus* - with near perfect information, computational ability and rational decision-making skills applied to utility maximisation - is the core of neoclassical theory, the difference is that behaviouralists are interested in *real people*. Real people make decisions within bounds; *bounded rationality*, *bounded will power* and, *bounded self-interest*

Relevance of choice and decision-making

This review of choice theory has highlighted economic approaches to conflict between humans and their environment and the evolution of theories to address this conflict. It is expected the investigation will find evidence of these theories and approaches being applied in the case studies that follow. From a methodological perspective, behavioural economics is seen as a fruitful approach for the investigation of questions 3 and 4; what are the impediments to greater uptake of collaborative governance and, how can these impediments be overcome?

2.5 Review

This literature review has defined key concepts and reviewed each lens of the multidisciplinary analytical framework for the investigation. In summary, governance is defined in terms of *rules of the game* and institutions for mediating relations between humans and humans and their environment. Stewardship is defined as the goal for environmental governance; a systems approach, intra and intergenerational equity. The analytic framework has been developed. For social context, the investigation will adopt an historicist approach looking at the evolution of governance in the context of power relationships at relevant inflection points. Institutional analysis will draw on historical and sociological institutional analysis, particularly the work of DiMaggio and

Powell (1983). For the analysis of choice on whether to participate in collaborative governance, the investigation will adopt a bounded rationality approach.

The next chapter will consider methodology for the investigation.

3 Methodology

This chapter will outline the methodological approach adopted for the investigation. In doing so, it will broadly follow Crotty's (1998) description of the research process in reverse order. Whereas Crotty advocates a tiered process that builds from a foundation of research methods and ends with epistemology, this chapter will move from theory to practice, from epistemology to method. The first section will discuss ontological and epistemological considerations. This will be followed by discussion of methodology and the final section will outline the research methods adopted. The approach can be summarised as adopting a constructivist ontology and epistemology, case study methodology and a mixed-methods approach that includes both qualitative and quantitative data. In adopting a phenomenological epistemology, the investigation does not test a predetermined hypothesis, but adopts an exploratory perspective to see what emerges from the case studies. It is aware that this will limit the generalisability of the findings.

3.1 Epistemology and ontology

In rejecting a positivist and scientific epistemology advocated by protagonists such as Popper (Popper, 1959) for social science research, the investigator has been drawn to the phenomenological and post-structuralist approaches to ontology and epistemology found in the work of Marx, Levi Strauss, Heidegger, Althusser and Foucault. As an exploratory project, the investigator was interested to allow findings to emerge naturally from the case studies in a way that would provide some learning as well as a basis for further investigation. Part of the reason was that the relationship between humans and nature, is a field that has been well cultivated with, at best, marginal change in the relationships and, possibly, a degenerative tribalism of researchers speaking to their own echo chambers. While the researcher enters the field with a set of beliefs (frame of meaning), it accepts after Giddens[14] that this is an inevitable part of social science research; "the double hermeneutic of social science" (Willmott, 2015).

The attraction of the above-mentioned approaches is in identifying a world in which there is both an interconnectedness and a layering of social and economic influences shaping the human world. Heidegger saw humans as part of a world where everything is interconnected. He and others questioned the capacity of structuralism to discern and identify universal structures of all cultures and human thought (Besley, 2011). Heidegger calls for recognition of the finitude of knowing and allowing people and things to present on their own terms and thus accept the world as it is encountered (Painter-Morland & ten Bos, 2016). At the outset, it is hoped that this way of thinking

[14] Giddens, A. (1977), *Studies in social and political theory*, London, Heinemann quoted in (Willmott, 2015) – library not accessible during COVID-19

will bring a different perspective to an investigation of humans and the environment and allow issues to emerge.

A constructionist (Crotty, 1998) or *constructivist* (Guba & Lincoln, 1998) interpretive social science framework (Bryman, 2012; Neuman, 2011) accepts that meaning is not preordained, but rather a transitory form constructed from circumstance influenced by culture, values (individual and social), institutions and physical circumstance. If there is no objective truth to be identified with precision but "humanly fashioned ways of seeing things" then making meaning of a situation or subject of investigation is not independent of the researcher, both subject and investigator "contribute to the construction of meaning" (Crotty, 1998, p. 16). Neuman (2011) distinguishes interpretative social science from positivism because it tells a story; it describes and interprets how people conduct their daily lives, whereas positivism tries to mimic natural science theory with deductive axioms, theorems and interconnected causal laws.

The research will be approached from an interpretive, constructivist ontological and epistemological foundation that sees humans as *being-in-the-world*, not detached as subjects relating to objects. It accepts that problems need to be viewed from multiple dimensions, providing breadth and depth (layers), and seeks to achieve this through the three lenses of the analytical framework. It accepts from both the post-structuralist literature above, and the case study literature discussed below, that observations will not be based on science and not generalisable although the findings will generate insights and working hypotheses to inform future research.

3.2 Methodology

The investigation considers how environmental governance emerges in three case studies in two jurisdictions. In particular, it is interested in collaborative governance; how it emerges, what it can contribute, barriers it faces and how these might be overcome. The work of one of the leading scholars in this field, Elinor Ostrom, was framed initially by case study fieldwork on collective action responses to common pool resource issues. Her subsequent research drew on game theory and empirical work in a laboratory. She found it impossible to construct a single over-arching causal theory of collective action given the range of influences and interdependencies (Ostrom, 2010). She argued experiments needed to be complemented by field trials examining not just successful self-organised institutions but also those that never got going or failed after initial success. *Second generation* collective action research, she argued, should not expect a single causal theory but rather, the development of coherent, cumulative, theoretical scenarios that start with relatively simple baseline models and change one variable at a time. She believed the kind of theory to emerge would not be a global bivariate (or even multivariate) prediction to which scholars have

aspired (Ostrom, 1998, p. 16). This advice has informed the investigation and the case study approach. It draws on a wide range of theory and does not expect to resolve into a single theorem.

3.2.1 Case study methodology

Case study research investigates a few cases, often just one, in considerable depth and does not necessarily result in claims about the generalisability of findings. What is crucial is the use others make of the findings (Hammersley & Gomm, 2009) and any patterns in the findings. Starke (2009) argues that while case studies have been useful for theory building, that is not necessarily their best use because the approach is expansive, more open-ended, rather than reductionist. A less formal style and experiential approach make case studies useful for understanding social problems and as a basis for naturalistic generalisations – that is, intuitive generalisations, based on personal experience, expressed in the language of the intended audience. The only generalisation for case study outcomes is that there is no generalisation. Local conditions make it impossible to generalise. What may be regarded as generalisations are no more than working hypotheses (Lincoln & Guba, 2009). Nevertheless, it may be possible to transfer a working hypothesis developed in one situation to another depending on the 'fit' of circumstance. Generalisability depends on the case study, how it is conducted and the relationship of the case study situation to other situations.

The lack of generalisability in case study research means it is likely to be more open-ended in developing theoretical ideas. Tsang (2013), after Welch et al. (2011), proposes four methods of theory building in case study research: (1) interpretive sense-making; (2) contextualised explanation; (3) identification of empirical regularities, and; (4) theory building and testing. Interpretive sense making is interested in in-depth human experience embedded in a rich real-world context; contextualised explanation emphasises explanation based on theory, and the identification of empirical regularities looks for patterns in the empirical observations. Theory building attempts to build and test theories through case study research. Building on Tsang's approach, the investigation will examine each of the cases with a view to:

(1) Building a contextualised narrative that considers origins and goals of governance in the context of the social, cultural, political and economic environment,
(2) Understanding the social, cultural, political, economic and institutional factors that influence the success (or failure) of governance,
(3) Understanding the attitudes and roles of individuals, groups and institutions as well as any patterns that emerge,

(4) Summarising the findings, whether they be working hypothesis or naturalistic generalisations, that can be tested in other situations or subjected to further investigation.

3.2.2 Selection of case studies

Three case studies are examined for this investigation: (1) management of State forests in Victoria; (2) management of water in Australia, with a particular focus on the Murray-Darling Basin, and; (3) management of water in China, with a focus on the Yangtze Delta region and northern China particularly Tianjin. As will be discussed later, the selection is based on the investigator's involvement with each of the case studies. As such, they represent an opportunistic sample. Case study 1 examines the evolution of governance in the context of forest management. The study identifies how the Forest Stewardship Council (FSC) emerged as a collaborative governance system, what distinguished it from other forms of collaborative governance, and how it survived despite institutional opposition. This experience framed the development of the Alliance for Water Stewardship (AWS) - a form of collaborative governance examined in case studies 2 and 3. AWS took on many of the elements that made FSC successful and entered the relatively new sphere of human interaction with water. At the time of the investigation, AWS had not been as successful as FSC and this investigation provides an opportunity to understand what influences success during the formative stages of collaborative governance. To do this, case studies 2 and 3 conduct, using a formal questionnaire, an empirical analysis of attitudes to water by water-using firms.

3.3 Methods

A mixture of methods will be adopted in each case study. *Mixed methods* research gained credibility and recognition in the 1990s following debate over the merits of qualitative versus quantitative research (Patton, 2002). The main challenge is to appropriately match methods to questions. Broadly, qualitative methods explore depth while quantitative methods are more suited to testing hypotheses based on an existing conceptual model to understand predictors of successful implementation (Palinkas et al., 2015). For this investigation, the following mixture of methods are adopted: historical (genealogical) research of primary and secondary sources, personal observation, qualitative interviews, quantitative analysis, seminars, workshops, conferences and collaboration with another researcher. Each is discussed below.

3.3.1 Historical analysis

A range of primary and secondary literature was reviewed to understand historical context, assemble data and analyse text. For example, in case study 1, the investigator reviewed all relevant Annual Reports from various government departments responsible for State forests over a 25-year period from 1990 to create a data set illustrating changing value of forest assets. All editions of *Australian Forestry* – the professional journal of Australian and New Zealand foresters – from first publication in 1936 to the present were reviewed for historical context. Repetitious documents, such as 200 conference papers presented to OzWater conferences in 2018 and 2019, were analysed for key words using the NVivo 12 software[15].

The interest of this analysis was not simply the historical narrative but the evolution of power and the interactions of power with institutions and knowledge to understand the present. It offers a critical reflection on history and power relations that both propel and gain advantage. Power is seen as complex, operating through networks encompassing practices, actions and institutions dispersed through society. It is concerned with practices and exercises more than individuals, groups and classes (Sax, 1989, pp. 773-774).

3.3.2 Participant observation

Jorgensen (2011) notes that participant observation is generally practiced as a form of case study research for exploratory studies, descriptive studies and studies aimed at generating theoretical interpretations. He notes it can be open-ended, flexible and opportunistic, establish and maintain relationships and used in combination with other methods for gathering information. Observers commonly gather information through casual conversations, but may also use in-depth, informal and unstructured interviews as well as formally structured interviews and questionnaires (p. 10). This approach stands in contrast to situations created and manipulated by researchers through experiments and surveys yet can still provoke concepts critical analysis.

Ellis, Adams and Bochner (2011) classify personal observation as a sub-set of *autoethnography* which they describe as a critical methodology interested in personal experience that helps to understand cultural experience. They describe it as both a process and an outcome that opens a wider lens on the world and may be self-consciously values-centred rather than values free. As a process, it can combine with other methods and analysed or used to illustrate facets of cultural experience. In this investigation, the form of *autoethnography* adopted is described as *layered accounts* where the author's experience is used in combination with other methods to allow readers to share emergent experience. The method is adopted in each of the case studies to

[15] NVivo is a qualitative and mixed methods data analysis software tool. It is particularly useful where large amounts of data are involved or where the data is in a range of formats (NVivo, 2019).

create social context or provide access to networks and experiences that would not otherwise be available. Where an observation is solely based on the investigator's personal experience this will be noted. In most cases correspondence, notes or newsletters, written by the investigator at the time, will be referenced.

The investigator has been a participant in the three case studies in a way that provides insights, connections and an identification with the issues. In Heideggerian terms, the investigator dwelt in the world of the investigation. While this has provided contacts and an ability to empathise with the subject, it has not been used in a peeping Tom sense of covertly noting private conversations and observations. The following interactions between investigator and the investigation are noted:

> In the decade between 2003 and 2013, the investigator participated in the forest sector working at the Forest Stewardship Council International Centre (FSC) in Bonn, Germany, between 2003 and 2005 and establishing the Forest Stewardship Council in Australia and New Zealand (FSC ANZ) after returning from Germany. He was the founding CEO of FSC ANZ and after retiring in 2012 received Honorary Life Membership. The investigator has maintained contact with some stakeholders and remained on a number of mailing lists where the evolution of forest policy has been discussed and criticised.
>
> From 2006, the investigator was a leader in the establishment of the Alliance for Water Stewardship (AWS) internationally and in the Asia-Pacific. He was the inaugural CEO of AWS Asia-Pacific and the founding Chair of AWS International. He resigned all positions in early 2020 prior to finalising this investigation. His involvement is relevant to the case studies on water stewardship in Australia and China in providing insights into the thoughts of implementers and non-implementers of water stewardship. Staff of AWS in China as well as Australia provided some support for this research through the identification of potential interview subjects and, in China, through administering a questionnaire in Chinese on behalf of the investigator.

3.3.3 Qualitative interviews

A small number of individuals were selected for interview in case studies 1 and 3. Formal interviews were not conducted for case study 2 because of the active engagement of the researcher with water at the time. As a result, conversations with the Australian water sector were more in the form of participant observation than interviews.

For State forests in Victoria and water in China, interviewee selections were based on the individual's role and ability to contribute insight to the case study analysis. As a result, for forests

they were individuals central to the evolution of governance arrangements at the turn of the 21st century whereas for China, they were individuals with insight into government processes for the regulation and management of water. Palinkas et al. (2015) describes this as *purposeful sampling* for information rich cases in order to make the most effective use of limited resources (p. 354). The selection strategy could be described as *critical case* in that the individuals were key players in the activities being discussed.

The interviews were loosely structured around the individual's role in order to explore their experiences and to seek their reflection on issues pertinent to the case study. For the forest case study, questions mainly focused on the evolution and demise of market governance and forces at work in managing forests. For the China water case study, questions mainly related to the role of government and how collaborative governance could work in a jurisdiction with such a heavy reliance on command and control (classic Hobbesian Leviathan). Interviews were recorded in note form. Individuals will not be personally identified in line with the ethics approval (Appendix 4). Table 1 provides a description of the individual's role and assigns a number for reference in discussion.

Table 1: Qualitative interview subjects

Interview number (case study/number)	Role
1/001	Senior political leader, Victoria
1/002	Senior official from forest agency, Victoria
1/003	Senior departmental official, Victoria
1/004	Forest taskforce member, Australia
1/005	Leading environmental activist, Victoria
3/001	Official, Environment Protection Bureau, Tianjin (China)
3/002	Official, Environment Protection Bureau, Shanghai (China)
3/003	Academic, Shanghai

3.3.4 Quantitative research

Quantitative analysis was used to understand choice decisions of water-using businesses for the water case studies in Australia and China. Some 53 surveys were administered to understand what motivated or constrained participation in AWS water stewardship. This was an appropriate research tool for understanding choice decisions reflecting the approach of both Ostrom (1990, 1998, 2010; 1994) and Simon (1955, 1956, 1986). The context and approach are explained more completely in Chapter 5; notwithstanding, below is a brief description of the purpose and approach to developing the questionnaire.

The questionnaire was developed to test firstly, whether decisions to participate or not participate in water stewardship were based on rational choice (utility maximisation) and, secondly, what other considerations may have been pertinent. Other considerations are detailed in Chapter 5 and derived from the literature review. This builds on the recommendation of Ostrom, who argued that while rational choice theories would continue to serve as a benchmark for empirical studies on collective action, a key research question would be: "What is the difference between the predicted equilibrium of a complete rationality theory and observed behaviour?" (Ostrom, 1998, p. 16). She predicted *second-generation* collective action research would focus on the effects of structural variables – variables that create the environment in which collective action emerges - on the likelihood of being able to build successful models of implementation.

The first draft of the questionnaire was tested with one water-using site in Kunshan (near Shanghai, China). It was then reviewed with local experts, including: Ms Zhenzhen Xu, Asia-Pacific Regional Director for the Alliance for Water Stewardship; Associate Professor Kathinka Furst, Duke Kunshan University; Professor Dan Guttman, University of New York Shanghai, and; Mr An Chen, TEDA EcoCentre in Tianjin. Following this review, the questionnaire was extensively rewritten and, some additional questions added to better understand current practices and water investments by water-using sites.

The questionnaire was applied to water-using facilities (or sites) not whole companies. Facilities were selected for participation from those that had either attended AWS training or participated in some form of AWS-related activity, sufficient to provide them with a basic understanding of AWS water stewardship. Requiring some knowledge or familiarity with AWS limited the field of potential participants. Thus, participating facilities were not a *random sample* but rather an *opportunistic sample* of sites that had shown sufficient interest in water stewardship to have been in contact with AWS either of their own volition or with encouragement from a government agency, customer or association.

Results were analysed in both IBM SPSS statistical software[16] and in Microsoft Excel as appropriate. Advice on statistical methods was obtained from the Department of Mathematics and Statistics at Monash University. Given the number of questions asked and the size of the sample, the investigator was advised to aggregate data from different questions into indexes. This proved to be a useful technique for analysis. Composition of these indexes is explained as they arise in Chapter 5 and 8.

[16] SPSS is an acronym for Statistical Package for the Social Sciences

3.3.5 Seminars, workshops, conferences and collaboration

Three seminars or workshops were conducted to engage a broad range of people, with some interest in the topic, in discussion on matters relevant to the investigation.

Valuing natural capital workshop (December 2012)

This workshop was held at the outset of the investigation to help the researcher define the issues for the investigation and understand stakeholder perspectives on relations between humans and nature. *Valuing Natural Capital; opportunities and risks for business* was held at the National Australia Bank head office in Melbourne and attended by 50 people from business, government and civil society. Organised, managed and introduced by the investigator, attendees were introduced to the issues by keynote speakers: Pavan Sukhdev (Visiting Fellow, Yale University previously head of The Economics of Ecosystems and Biodiversity (TEEB) project); Will Steffen, Climate Commission and Executive Director ANU Climate Change Institute, and; Joshua Bishop, National Manager Markets, Sustainability and Partnerships WWF Australia and previously Chief Economist IUCN. Case studies on managing natural capital were presented by Rio Tinto, PWC, NAB, Kilter, Ashurst Lawyers and EcoInsights (ANU).

Sukhdev, who had recently published *Corporation 2020; transforming business for tomorrow's world* (Sukhdev, 2012) challenged the audience to say how they could each address the problems of declining natural capital. A memorable moment that influenced this investigation was when a politician present said that government would only adopt a more stringent regulatory approach if it had support from business. A short while later, a participant from business told the audience that business would only act if there was a clear requirement from government. This brief exchange illustrated the logjam with neither government nor business prepared to lead (presumably unless there was an immediate identifiable threat). The workshop contributed to identifying some of the obstacles to resolution of conflict between humans and the environment.

Workshops Tianjin University Law School

Two workshops were held at the Tianjin University Law School to discuss this investigation with academics in China. Professor Dan Guttman (New York University, Shanghai and Tianjin University Law School) facilitated the workshops and Ms Zhenzhen Xu (Alliance for Water Stewardship, Asia Pacific Director) provided translation. The first workshop was chaired by the Dean of the Law School, Professor Sun Youhai, who encouraged further work through collection of case studies. The workshop with about 20 participants, including the Director of the Tianjin

Environment Protection Bureau, provided useful insights for framing the questionnaire as well as perspectives on water stewardship and soft law approaches in China. The second workshop was smaller and provided an opportunity to present results from the research and discuss interpretation of the results with a range of academics. This provided some important contextual insights into how to interpret attitudes and the factors that may influence certain responses in the China survey.

Publications and conferences

The researcher has exposed parts of the investigation to a variety of audiences by participating in seminars and conferences, as well as preparing articles for publication. This includes conferences organised by the International Water Association, the Alliance for Water Stewardship, University of NSW Global Water Institute and Monash Business School. Book chapters have been accepted for two forthcoming books (listed at the front of this thesis). The investigator was invited to join a *High Level Panel on Private Sector Adaptation to a World of Climate Change and Water Extremes* at the International Water Resources Association XVII World Water Congress in Korea (rescheduled for 2021) where he was also to coordinate a Special Session on *Business Risks and Public Goods; empowering public-private partnerships to address water stress*.

3.3.6 Collaboration on water and agriculture

The researcher shared the questionnaire with a student from the Graduate Institute of International and Development Studies in Geneva, Switzerland. The student, Alex Whitebrook, was interested in undertaking research on water in China for his Master's degree in Development Studies. The investigator encouraged Whitebrook to look specifically at rural water users in China. Whitebrook made some modifications to the questionnaire and surveyed 15 smallholders and one community leader in two agricultural villages in collaboration with Zhenzhen Xu, AWS Asia Pacific Director. The methodology adopted by Whitebrook (Whitebrook, 2019) to analyse his results was based on stakeholder theory (sometimes seen as a sub-set of institutional theory (c.f. Deegan, 2014). His data was made available for this investigation and is used in Chapter 6 to contrast findings collected at a village-level in China with findings from industrial water users.

3.4 Summary

The methodology described here is proposing a constructivist approach to a series of three case studies that will be investigated using mixed research methods in order to explore these cases from different perspectives. This approach is not designed to test a hypothesis or produce generalisable theories. However, it is hoped the approach will produce findings that may be applicable in similar circumstance and can be tested through further investigation.

4 Management of State forests in Victoria (Case study 1)

This case study explores governance through an examination of State forest management in Victoria, Australia. It will do so through each of the lenses of the analytic framework described in the literature review - social context, institutional and choice. It is interested in: how governance and collaborative governance evolves; opportunities for better stewardship outcomes; institutional influence, and; factors that influence the success and failure of collaborative governance. Unlike the two water case studies that follow, this case study will not include an empirical investigation of choice behaviour by participants in collaborative governance. The case study starts with a brief explanation of the forest problem internationally and in Australia.

4.1 The forest problem

Forests represent a public good prone to over-consumption and *Tragedy of the Commons* problems. As economist Paul Samuelson noted in his 1976 contribution to the forest debate, "… standard managerial economics, and actual commercial practice, both tend to lead to an optimal cutting age of a forest that is much shorter than the 80 or even 100 years one often encounters in the forestry literature" (Samuelson, 1976, p. 467). In other words, economic pressure means trees are prone to being cut before forests grow back to maturity.

Between 1990 and 2015, the planet lost 129 million hectares of forest, an area the size of South Africa, including 21 million hectares of primary forest. The problem is not just trees, but a range of ecosystem services associated with forests. Forests contain more than three-quarters of the world's terrestrial biodiversity, protect soils and water and contribute to the socio-economic condition of hundreds of millions of people including many of the world's poorest. Deforestation threatens loss of habitats, land degradation, soil erosion, decrease in clean water and release of carbon into the atmosphere (FAO, 2018). Over the past 25 years, carbon stocks in forest biomass have decreased by almost 11 gigatonnes (Gt) driven by conversion to other land uses and forest degradation (FAO, 2016).

Many of these international problems are present in the State of Victoria. At the time of European settlement, approximately 90 per cent of the state, comprising 22.7 million hectares, was covered by forest, woodlands and shrublands (forest cover). Since then, clearing for agriculture and urban development has left less than 9 million ha of forest cover of which two thirds are on Crown land. The approximately 6 million ha of forest cover on Crown land is split between areas classified as parks and conservation reserves and State forests (3 million ha each) (DEPI, 2014; Sparkes, 2019a). State forests include areas for production of timber and other forest products as well as special protection zones, water catchments and recreational facilities. Pressure on forests has

grown as a result of demand for timber and pulp, water, recreation and biodiversity services. Reports since the 1960s have shown evidence of over harvesting for wood (Bracks & Garbutt, 2002; I. S. Ferguson, 1985; McGrath, 1965). There is evidence climate change will damage the vitality and health of Australia's forests due to more frequent and intense fire seasons and forest fragmentation with impacts on threatened flora and fauna (Sparkes, 2019a).

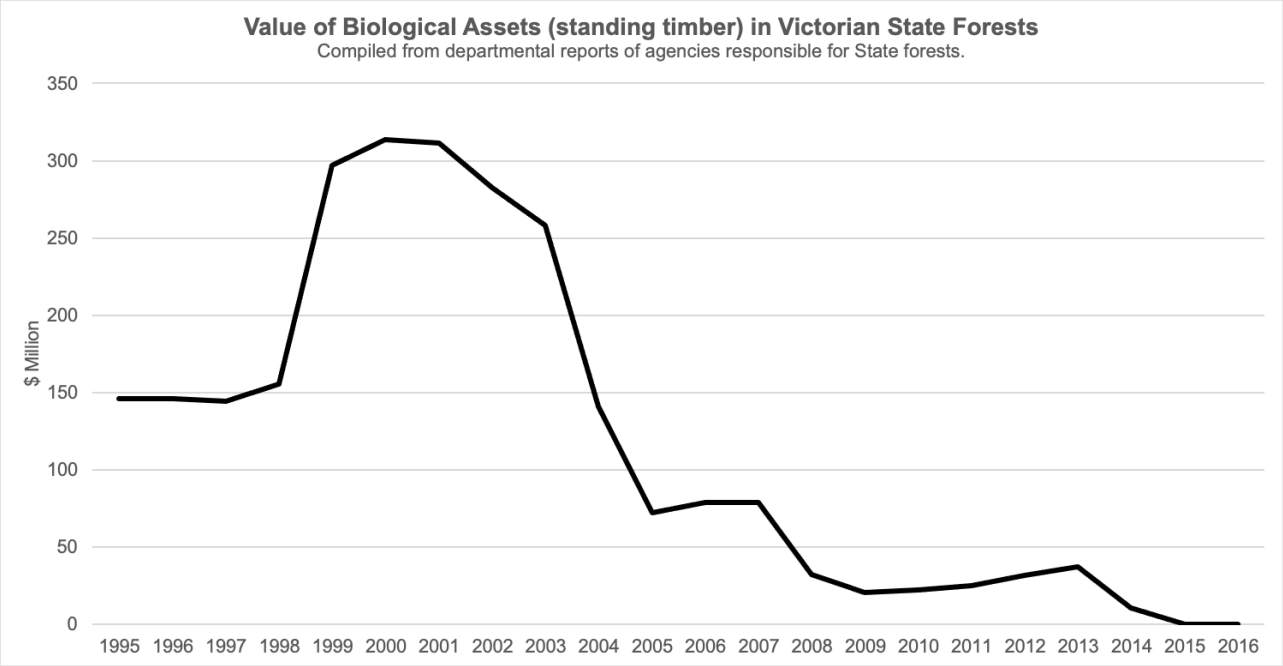


Figure 3: Value of Victoria's biological timber assets 1995 - 2015

Figure 4 illustrates the decline in the value of standing timber in State forests since this data was first collected under accounting rules developed and introduced in the mid 1990s. It should be noted that there was a change in how these valuations were calculated from Net Market Value (NMV) (1997 – 1999) to Net Present Value (NPV) (2000 - 2015). NMV is the amount that could be expected to be received from the sale of the asset after deducting the costs of disposal whereas NPV is based on discounted cash flow of future sales (DNRE, 2000). The almost doubling of the valuation in 1999 followed the sale of the Victorian Plantations Corporation for $544 million. The constant decline from 2000 reflects estimates of the value of future sales. These estimates would be influenced by availability of timber due to previous harvesting, bushfire and protection or conservation measures. Between 2003 and 2008, the valuation decreased from $258 million to $32 million. In 2014 all commercial timber in State forests was transferred to the harvest and sale agency VicForests for a book value of $10 million based on NPV[17].

Contested demands and expectations of forest eco-system services have featured in public debate since the 1970s as a result of three factors: (1) development of a strong forest protection

[17] This data has never been displayed in this form to illustrate a continuous decline in value and a number of protagonists including senior forestry leaders argued they could not be correct.

movement, (2) growth in demand for low quality pulpwood, and (3) development of mechanised integrated harvesting methods that clear-fell large coupes of forest. Sawn wood demand has concentrated on a narrow range of species - *E. regnans* (mountain ash), *E. delegatensis* (Alpine Ash) and *E. sieberi* (Silvertop) - available from highly contested areas that also provide tourism, water and biodiversity services. The impact of bushfires, clear-fell logging practices and restrictions to limit impact of timber harvesting on water and biodiversity resulted in these areas being logged-out to commercial timber. As a result, the Victorian Government announced it would phase out logging of State forests by 2030 (Andrews, 2019). The move prompted outrage from conservative politicians, industry groups (Preiss, Towell, & Grieve, 2019) and the forest worker's union (Towell & Preiss, 2019). Debate continues and it is anticipated that there will be efforts to overturn the phase-out of logging before it is implemented (interview 1/005).

4.2 Evolution of forest governance

The evolution of forest governance in Victoria can be divided into five periods as illustrated in Figure 5 below: (1) governance adopted by Indigenous people who occupied the land for 60,000 years; (2) frontier governance from the arrival of Europeans but particularly the start of the gold rush period; (3) state regulatory governance from 1907; (4) market-based governance from 2003; (5) state-sponsored social enterprise from 2010, and; (5) period following announcement that timber harvesting would cease from 2030.

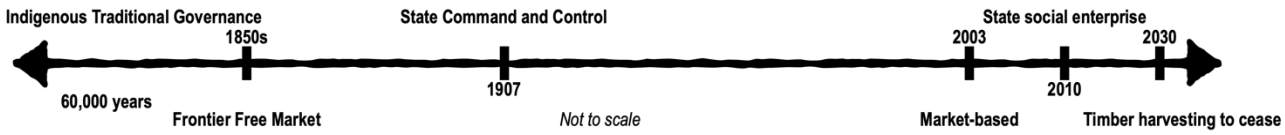


Figure 4: Evolution of forest governance in Victoria (not to scale)

4.2.1 Indigenous forest management

It is a grave error to date the start of forest governance from the arrival or invasion of Europeans on the Australian continent, as most histories of forestry in Australia seem to do. Very little is written in the forestry literature about Indigenous forest management. Rule's *Forests of Australia* for example starts:

> *Australia's forest story begins in one sense from the moment the first white men stepped ashore at Sydney Cove and began clearing the scrub. Ages before that the Aboriginals fashioned dugout canoes from logs, and prised sheets of bark off gum trees to make their bark canoes, in order to spear fish in still waters – thus beginning forest exploitation of a sort. But it seems fair enough to start with the first sawpits dug in Australia.* (Rule, 1967, pp. 44-45)

It would be another 40 years before Gammage (2011) would bring to popular attention the intricate management of landscapes undertaken by Indigenous people for tens of thousands of years before the invasion of Europeans. That is not to say these practices were not observed, they clearly were. Rhys Jones, for example, coined the term *fire stick farming* in the 1960s to describe Indigenous land management (Ross, Pickering, Snodgrass, Delecore, & Sherman, 2011). More often than not, colonialists saw these practices as a nuisance as illustrated by Governor Phillip's observation of Indigenous forest management:

> *they are so frequently setting the country on fire is I apprehend the reason we find so little timber is sound. It must injure the very young trees which it does not destroy and so very scarce is the sound timber …* (Governor Phillip to Lord Sydney, quoted in Carron, 1985, p. 2)

Fire was the major tool used by Indigenous people to manage landscapes in a planned and systematic way, rendering the landscape luxuriant, abundant and comfortable (Gammage, 2011). Importantly for this investigation, Indigenous environmental management was not random but systemic management within a framework of traditional governance. At the heart of this governance model was an ontological belief system, rooted in a creator story of spirits and ancestors who laid down the law in a timelessness referred to as the Dreaming:

> *The Dreaming has two rules: obey the Law, and leave the world as you found it – not better or worse, for God judges that, but the same. The first rule enforces and exists for the second. Together they let place dominate time, and translate well understood ecological associations into social relations – kin, marriage, diplomacy, trade and so on. They apply these same relations and obligations to all creation, guarding the universe by outlawing fundamental change, so making all creatures conservationist and conservative.* (Gammage, 2011, p. 124)

Building on the two-stage definition of governance provided in the literature review, the *rules of the game* were the laws handed down from ancestors and spirits in the dreaming. The mechanisms of governance were *ceremonies* and *elders,* who were "integral to the maintenance of the system of law and custom" (Sutton, 2003, p. 123). This form of governance is foreign to the modern paradigm. At its base, is a belief system that sees humans in a systemic way as part of their environment and with accountability to future generations.

With the despatch of England's redundant poor, for the establishment of an idealised peasant economy in New South Wales (Fitzpatrick, 1971) and an imperial base to protect and enhance its position in Asia (Frost, 1987), Indigenous society was swept aside. As Indigenous Australians had not cultivated the land in the manner of Europeans, it was seen as a "Virgin Mould, undisturbed since creation" awaiting the "creative European hand" (Frost, 1987, p. 410). While Governor Phillip's instructions were to open exchange with "the natives" and to "conciliate their affections"

with “amity and kindness” (Clarke, 1962, p. 80), there was no regard for the legitimacy of their knowledge, governance or indeed, prior occupation.

> *The totalising expectations of the European settlers arising from colonisation and state formation created the starting point for supressing Indigenous knowledge systems … European ethnocentrism led to the misguided conclusion that there was no Indigenous knowledge*. (Ross et al., 2011, p. 72)

When John Batman sought to make a treaty with the Indigenous people of Port Phillip, the British Government issued a proclamation of *terra nullius,* effectively denying prior occupation and any claims to the land Indigenous people had managed for more than 60,000 years (R. Bourke, 1835). The British subdued Indigenous people and imposed their ontological beliefs, economic and political systems, social practices and governance.

> *In this atmosphere of asserting Western European cultural superiority, there was little room for appreciating or even recognising Indigenous knowledge in relation to natural resource management. Indigenous experience was pushed aside in favour of so-called scientific and capitalist approaches to land use and resource management.* (Ross et al., 2011, pp. 72-73)

It would take 200 years to start to recognise what was lost.

4.2.2 Frontier governance

The period that followed European invasion can best be described as a period of frontier governance. There was virtually no government control and attitudes to forests were characterised by two views: one considered them an impediment to settlement that should be removed as quickly and completely as possible; the other regarded forests “as an inexhaustible supply of wood to meet local and, where possible, export needs” (Carron, 1979, p. 65). Shepherd (1979) notes “our forefathers saw the bush as limitless and, alas, something to be sub-divided and mastered”. The result was that when Victoria was separated from New South Wales in 1851 at the beginning of the Gold Rush period, the accompanying population explosion brought about a “great onslaught on the forests” to meet the needs for housing, firewood and mining. Seeing wood as something that should be available at next to nothing, the colonial government exercised only the lightest of controls (Carron, 1985, p. 179). The onslaught continued over the next half century with little effective governance of forests.

The second half of the 19th century was a period of tension between the frontier industries of mining and land development, and those who saw a long-term industry in the management and harvest of timber. The period was punctuated by inquiries, token appointments and unenacted legislation. One inquiry in 1887 was so frank and outspoken that it was suppressed, while a

subsequent inquiry in 1895 described forest conservancy and management as being in “an extraordinary backward state”. The reasons “were political and centre in the disregard of the general public weal where this clashes with the monetary profits of individuals and classes who can exert a direct Parliamentary influence” (Carron, 1985, p. 181).

A subsequent Royal Commission condemned the wasteful management of forests that deprived the colony of a valuable resource; for example, in their fifth report, the commission said in relation to the development of the Otway region:

> *Regarded from every point of view, the manner in which settlement in this forest has been not only permitted but encouraged has been a great administrative blunder. … The destruction committed by them in making homes for themselves has been put in a very emphatic, if exaggerated, way by saw-millers in the district, who say that the value of the timber so destroyed “would have paid the national debt”.* (Tucker, Bailes, et al., 1899, p. 7)

This was a battle between an emerging nationalist elite of businesspeople and politicians, with a longer-term commitment to building a timber industry as part of a national economy, and the frontier economy established following the arrival of Europeans. In their final report, Tucker and his colleagues made it clear where they stood contrasting “the weak, unsystematic, and inefficient” control of forests in Victoria with the “*public-spirited policy firmly established in countries such as France, Germany, and British India …”.* They saw their role as to

> *lay down the main principles of the scheme of legislation, control, and management which we consider essential for the preservation of the immensely valuable property contained in the forest domain, and for insuring the climatic and industrial benefits arising from a well-ordered system of conservancy. (Tucker et al., 1901, p. 8)*

Although those with an interest in the frontier economy continued to hold the ascendancy for several years, eventually, in the wake of Federation and the new spirit of nationalism, those promoting a national industry gained control. Victoria passed a *Forest Act* in 1907, established a systematic forest management regime through amendments to the Act in 1918 (Rule, 1967) and locked this in with the establishment of the Forests Commission, staffed by professional foresters, as a statutory authority in 1919. Establishment of an arm’s length statutory authority was important because it was perceived forestry involved long timeframes and needed to be able to fend off parochial politicians (Greig, 1986). The Forest Commission, the forestry profession and supporting legislation were the foundation for state command-and-control. This institutional set would control forest management throughout the 20th century.

4.2.3 State command-and-control (regulatory governance)

The fledgling institutions of forest governance grew and developed over the following 50 years. The Forests Commission embraced modern technocratic, professional management based on science (*scientific management*). It advocated for its role in the economy and promoted the idea of self-sufficiency in wood production after World War 1. Its influence grew as national and state targets were set for native hardwood and softwood plantation production at a Premiers' Conference in 1920 (Ajani, 2007). Exotic pine plantations were expanded to meet targets, silviculture[18] was introduced to improve wood production in State forests and, during the 1929 Great Depression, foresters were supported by unskilled workers assigned to State forests (Carron, 1985; Rule, 1967). A professional association was formed in the 1920s to promote the standing of forestry and scientific management of forests. In 1936, this was consolidated with the establishment of a professional journal, *Australian Forestry*.

In 1939, bushfires worse "than anything experienced in the previous hundred years" (Rule, 1967, p. 69) inflicted heavy losses on both pine plantations and native hardwood forests and presented the Forest Commission with its first major challenge. The industry adapted making the salvage of burnt timber a focus for operations. Salvage wood supported the World War 2 war effort[19] and the post-war demand for housing expansion during the 1950s. Timber imports had virtually ceased. When salvage came to an end, more than 4.5 million cubic metres of timber had been harvested (VicGov, 1986) and more than 300 mills set up to meet demand for housing. But the decade-long salvage operation exhausted the capacity of accessible forests and, with regrowth requiring at least 80 years (2020), forestry was forced into less accessible areas, particularly East Gippsland.

Demand for wood saw the Commission expand its activities with increased softwood planting, supported by long-term loans from the Commonwealth (Ajani, 2007), and land acquisition for an ambitious reforestation program (VicGov, 1986). Less productive State forest areas were cleared for pine plantations. Industrialisation of forestry transformed it towards a more intensive industry characterised by tree breeding, massive site cultivation, heavy machinery, fertilisation, chemical weed control and mechanical harvesting to grow uniform crops best suited for industrial processing (Dargavel, 1987, p. 7). After 50 years, the Commission sat at the apex of an industry entering the modern era.

Modernisation changed the relationship between foresters and forests. In Heideggerian terms, it increased the separation between subject and object. Foresters were no longer part of and

[18] Silviculture is concerned with the culture, establishment, composition and growth of forests to attain specified management objectives (Lutze, Campbell, & Fagg, 1999)

[19] Which included the use of interned "aliens" engaged in cutting firewood for Melbourne and some silviculture work such as thinning of multi-stemmed trees resulting from mining era harvest (Ransome, 2020)

protectors of the forest, but managers of forest exploitation. By the early 1960s, this manifested in the highly contested approach of mechanically clear-felling large areas of forest to remove commercial timber and then burning the residue or slash in mountain ash and alpine ash forests (Lutze et al., 1999). Development of demand from the pulpwood industry allowed the full economies of clear-fell to be realised through integrated pulp (wood chip) and sawn wood harvesting. Carron (1979) argued foresters had dreamed of circumstances that would allow them to sell material not suitable for timber so forests could be felled economically and then regenerated with even-aged stands of commercially desirable species.

Forestry institutions built a powerful culture that created camaraderie and set them apart from non-foresters. Greig (1986) notes three critical effects of forests being run as a statutory corporation:

- the corporation ran its own school to train its own professional foresters
- those trained in the school ran the corporation efficiently and at arms-length from Parliament, and
- generations of foresters developed a culture that became out of step with influential parts of society.

Industrialisation of forestry, an inability to restrain over-harvesting and the culture of foresters would play an influential role in future developments.

4.2.4 Challenges to modern forestry

From the 1970s, new forces emerged with different priorities for forests. The following 50 years would be characterised by a power struggle between the entrenched institutions of forestry and new institutions that emerged in civil society, environmental non-government organisations (ENGOs), and the state (conservation agencies). Industrialisation of forestry was creating externalities (loss of other ecosystem services). The new institutions were intent on holding foresters to account for these externalities and asserting their priorities for State forests.

These new forces emerged as the industry committed to export woodchip markets and converted so-called “unproductive forests” into “productive ones” (Carron, 1979, p. 72). These developments “appeared as a fast lane in the road to modern forestry” (Dargavel, 1987, p. 8). One industry leader described the “modern” section of the industry as “waste users” who saw homogeneous inputs such as uniform pine plantations and wood chips as allowing “sufficient scale to be adopted in plants for modern capitalised techniques to be employed (Gunnerson, 1981, p. 67). However, this larger scale, capital intensive and technologically sophisticated industry caught to attention of post-war baby boomers for whom forests had values other than commercial wood production.

Despite changing social attitudes, the Forest Commission maintained conservation and recreation in forest reserves "were secondary" to the main purpose of wood production (Carron, 1985, p. 208). Richard and Val Routley (later Richard Sylvan and Val Plumwood) brought things to a head in *Fight for the Forests* (Routley & Routley, 1974) that highlighted the ecological impact of softwood plantations, conversion of native forests to pine and the clear-fell of native forests for wood chips.

> *Plumwood and Sylvan juxtaposed detailed numerical analysis of the softwood program and its environmental consequences with black and white photos of huge plantations. 'Fight for the Forests' combined heart and mind. The attack was devastating because it drilled into the forester's ambivalence about what they had become as caretakers of public forests.* (Ajani, 2007, p. 84)

The changing social landscape and awareness of environment led to new institutions, new agencies of government, being established. The Land Conservation Council (LCC), established in 1970, provided a forum to influence land-use decisions and the reservation of land (including forest land) for conservation (Rawlinson, 1977). The LCC and its successor the Environment Conservation Council (ECC), successfully influenced the allocation of public land and marine areas for different purposes over the following decades (Clode, 2006). In 1970, 33.6 per cent of Victoria was unreserved Crown Land and reserved forest. By 2005, 16.6 per cent was allocated to national parks or conservation reserves and 15.2 per cent to State forests. From the 1970s the institutions that had governed State forests had to compete with new institutions for power and influence.

The challenge caught the Commission by surprise (Greig, 1986). Environmentalists questioned the competence of foresters and the "ill-conceived, ill-planned and unnecessary" woodchip export projects (Routley & Routley, 1974, p. 2). The Forest Commission was self-contained and powerful and regarded the environment movement as a "faction without substantive interest in forest resources, but also a city culture, undisciplined and impractical in the serious business of utilising forest resources" (Greig, 1986, p. 198). Forestry institutions tried to protect their position through increased secrecy, with reports and other data being withheld, even from members of parliament (Rawlinson, 1977). The industry became the subject of scrutiny from both Federal and State parliaments. In the mid-1970s, subsidies for softwood plantations were withdrawn (Ajani, 2007). Institutions of forestry and environment became embroiled in a power struggle similar to that between foresters and the frontier dwellers in the 19th century.

4.2.5 Seeds of market governance

The period that followed, the 1980s, 90s and 2000s, was characterised by forestry institutions moving to defensive mode, government recognition of a broader set of interests in forests and, the emergence of new public sector management (NPM) in Victoria. Eventually, it would see

government attempting to resolve conflict between environment and forestry by establishing new institutions based on a private rights and a market-based approach to governance.

Closing ranks to defend their position

Initially, some foresters were open to reconsidering priorities based on changing community expectations. Others saw the environmental challenge as a call to arms and rallied colleagues to protect the industry they had inherited. Grose (1973), for example, noted that while the clear-fell approach he had previously advocated was “a sound basis for regeneration”, it had a problem co-existing with other values such as recreation and nature appreciation. Florance (1973) argued that, if foresters were to retain the right to make and implement management decisions on public forest land, they needed to broaden the resource use and management-planning base. Exemplifying the call to arms approach, Institute of Foresters (IFA) President, Wallace, told members that as foresters and “in the interests of the industry … we must be prepared at all times not only to defend the commercial use of this national asset but to explain in simple language the sustained yield principle under which we operate” (Wallace, 1971). A decade later, the then IFA President said foresters had to face the “harsh realisation” that the views of the foresters “do not align with those of the public” (Nicholson, 1983). Fast-forward another decade and the keynote speaker at the triennial conference of foresters was rallying the troops:

> *Many of us here have felt as if our future is being whittled away, eroded by increments….Clearly I am not alone in believing it is time for us to take a firm grasp of the levers and create the future we want.* (Drielsma, 1993)

Drielsma was at the time Managing Director of State Forests NSW and would later move to Forestry Tasmania. The industry became more assertive to a point where, in 2011, members would be publicly chastised for departing from the IFA script and proposing ideas similar to those put forward by Grose and Florance in the 1970s. Poynter, a public advocate for the IFA, criticised a guest editorial in *Australian Forestry* journal for trying to open debate:

> *There is a need to recognise that the Guest Editorial in Australian Forestry is no longer just a cosy chat between foresters but is being scrutinised by ENGOs searching for internal discrepancies and disagreements within the profession that may be harnessed to further their agendas.* (Poynter, 2012)

By this time, the ground had well and truly shifted.

Shifting ground

Growing environmental influence was evident in a change of government in Victoria in 1983. After 27 years of conservative leadership, Labor was elected on the back of a "sea change in public opinion and expectation in relation to both government and environment" (Clode, 2006, p. 54). The Forests Commission "had given little recognition to Labor in opposition to which the cutting edge of the environmental movement became aligned" (Greig, 1986, p. 199). The new government effectively abolished the Forests Commission amalgamating it with other natural resource agencies to form a new Ministry of Conservation, Forests and Lands. It found the Commission's wood production plans "were vague and secretive" and failed to generate sufficient confidence to form the basis of a timber industry strategy for Victoria in the environmental climate of the time (Greig, 1986, p. 200). Two priorities of the new government would have a major impact: a commitment to commercial principles and new public sector management (NPM), and; a desire to resolve forest conflict by first appointing a *Board of Inquiry into the Timber Industry* (I. S. Ferguson, 1985) and then developing a *Timber Industry Strategy*.

Chair and sole member of the *Inquiry*, Melbourne University Professor Ian Ferguson, was a prominent member of the forestry community, forest educator and a regular contributor to *Australian Forestry*. His report noted that since the turn of the century, forest concerns had moved from "security of the public forest estate" to "the appropriate balance between competing uses" (p. iii). The wood-processing industry now found itself in competition with a wide range of users interested in environmental services (conservation, recreation, water etc.) and other forest produce (for example honey). Ferguson argued for a "sensible balance" between competing uses (p. iv).

Ferguson (1985) made important observations on the contradictory nature of forest policy such as trying to combine *multiple use* forestry, that respected all forest values, with *sustainable yield,* "that assumes the sole objective of management is maximisation of average annual wood production in perpetuity" (p.118). He recommended that the objective for managing public forests should be to maximise the *net social benefit* to the community although he also observed that the data to implement such a recommendation was not available. As a result, he recommended *operational principles* for management of State forests that covered: (1) economic viability; (2) environmental sensitivity; (3) sustainability with respect to future generations, and; (4) public participation in the planning process. The government accepted Ferguson's recommendation although it did not translate into the *Timber Industry Strategy*.

The Victorian *Timber Industry Strategy* (VicGov, 1986) had an economic agenda to improve viability of the industry and returns to government from use of forest resources. Environmental issues such as biodiversity were to become part of a separate environmental strategy. The *Timber*

Strategy provided compensation for reductions in harvest levels to deal with a failure to manage over-harvesting (Greig, 2004; Kirner, 1985; VAGO, 1993). In return government wanted accelerated economic reform (Greig, 2004). It wanted better use of available timber, higher royalties to cover a four per cent return to government, greater use of logs for sawmilling rather than woodchip, greater use of softwood and encouragement for private hardwood plantations. It offered longer license terms but wanted to see further value adding to timber harvested from State forests. This emphasis on commercialisation would become an ongoing theme even though, certainly at the start, industry did not have the institutional structure to implement these policies.

New public sector management

The commercial agenda for forestry was influenced by Victoria embracing new public-sector management (NPM) from the 1980s. Departments and authorities were expected to implement business practices adopted from the private sector; annual productivity saving of 1.5 per cent (unchanged policy basis) and centralised debt management. Agencies became service providers with guidelines on economic and financial performance, accounting and reporting, investment evaluation and non-financial performance. They were expected to achieve a target real rate of return on assets (four per cent in 1987) to recognise private sector opportunity cost of funds employed (VicGov, 1987). Ferguson warned data is “simply not available” (p.122) for State forests to implement these practices and would require a period of education. Accounting for forestry was so primitive it was not possible to assess in any comprehensive manner how Victoria’s public investment in wood production compared with government financial performance criteria.

Change of government in 1992 saw greater emphasis on commercialisation and privatisation. The Auditor-General report criticised the lack of progress on economic reform and delivering the four per cent rate of return (VAGO, 1993). Shortly after the department started to report improving profitability as a result of restructuring, contracting out, improved market conditions, enhanced royalties, and separation of public and private costs (DCNR, 1995). The following year, the department described one of the four objectives of its forest service program[20] as “to manage forest production as a business and ensure sustainable supply of forest produce” (DNRE, 1996, p. 5). The Victorian Plantations Corporation (VPC), established in 1993 as a commercial operation under the then *State-Owned Enterprises Act (1992)*, was sold for $544 million in 1998 (DCNR, 1994; DNRE, 1999, 2000). Thereafter, the government established Forestry Victoria to manage commercial forestry in State forests, improve returns and increase investment in forest industries (DNRE, 1999). The focus on commercial outcomes increased concentration on wood production.

[20] Other goals were; (1) to provide advice regarding forestry service, (3) to prevent and supress fires on public land and to provide community services such as recreation, (4) education and conservation of forest assets.

4.2.6 Market-based governance

At the turn of the century, there was growing concern among environmentalists that State forests were being *high-graded* (over-harvesting higher quality logs) under commercial management (Nicastro, 2003). Some saw NPM and the development of a National Competition Policy agenda as an opportunity to attack subsidisation of native forest logging through market-based approaches that would increase the price of native forests logs and make plantation forestry more competitive (interview 1/005). The Australian Conservation Foundation (ACF) commissioned a report from consultants Marsden Jacob to press the case for the application of competition policy to the native forest industry (Marsden Jacob, 2001). The report resonated with an incoming government sensitive to anxiety about over-harvesting and open to the competition argument. Market-based governance held the prospect of resolving conflict or at least limiting rent-seeking behaviour.

The new government believed institutional arrangements had been captured by industry. It identified a 20 per cent over-commitment of logs, beyond what could be supplied sustainably and, inherent subsidies due to under-pricing: “There were cosy relationships when we came to government that were not being market-tested, resulting in over-commitment, subsidies and under-valuing of the forest estate” (Bracks, 2020). As a result, harvest levels were reduced, a new process to monitor sustainable yield was introduced and legislation drafted for a government business entity, VicForests, to manage commercial wood from State forests. The creation of VicForests would disentangle commercial and regulatory functions and promote an efficient and competitive industry (Bracks & Garbutt, 2002). The legislation mapped a pathway for forestry to move to private rights market-based governance.

The *Sustainable Forests (Timber) Act 2004* established VicForests to harvest and market wood from State forests on a commercial basis. It would access the forest through an Allocation Order that created a right to harvest and an obligation to return the harvested area to the state after replanting. VicForests was established under the *State Owned Enterprises Act 1992* as a *state business corporation* (S. 17) and proclaimed by *Order in Council* in October 2003 (VicGov, 2003) with the following functions: (1) To undertake the sale and supply of timber resources from State forests on a commercial basis; (2) To develop and manage an open and competitive sales system for timber resources, and; (3) To pursue other commercial activities as agreed by the Treasurer and the Minister. It was required to operate efficiently, consistent with prudent commercial practice, maximise its contribution to the well-being of the State (S.18) and pay a dividend (S. 49).

The new entity would leave the Department free to focus on sustainable forest management through allocating areas for harvest, regulatory controls and reporting against sustainability criteria set out in the *Act*. Competitive commercial sales would provide market discipline and transparency.

Turning theory into practice

VicForests set out with a strong team and what it thought was a clear mission. The new CEO saw the job as an opportunity to bring modern management to the sector: “I had a positive view of trying to transform a clunky forest management system in the public sector to a modern market-based system” (Pollard, 2019). He surrounded himself with a well-regarded team including a number of former Forests Commission staff. “People who went to work at VicForests had spent all their lives working in forests. It wasn’t just the Forests Commission culture; a lot of the people were good, and they brought a lot of talent to the organisation” (interview1/003). However, the challenge of gaining a commercial return in an industry that “wasn’t a very sophisticated” would be considerable (interview 1/002). The new entity would be under pressure: “They [VicForests] had to set the world on fire. They were charged with getting more out of forests” (interview 1/003).

In its first years of operation, VicForests delivered dividends to the State and established a timber auction system that began to reflect the economic value of the product. However, within a few years, the impact of bushfires and politics began to erode the market-based principles on which VicForests was established. The Premier was aware that “cosy relationships” would attempt to reassert themselves (Bracks, 2020) but retired four years after VicForests was established. Power relationships and lack of political will were obstacles:

> *[The market approach] is totally checkmated by the politics of forestry. At some point, they all argued for markets and changing the system but whenever there is a political problem, they will say … too much cost and we are not going to do it* (interview 1/002).

This was an industry accustomed to subsidy (interview 1/002). Political follow-through was another problem. “The 2002 [policy] was always a compromise. It had some good ideas, but they were not followed through” (interview 1/005).

The strategy of separating the *commercial* timber operations and *regulatory compliance* created new tensions. Considerable thought had gone into the new commercial entity, the same thought had not been put into the role of the continuing department: “There was a lot of emphasis on what VicForests would look like but not nearly as much into what the Department would look like. It had to be built while trying to implement the new model” (interview 1/003). Others saw it differently: “So we had a clash. The Department had a very green culture. They turned up to work looking like hippies and nobody had any interest in facilitating the commercial culture of VicForests” (interview 1/002). From VicForests’ perspective this clash undermined the intent of the Act. One senior official saw the allocation of areas to be harvested as being in the hands of people who did not believe in harvesting State forests. The Department saw this as natural tension between a new agency, in charge of its own destiny and without the same responsibility for forest protection (interview 1/003).

Other factors complicating the new arrangements were: (1) The Department's role as independent regulator was compromised by government commitment to the timber industry and the regional employment it was perceived to provide; (2) Parliament had entered a long-term commitment to pulp and paper manufacturer, Australian Paper, to supply woodchips from the most valuable forest areas at a price based on the prevailing price of office paper; (3) Australian Paper was a very successful lobbyist for its business (interview 1/002) and native timber harvesting (interview 1/005) that had infiltrated major political parties (Neighbour, 2006), and; (4) VicForests held forest data the Department needed to calculate sustainable yield. Lack of commitment, lack of follow through, entrenched politics and built-in contradictions poisoned ambitions for a new governance model.

4.2.7 Retreat to social enterprise

Apart from in its first few years, VicForests did not get close to commercial success and, by the end of a decade that included three significant bushfire years, the idea of a market-based system had all but disappeared. From 2004 to 2015, VicForests generated $6.8 million in dividends for taxpayers. However, it also received $25.7 million in government grants and payments. Apart for 2006 and 2007, instead of a four per cent rate of return, it averaged 0.4 per cent return on contributed capital. As well as political and regulatory tensions, bushfires had a major impact. Following a devastating fire season in 2009, CEO Pollard said the organisation was struggling to meet supply commitments:

> *It is our view that while existing sawlog and pulplog contractual commitments can be met, overall the industry in Victoria is on a vector of long-term contraction and there will be an increasing dependence on lower quality forest until regrowth forest mature to sufficient size in about 30 years* (VicForests, 2009, p. 10).

This was a clear and strong message about what was to come in the next decade but, as will be shown, no one appeared to be listening.

The auction system for timber had resulted in price increases of up to 50 per cent for some log grades (VicForests, 2009). This coincided with mounting competitive pressure from maturing pine plantations and the Global Financial Crisis that saw mill closures, competition from international markets, declining native timber availability, slowdown in construction demand and a rise in timber substitutes. The auction system became an object of scorn with claims it was impoverishing timber families in regional centres (A. Morton & Fyfe, 2012). Political pressure mounted and in 2010, the fig-leaf of VicForests being a commercial entity was removed when its Order in Council was amended requiring it to "undertake its commercial activities in a manner which will maximise the

long-term economic return to Victoria" (VicGov, 2010). This resulted in a significant change in the assessment criteria that would be applied in evaluating its performance (c.f. VAGO, 2013).

Following a change of government and a new *Timber Industry Action Plan* (DPI, 2011), the auction system was required to consider "long-term security" and investment in Victoria's native forest industry (p. 9). No further auctions took place. In 2011, power to make an Allocation Order was transferred from the Minister for Environment to the Minister for Agriculture and the management of State forests was transferred from the Department of Environment to the Department of Primary Industries (DPI 2012). The *Sustainable Forests (Timber)* Act was amended in 2013 to insert the goal of providing long-term access to timber resources in State forests. Despite supply constraints already mentioned, amendments allowed VicForests to enter contracts to supply timber for 20 years and longer. In October 2013, the entire State forest timber estate was allocated to VicForests at a book value of only $10 million (VicForests, 2015; Walsh, 2013). Yet the swathe of changes failed to address the long-term decline of the resource. By 2014, *VicForests Resource Outlook* showed a decline in the area available and commercially suitable for harvesting (VicForests, 2014). The period not only saw abandonment of market-based governance but realignment of institutions within the state to shift power away from environment and toward wood harvesting.

4.2.8 End of timber harvesting in State forests

In 2017 VicForests was unable to meet the requirements of its largest sawlog customer (accounting for two thirds of sawlog deliveries). VicForests said improved modelling of future timber resources showed supply would need to be reduced (Hill, Langshaw, & Ford, 2017). When the customer decided to close its mill (S. Anderson, 2017), even though government knew the limitations of the resource, the state entered into an in-principle agreement to buy the operation (Pulford, 2017). In 2019, the Government announced a gradual phase-out of all logging in native forests by 2030 (D'Ambrosio, 2019) and a 30-year plan to support the transition to plantations (Andrews, 2019). Ironically, Bracks had made a similar announcement almost 15 years earlier (Bracks, 2005). On this occasion, however, taxpayers would contribute $110 million to establish the plantations. Environmentalists welcomed the announcements although were fearful that further twists of the electoral cycle may result in a recommitment to logging State forests (interview 1/005). After 30 years of policy change, State forests had a resource crisis and the surviving industry, rather than becoming a dynamic contributor to the economy of the state, was reduced to a social enterprise dependent on state support.

4.2.9 Overview of governance evolution for State forests

Traditional Indigenous governance was eliminated by British invaders who brought their own ontology, values and expectations of governance. After a period of anarchic frontier governance, there was a period of tension between those who had benefited from frontier governance and those committed to a local timber industry. This coincided with Federation and Australia's industrialisation. The new institutions created were the foundation for technocratic regulatory governance managed by foresters who established a professional association and education system. Foresters won credibility by responding efficiently and effectively to the development and industrialisation agenda. In doing so, they distanced themselves from their role as forest stewards to become part of an economic system of management. This created the pre-conditions for a *tragedy of the commons* problem. New institutions emerged that challenged the foresters and a power struggle developed. Government attempted to mediate by introducing market-based governance, but this lacked long-term commitment and was overpowered by the well established forest institutions. Accelerated by bushfires, the *tragedy of the commons* problem of State forests was realised and government announced cessation of logging in State forests.

4.3 Collaborative governance in Victorian State forests

Different forms of collaborative governance appeared during the 1990s, in response to the institutional power struggle between forestry and environmentalism, as different actors searched for governance arrangements that could resolve conflict. This section will consider three initiatives: (1) Regional Forest Agreements (RFAs) promoted by the Commonwealth to resolve conflict over native forest management; (2) Forest certification schemes that sought to establish multi-stakeholder governance over standards for responsible forest management, and; (3) a locally initiated community forest management program. These represent different forms of collaboration (Kekez et al., 2019) with different power relationships.

4.3.1 Regional Forest Agreements (RFAs)

The RFA process was impactful but ultimately left stakeholders dissatisfied as it failed to deal with conflicts of values or provide a basis for ongoing collaboration. RFAs were an initiative of the Commonwealth Government in response to escalating forest conflict in the 1970s and 1980s. Environmentalists had sought Commonwealth intervention due to a perception that states tended to promote economic outcomes regardless of environmental cost (Lane, 1999). The Commonwealth had shown a preparedness to become involved in environmental conflict through the Tasmanian Dams Case, using the external affairs power in the Commonwealth Constitution (Sec. 51 (xxix)). Environmentalists wanted the Commonwealth to adopt a similar approach to woodchipping of State forests.

The Commonwealth had a stake in the argument because it had taken on the role of issuing export licenses for woodchips through the *Export Controls Act (Cth) 1982.* The annual approval of woodchip licenses had become a focus for environmentalists' campaigning and drew the Commonwealth into acrimonious and divisive public debate on the validity of native forest logging (Davey, 2018). Ajani argues that a key Commonwealth minister believed electoral success depended on capturing the growing environmental vote. A further incentive for action was the international environmental commitments signed by the Commonwealth at the 1992 Rio Earth Summit. A draft National Forest Policy Statement was designed to give effect to the Earth Summit conventions and set out a shared vision for achieving ecologically sustainable forest management through 11 goals. It offered something to every stakeholder group (Ajani, 2007). One of its goals was to foster community support and invite public participation in decision-making (DOA, 2015).

After most states signed the Statement in 1992, the Commonwealth produced a discussion paper that introduced Regional Forest Agreements (Ajani, 2007) as 20-year plans, agreed between the Commonwealth and each state "for the productive use and conservation of Australia's native forests. RFAs were intended to … provide a long-term solution to debate about access to and use of Australia's forests" (DOA, 2015, p. 1). The agreements sought to balance economic, social and environmental demands through commitments to deliver: (1) certainty of supply to industry; (2) ecologically sustainable forest management, and; (3) an expanded and permanent forest conservation estate. Ten RFAs were signed with state governments between 1997 and 2001, covering commercial native forestry regions in Victoria, New South Wales, Western Australia and Tasmania. Queensland did not sign an RFA but did complete a Comprehensive Regional Assessment for South-East Queensland.

Resource assessments underpinned RFAs and represented the public participation component of the agreements. They assessed forest uses and values based on consultation and commissioned reports from experts in biology, ecology, sociology and forestry. States were expected to establish National Forest Reserve Criteria based on a Comprehensive Adequate and Representative (CAR) reserve system. Nationally, RFAs placed 3.3 million hectares of forest, previously available for logging, into timber reserves to protect biodiversity, old-growth and wilderness values. Each state committed to achieve *sustainable forest management* and the Commonwealth committed to more than $200 million for industry adjustment. Areas subject to an RFA were exempt from some provisions of the *Environment Protection and Biodiversity Conservation Act (Cth) 1999* and the *Export Control Act (Cth) 1982*. Ajani (2007) argues the RFAs largely absolved the Commonwealth of responsibility for logging in State forests for the term of the agreements.

Assessing the RFA process

The engagement process varied between states. Victoria drew heavily on processes established by the Land Conservation Council and New South Wales sought to balance competing forest users (Kanowski, 2017; R. D. Spencer, Bugg, & Frakes, 2003). Ford (2013) argues the processes lacked appreciation of the need to address competing social values. Values conflicts, she argues, need to be resolved through flexible discursive processes rather than top-down technical processes. Lane (1999) argues technical approaches to resource assessment were poorly adapted to dealing with symbolic and ideological dimensions of land use. According to Vanclay (2012), the approach resorted to command-and-control "despite the well-documented limitations" of that approach. Clode (2006) contrasts the RFA process with the LCC process pointing out "consultation is only beneficial if people feel their input is heeded and influences the outcome" (p. 112) arguing failure to do so can result in cynicism and lack of commitment to the end result.

RFAs set out with the intention of reconciling competing demands on forests (Lane, 1999) but ended in disappointment. Lindenmayer et al. (2004) found there was one point of consensus in the RFA process; both industry and conservation groups were dissatisfied. For Ford (2013), early optimism and goodwill were let down by a failure of process. A roundtable of 35 people from industry, government, environment groups and academics felt the process required a participatory rather than a consultative approach and stakeholders needed equal access to data and analytical procedures (Lindenmayer et al., 2004). Lane (1999) argues *Regional Forest Agreement* was a misnomer as the term suggests an inclusive process of regional negotiation amongst key stakeholders. He considers that RFAs were an exercise in centralised resource assessment that did not result in stakeholder agreements; it merely achieved agreement between two levels of government. Slee (2001) believes the process may have exacerbated conflict and sharpened irreconcilable differences between foresters and environmentalists. Others argue the process left a legacy of "low levels of trust and consensus" between key stakeholders about "forest management and sustainability strategies" (Kanowski, 2017, p. 58).

4.3.2 Forest certification

Forest certification emerged internationally in the late 1980s. Strong post-war demand for wood had seen an intensification of logging through heavy machinery replacing axes and saws, road building, land clearing, use of pesticides and herbicides and, rapid spread of industrial scale plantations often on cleared natural forests and wildlife habitat (Synnott, 2005). Concern was focused on tropical forests where failure of national and multilateral processes to halt deforestation and forest degradation attracted attention of international non-government-organisations (NGOs),

such as Friends of the Earth and the World Wildlife Fund in customer markets (G. Auld, Gulbrandsen, & MCDermott, 2008; Synnott, 2005; Tollefson, Gale, & Haley, 2008).

NGO agitation impacted markets with companies using tropical timber branded as contributing to forest destruction. In 1987, Friends of the Earth adopted exclusion of tropical timber as a criterion for the first Good Wood Seal of Approval (Synnott, 2005). Matters came to a head when the International Tropical Timber Organisation (ITTO) refused to support a proposal from NGOs to develop a forest certification and labelling scheme. The NGOs were further frustrated in the lead-up to the 1992 Earth Summit when forest-rich countries argued that a forest convention would be a barrier to trade and negotiations stalled (G. Auld et al., 2008). Despite this, forest certification began to develop in North America driven initially by New York-based Rainforest Alliance and then San Francisco-based Scientific Certification Systems. UK-based Soil Association and Swiss-based SGS followed in the early 1990s.

A collaboration between artisan woodworkers in the UK and California promoted the idea of an international monitoring agency, and workshops in 1991 and 1992 eventually led to the formation of the Forest Stewardship Council (FSC) in 1993 (Tollefson et al., 2008). FSC was built around a multi-stakeholder governance system with three chambers (social, environmental and economic) holding equal power through a General Assembly of members and an international board. It developed a set of *Principles and Criteria* for responsible forest management that would be implemented through national, regional or generic forest management standards. Forest management units (FMUs), complying with the standard and certified by an independent third-party conformity assessment body (CAB), would be eligible to make claims of compliance and use the FSC brand. This was supplemented by a Chain of Custody certification program that tracked certified wood through the supply chain to final products being offered by retailers.

The forest industry's initial response was to vociferously oppose certification. However, by the 1990s, industry leaders saw "the strategic necessity to spearhead development of alternative, industry-friendly certification schemes" (Tollefson et al., 2008, p. 27). Forest producers objected to the institutional governance of the FSC system (the sharing of power between environment, social and economic chambers), the stringency and intrusiveness of FSC's environmental and social standards, and expressed the view that those who implement sustainable forest management (producers) ought to develop the rules (G. Auld et al., 2008). This led to a plethora of industry or national government sponsored schemes that would eventually coalesce under the banner of the Program for the Endorsement of Forest Certification (PEFC).

Australian Forestry Standard

Australian governments and the forest industry resolved to build a national forest certification scheme to access international markets where there was a growing awareness of forest certification (Gale & Haward, 2011). After a delay due to the RFA process, the Australian Forestry Standard (AFS) was developed between 2001 and 2002 as a national forest management standard and recognised by Standards Australia (AS 4708 Forest Management). The Primary Industries Ministerial Council (PIMC) endorsed AFS (PIMC, 2002b) and the partnership between the Commonwealth, the forest industry, the states and territories it represented (PIMC, 2002a). While unions did not receive a specific mention, they were represented on the AFS Steering Committee (Gale & Haward, 2011). AFS joined the PEFC Council in 2002 and in 2004, along with Chile, became the first non-European scheme endorsed by PEFC (AFSL, 2020). The first forest manager certified under the scheme was the most controversial forestry company in the country at the time, Gunns Limited, in November 2003. Gunns was under pressure to independently verify its claims of environmental sustainability in its wood operations (Frame, 2004).

Environmental groups (ENGOs) removed themselves from the AFS process shortly after it commenced and, with Gunns Limited becoming the first AFS certified operation, campaigned to discredit it. The Wilderness Society (TWS), for example, said it did not support “in any way, the Australian Forest [sic] Standard (AFS) or the Australian Forest Certification Scheme (AFCS) that is based upon it” (TWS, 2005). TWS claimed AFCS “certifies wood and wood products that come from land clearing, old-growth forests logging and clearing, the poisoning of thousands of animals every year, and contamination of domestic water supplies”. It claimed the process for development of the Standard was dominated by forestry interests, biased and procedures were poorly implemented (TWS, 2005). Forest certification became another site of forest conflict.

After initial scepticism, ENGOs embraced FSC as an alternative to AFS. This brought forwarded a coalition of government, industry and unions to attack FSC. In 2006, the Commonwealth Forestry Minister threatened a federal inquiry into what he referred to as “the Mexico-based Forest Stewardship Council” (FSC relocated from Mexico to Germany in 2002). The Opposition spokesperson joined the attack, describing FSC as a business that encouraged boycotts of non-FSC certified products and was dominated by environmental groups (M. Ferguson, 2006). The head of the Victorian Association of Forest Industries (VAFI) claimed it was “impossible for even the best managed native forests in Australia to obtain [FSC certification]” (Caswell, 2006). FSC versus AFS became a proxy for the broader institutional conflict over forests.

Forest Stewardship Council[21]

FSC did not have an easy birth in Australia. Despite proponents agitating from the early 1990s it was only in 2001 that environmental organisations endorsed a proposal to investigate an "FSC-type certification process for plantations and agroforests" (Gale & Haward, 2011, p. 157). This decision was influenced by the decision of Hancock Victorian Plantations (HVP), owners of the former Victorian Plantations Corporation, to seek FSC certification, creating a situation where "it was no longer feasible to postpone a decision on FSC" (p. 158). However, a stakeholder meeting to advance the proposal could not reach agreement on the form FSC would take in Australia and "ended in some disarray" (p. 158). An independent small forester who attended said: "Industry and government representatives present actively undermined the formation of FSC in Australia on the basis that it was *green* controlled" while "all the green groups present were adamantly opposed to the certification of ANY native forests" (P. K. Davies, 2007).

Despite these apparently intractable conflicts, a new generation of forest owners - finance people taking advantage of tax incentives to develop plantations using managed investment schemes (MIS) to serve export woodchip markets - were instrumental in establishing FSC. Separately, leading paper merchant, Paperlinx, had seen the trend toward certification growing in Europe and became an important supporter of FSC in Australia. These economic interests were joined by influential forest leaders from environment groups as well as smaller regional social and environmental groups and academics with an interest in forests and forest certification to lead development of FSC in Australia (M. Spencer, 2006).

In March 2006, an Interim Board met at the offices of MIS company, Timbercorp, in Melbourne to establish FSC Australia. The six-person Board comprised two representatives from environmental groups, two from industry and two from social chamber organisations. A Constitution was drafted based on the FSC International three chamber, multi-stakeholder governance model to balance the interests of the economic, environment and social chambers. By the middle of 2006, Responsible Forest Management Australia Limited (trading as FSC Australia) had applications from 29 Foundation Members who declared their commitment to the *FSC Principles and Criteria for Responsible Forest Management* (M. Spencer, 2006).

The new organisation saw early success in the paper, printing and publishing sector. Paperlinx launched a marketing campaign to promote a new range of FSC-certified papers and created a forum in major cities where FSC could speak directly to printers and publishers. Publishing houses, led by the Europeans or North Americans, began to specify FSC-certified paper. Author and forest

[21] This section on the evolution of FSC in Australia draws on sources as indicated in the text as well as personal experience of the investigator.

activist Richard Flanagan lent his support to “persuade our colleagues to insist on FSC-approved paper” (Flanagan, 2007). With this foundation, FSC was able to withstand the pressure that came from government, the native logging industry and controversial Indonesian paper producer Asian Pulp and Paper, who sponsored an Australian consultant to attack the credibility of FSC in Australia (Kohn, 2008). Australian Paper, conscious of the growing market pressure but dependent on logging native forests, was soon exploring ways to produce an FSC-certified product.

Governments, having funded AFS, declined to support for FSC. Requests for financial support were met with variations of: “Unfortunately, the government cannot provide additional funding support to develop a FSC forest management standard for Australia” (T. Bourke, 2009). It would take six years, and pressure from state forest agencies facing demands from their customers, for government to provide support for the development of an FSC Australian forest management standard. In 2013, with the industry in crisis because Japanese demand for wood that did not carry FSC certification had collapsed, the Commonwealth offered $500,000 to support development of an FSC Australian standard (Sidebottom, 2013). The project commenced with a nine-member elected working group (three from each of the economic, environmental and social chambers) and after seven drafts and five years of consultation the Standard was published in 2019 (FSC, 2019).

Major changes impacting the Australian forest industry between 2006 and 2013 made support for FSC not only easier but compelling for government and former opponents in the forest industry. The Global Financial Crisis reduced global demand for paper and woodchips allowing customers to be more selective in their purchases. Japanese paper companies were under pressure for sourcing controversial wood from Tasmania (M. Spencer, 2010). Mitsubishi Paper Mills sought out FSC Australia to discuss FSC wood requirements (Ishii, 2007). During stakeholder consultation, Alec Marr, The Wilderness Society, offered to sign-off on exports from Tasmania if Mitsubishi excluded wood from a list of high conservation areas. Controversial exporter Gunns agreed and eventually extended the agreement to all its Japanese customers (Hayes, 2010). Gunns moved from being a leading opponent of FSC to a supporter and implementer of FSC through its operations.

Gunns advanced its engagement to a point where in 2010, it was prepared to put itself in front of stakeholders with the CEO of FSC Australia and FSC Conformity Assessment Body Rainforest Alliance. A news report of the meeting said community reaction suggested Gunns road to gaining “social license” for its oft-contentious timber operations would not be smooth. What was clear however was the politics of forestry in Tasmania had changed:

> *A new-found pragmatism forced by economic downturn, public pressure and high-stakes politics has entered the previously hard-core centre of Tasmania’s forest industry. Entrenched and polarised views are finally disappearing, or at least being slowly cast aside, in the face of irrefutable need for industry change* (Neales, 2010).

Reconciliation talks between stakeholders, originally discussed by the heads of Forestry Tasmania and Gunns with the FSC Australia CEO in 2009, commenced in 2010 and engaged national and state-based industry leaders and environmental leaders to find common ground and resolution.

4.3.3 Community forest management

The Wombat Community Forest project represents a rare example of community forestry in Australia. The project was established to achieve community consensus on sustainable forest management and prevent over-harvesting. After an initial period of operating independently of the state, the community sought government involvement to fund management infrastructure for the project and ensure legitimacy for outcomes agreed through the process. For government, the Wombat provided a potential model for resolving forest conflict. However, after the project ended in acrimony, there was little interest in further developing or even experimenting with community collaboration from government, civil society or industry.

The project was based on the Wombat State Forest, a 50,000-hectare mixed forest north of Melbourne with a long history of over-exploitation dating from the discovery of gold in the area during the late 19th century (N. Matthews & Missingham, 2009). At the turn of the century, it was described as a "ruined forest" that had been largely "exhausted" (Tucker, Baker, et al., 1899). Closed to commercial logging until the 1930s, logging recommenced in the 1940s and small family run sawmills were established in the area. In the 1990s, logging pressure stepped up and harvesting was intensified through combined saw log and pulp log harvesting to meet requirements of new licenses granted to a Geelong-based export woodchipper (T. Anderson, 2017). This prompted establishment of the Wombat Forest Society (WFS), a community group with a shared interest in curbing what was seen as excessive harvest levels being permitted by government while supporting sustainable logging of the forest:

> *The Wombat issue during the 1990s was not an us and them or greenie vs logger typical forest dispute. We all worked through the issue as a community. Packed town hall meetings with never an angry word. WFS shared its research and modelling with the industry and industry gave us information. It was why there was (sic) such dramatic reductions [in logging licenses]* (T. Anderson, 2017, p. 3).

These achievements had an appeal to a government looking to defuse forest conflict. In 2002, government committed to "developing options for community participation in forest management" (Bracks & Garbutt, 2002, p. 6). Local politicians became involved in discussion about collaborative forest management, a survey of community forest projects around the world was undertaken and a telephone survey conducted that found almost 90 per cent of respondents wanted the community

and government to manage the forest jointly (N. Matthews & Missingham, 2009) Within months, government announced that a trial of community forest management would proceed in the Wombat State Forest (Nelson & Pettit, 2004). However, research on existing community forestry projects offered only a generalised model and the Wombat community was left to develop its own vision (N. Matthews & Missingham, 2009) and form of participatory democracy (Nelson & Pettit, 2004).

Governance processes were soon racked by internal conflicts and irreconcilable differences. Government funding allowed the former President of the WFS to become a paid community development officer. An Interim Stewardship Council with seven working groups transitioned, in 2004, to a Council of Stewards comprising 11 Working Group representatives and non-voting government representatives. Public attention drew in new participants representing broader interests beyond the Wombat forest, while government was insisting existing logging contracts be honoured. Conflict resolution workshops were required as progress became slow and tedious. By late 2005, most working groups resigned, government terminated the Council of Stewards and decided to recommence logging. Community protests halted logging and a few months later the government bought out remaining logging contracts effectively ending commercial harvesting.

The experience left participants weary and unwilling to be involved in similar processes (N. Matthews & Missingham, 2009). There had always been a degree of suspicion by some stakeholders (Nelson & Pettit, 2004). Loggers feared anti-logging groups would overwhelm the process and they would lose access to the forest. They were conscious of differences in class and background as well as “perceived blame for historical mismanagement” (N. Matthews & Missingham, 2009, p. 1057). Environmental groups were divided between those opposed to any native forest logging and those opposed to plantations who were willing to tolerate some logging of native forest (c.f. Amis, 2007). WFS, with a mix of alternative lifestyle environmentalists and long-term timber families fell into the latter category. National and state environmental groups feared the Wombat project could open the way for ongoing native forest logging.

Some government agency staff saw community forest management as a process invented elsewhere, imposed on them, and feared it would reduce their authority and disregard their expertise. Government foresters did not fully engage with the project. Matthews and Missingham (2009) believe foresters stepped back as a result of their loss of credibility over the unsustainable forest yield issues. Poynter, representing the Institute of Foresters, argues the appointment of the former President of the WFS to coordinate the program “effectively transferred the control of the forest to those in the community who had for years campaigned against its management by the Department” (2005, p. 195). He claims community participants “dictated wood production objectives and outcomes with minimal input from government foresters who still carry responsibility

for forest management" (p. 199). WFS did not dispute this but argued the project provided young foresters with an opportunity "to work outside the conservative forestry paradigms" (Duclos, 2006).

Nelson and Pettit (2004), who were involved in the initial consultation, describe "troubled consultations" where, from the start, there was "futile discussion" that rotated on 'us' and 'them' categories counterintuitive to the process of creating common ground. A number of those "vocally and visibly interested in forest issues boycotted, trivialised or criticised the process as a sham" (p. 309). The intervention of large well-organised state-wide and national interest groups heightened tension. "The Greens just staked their people across as many as possible working groups to gain control" (quoted in N. Matthews & Missingham, 2009, p. 1057). Recreational vehicle users became deeply involved and were accused of "stacking a meeting" with members (who, it was argued, didn't know why they were there or what they were voting for) (Toonfish, 2004). In their analysis of what went wrong, Matthews and Missingham (2009) report meetings "often included screaming matches, people breaking down in tears, and disrespect for participants" and "men puffing their chests". They say that, when meetings digressed to verbal conflict, "neither the chairperson, nor [the Department] made significant attempts to intervene or protect volunteers" (pp. 1059-1060).

There was ambiguity about the purpose, goals and authority of the community forest management group. The concept of community forest management was not clear to either government or steering committee members. (Nelson & Pettit, 2004). Government urgency to develop a model and settle logging allocations added to these problems (N. Matthews & Missingham, 2009); "participants would have benefited greatly had the consultations been slower and broader in their reach (Nelson & Pettit, 2004). While the success of community forest management is greatly influenced by the support available from government, the process is vastly different to the concept most Australian resource managers have about community involvement based on experience with "public consultation, reference groups and other engagement techniques" (Petheram, Stephen, & Gilmour, 2004, p. 143). Government support does not need to involve strong direction but does require long-term commitment, meaningful devolution of power and ongoing institutional support including training and financial aid (N. Matthews & Missingham, 2009).

4.4 Success of forest governance in Victoria

In the decades that followed the Ferguson Inquiry (1985), the goal of maximising net benefits to the community revolved around four contradictory themes: (1) support for a timber industry in Victoria providing regional jobs; (2) sustainable timber harvesting to support regional timber mills and supply Australian Paper; (3) commercialisation insofar as the industry would pay its way and become more sophisticated, and; (4) protection of non-timber forest values particularly threatened species. None of these four goals was achieved and there was little interest from government in

assessing net benefit to the community. Industry had long feared a net benefits assessment would not be in their interests (I. S. Ferguson & Greig, 1973; Leslie, 1986) and subsequent independent reports (ACF, 2009; Bren, Jeyasingham, & Davey, 2013; Creedy & Wurzbacher, 2001; Keith, Vardon, Stein, Stein, & D, 2016; Mackey, Keith, Berry, & Lindenmayer, 2008; Read Sturgess and Associates, 1992; URS, 2007) reinforced those concerns.

4.4.1 Regional employment

The number of native forest sawmills in Victoria declined consistently from the 1950s (NIEIR, 2009). By 2012, there were about 10 with one mill accounting for two-thirds of VicForests sawlog production. From the 1990s, employment in softwood plantations and mills expanded and, along with growth in hardwood plantations for woodchip, absorbed much of the decline in employment and capacity in the native hardwood sector (Howley & Kelly, 2007). Schirmer (2010) attempted to estimate employment through an industry survey but was unable to separate the role of native forests logging because many jobs in primary production worked both native forests and plantations (harvest and haulage crews, professional foresters etc.). She found 849 jobs in primary processing of native forest logs (sawmilling, wood chipping etc.) and 1,887 processing jobs dependent on a mixture of native forest logs and plantation logs. The latter would include almost 1000 jobs at the Australian Paper mill. A 2009 study found native forest logs for the mill could be sourced from hardwood plantations (NIEIR, 2009). Ten years later this was adopted (Andrews, 2019). Former Premier Bracks recalled that when his government decided to close the Otway forest to native forest logging the reaction from industry was that this would have a major economic impact and result in lost employment. He notes this dire warning did not eventuate (Bracks, 2020).

4.4.2 Sustainable timber harvesting

The overall decline in harvestable timber within State forests from the mid-1990s was illustrated in Figure 4 at the start of this case study. Scarcity had been raised as an issue through most of the 20th century. Eggleston, in the 1930s said: “In the early years there was ample supply of timber, but in the last twenty-five years the people have realised a possible shortage” (Eggleston, 1932, p. 186). Kessell, World War 2 Controller of Timber, argued the emerging pulp and paper industry would impose “an increasing drain on our forest resources …”(Kessell, 1944). In the 1960s, concern was again raised about the ability of native forests to supply timber needs (McGrath, 1965) and about the long-term sustainability of the logging industry (Strachan, 1965). Cromen (1960) noted the lack of forest resource assessment that meant “reliance has had to be placed on guesswork”. Greig (1986) argued this was due to a lack of trained foresters: “too few to devote to the fledgling science of determining the volume and growth rates of the State’s growing stock”. McGrath (1965) noted this did not prevent “continued withdrawals” from the “age-old native forest

bank", pushing the State to a "grave" timber shortage in less time than the forests could regenerate. Despite a commitment to developing plantations, Dargavel (1987) argued the rate of exhaustion of mature reserves was not matched by the growth of new plantations.

At the turn of the 21st century, an independent Expert Data Reference Group politely observed other priorities impinged on resource estimation during the 1990s (Vanclay & Turner, 2001) and the Department subsequently admitted that a lack of monitoring against sustainable yield estimates had contributed to the over-harvesting (DSE, 2011). In 2009, VicForests reported declining timber reserves would impact industry (VicForests, 2009). Investigation by VEAC (2017b) found a 50 per cent decline in harvest levels over the previous decade and anticipated further decline of between 25 and 35 per cent "over that already factored in by VicForests" (p. x). VicForests admitted it was unable to meet supply contracts (Hill et al., 2017) and government subsequently accepted that native forest logging should end (D'Ambrosio, 2019).

4.4.3 Commercialisation and sophistication

Commercialisation evolved from NPM strategies adopted in the 1980s, was implemented during the 1990s, legislated in 2003 and abandoned by 2010. A former VicForests executive (interview 1/002) questioned whether it was ever realistic given the level of subsidy the industry had become accustomed to over the previous century. In terms of creating a more sophisticated industry, few were prepared to invest in technology for the native logging industry. The one mill that did invest in value-adding required a consistent supply of Ash saw logs that could not be met by VicForests after 2017 and the state was forced to purchase the mill. Environmentalists tracked native forest logs being trucked directly to the port where they were exported as unprocessed logs.

4.4.4 Protection of non-timber forest values

Consideration of non-timber forest values is difficult because of what appears to have been a systematic reduction in measurement of other values such as recreation, flora and fauna and water from the 1990s. Government failed to utilise available tools and expertise to measure net community benefit from State forests. What is clear, is that on most measures, there has been a deterioration (Sparkes, 2019a, 2019b).

Lack of measurement is illustrated in the tracking of recreational use of State forests. Ferguson (1985) had noted that recreational use of State forests had grown rapidly from about three million visitors in 1972 to more than six million in 1982. However, the data trail deteriorates after the Inquiry. By 2008, the *State of the Forests* report offered an "estimate" of 'more than four million people visiting State forests each year' (DSE, 2009). It clearly was possible to measure visitation

as illustrated in the 2013 *State of the Forests* report. It said visitors to State and National Parks had grown from 25 million in 2003 to 35 million in 2013. However, for State forests only “staff estimates and field observations” were available, which estimated that more than five million people a year visited. Recreational sites in State forests decreased by 13 per cent between 2003 and 2013 (DEPI, 2014). Lack of measurement and monitoring is consistent with the view of the Forest Commission in the 1980s that for State forests, recreation use was secondary to wood production (Carron, 1985).

The clash between wood production and habitat protection was evident to Ferguson (1985) and the most intense clash of values is in the mountain ash forests of the Central Highlands. A VEAC report (VEAC, 2017a) categorised areas for biodiversity and found areas in the highest category overlap with the most productive forests for timber. In other words, forestry areas of State forests are as important for biodiversity as areas such as Special Protection Zones and there is a strong correlation between areas high in biodiversity and high in timber values. Yet, despite concern over ongoing biodiversity loss (DOEE, 2017; Sparkes, 2019b), in 2020 VicForests was found by the Federal Court (Mortimer, 2020) to be in breach of the *Code of Practice for Timber Harvesting 2014* because it did not apply the precautionary principle to habitat of the threatened Greater Glider. As a result, VicForests was in breach of the *Environment Protection and Biodiversity Conservation Act 1999 (Cth)* in 66 forest coupes harvested or scheduled for harvest.

The relationship between forests and water was noted by the timber Royal Commission (Tucker et al., 1901), and the impact of forest clearing on water availability has been of interest to catchment managers since the 1920s (Rule, 1967). Logging was excluded from most Melbourne catchments in the 1960s although new catchments created later and some small Yarra tributary catchments containing high quality timber and supplying Australian Paper were not included (Taylor, Blair, Keith, & Lindenmayer, 2019; VicForests, 2016). Considerable research was undertaken to understand the relationship between growing trees and water yield following wildfire or logging (Duncan, Langford, & O'Shaughnessy, 1978; Jayasuriya, Dunn, Benyon, & O'Shaughnessy, 1993; Kuczera, 1985; Langford, 1974; P O'Shaughnessy & Jayasuriya, 1991; P. O'Shaughnessy, Langford, Duncan, & Moran, 1979). An outcome of this work, the ‘Kuczera curve’, showed that for mountain ash forests the yield of water after a clear-cut, relative to an old growth forest, increases briefly after logging and then decreases for many years until the forest returns to its former state (Bren et al., 2013). O’Shaughnessy et al. (1979) estimated that 80 per cent of streamflow contributing to Melbourne’s catchments were from highly valued ash-type forests. However, a parliamentary committee noted that monitoring of Melbourne’s catchment yields “tapered off during the late 1980s and early 1990s” (ENRC, 2009, p. 291) and recommended further investigation.

It is clear there is an overlap of areas best suited for timber, water, biodiversity and recreation particularly in Victoria's Central Highlands, although little effort has been made to calculate net community benefit from the trade-offs, or joint production of these forest values.

4.4.5 Summary on success of forest governance

This section has provided evidence of the failure to achieve the ambitions set for forest management in the 1980s: forests have been logged-out (or burnt-out by bushfire) of harvestable timber; forest-related employment has declined consistently in regional areas; commercialisation has been abandoned and there has been little investment in new technology; measurement of non-timber forest values is in many cases worse than it was in the 1980s, and; forest dependent threatened species are in many cases more threatened.

4.5 Institutional considerations

The case study has shown that the institutions of command-and-control forest management that developed in the wake of the 1907 *Forest Act* became *locked-in* to an economic focus on wood production rather than forest stewardship. This persisted after abolition of the Forest Commission and re-emerged in VicForests. The strength of these institutions was such that they were able to overcome new governance arrangements legislated in 2003. They were blind to the deteriorating health of their resource and deaf to changing community expectations.

Leslie (1987) argued that while a single-minded focus on wood production had been a great strength around which foresters could coalesce, it became a handicap "not recognised by Australian forestry" (p. 13). He became a forceful critic of the profession that had been his life's work, posting the following observations in a United Nations newsletter:

> *For some time now, the world has been signalling that forests are more valuable as forests than they are as wood factories. … knowing that we are going to be thrown out of what we have taken to be our core business gives us the opportunity to design a really new forestry. And that will be a forestry in which industrial wood is a by-product of ecosystem conservation while the ecosystems themselves are adjusting to the changing physical environments.* (Leslie, 2001)

He believed much of what foresters did, advocated, studied and taught was hopelessly wrong (Leslie, 2001). His profession had become *locked-in* to a way of thinking and being that was self-reinforcing.

4.5.1 Institutional isomorphism

DiMaggio and Powell (1983) describe forces that propel organisations toward homogenisation and constrain their ability to adopt new directions and priorities. *Institutional isomorphism* works through three institutional mechanisms:

- *coercive* isomorphism that stems from political influence and the problem of legitimacy;
- *mimetic* isomorphism resulting from standard responses to uncertainty, and;
- *normative* isomorphism associated with professionalization.

Coercive isomorphism and state forest management

Coercive isomorphism results from both formal and informal pressure (coercive authority) on organisations from politicians and others on whom they depend as well as the cultural expectations in society. In forestry, nobody wanted to *kill Bambi* in the sense that no political leader in Victoria wanted to be responsible for the demise of the timber industry and any loss of regional jobs, even while they recognised the need for reform and change. Political commitment was contextualised by a reference to employment and contribution to the State's economy. For example, the *Timber Industry Strategy* would enable the industry "to develop and invest with a sense of certainty and stability" (Kirner, 1985). This theme was repeated by successive governments in successive timber strategies (Bracks & Garbutt, 2002; Helper, 2009; Walsh, 2011). Even when announcing the phase-out of logging in State forests, the Premier claimed he would "ensure a long-term and sustainable future for Victoria's forestry industry – and for the Victorian workers who rely on it" (Andrews, 2019). Each statement sought to provide assurance that there was a viable way forward for the wood industry. Commitment to regional employment through forestry operations is an article of faith in Victorian politics and a form of coercive isomorphism in the agencies.

Government also demonstrated through its actions that other forest policy goals (for example, commercialisation, sustainable harvesting, other forest values) could be sacrificed to protect the wood products industry. For example, despite being required to pay dividends under the *State Owned Enterprises Act 1992*, VicForests was exempted on a number of occasions (for example VicForests, 2008; VicForests, 2009). Eventually government amended the VicForests *Order in Council* to reduce the pressure to deliver annual profits and dividends (Lenders, 2010). Independent annual monitoring of sustainable harvest levels was abolished in 2009 and the function subsequently handed to VicForests. In 2013, the Government allocated the entire State forest in the eastern part of Victoria to Vicforests for a book value of $10 million (Walsh, 2013).

Key institutions such as the Auditor-General both rationalised these actions and, by silence, encouraged action that, upon proper examination, may not have been in the interests of the Victorian community. For example, in 2013 despite the continuing decline in commercial timber resources noted earlier, the Auditor-General assured Parliament that "Victoria's timber resources are being managed productively" (VAGO, 2013, p. ix). The Auditor-General provided no evaluation of the performance of VicForests against the requirements of the *State-Owned Enterprises Act* and created a rationale for VicForests that does not exist in the Order in Council: to "balance the need for long-term profits with the need to support a sustainable industry" (p.iii). There is no evaluation of the phasing out of the auction system nor the implication for price signals to the market regarding demand and supply. These changes were referred to as "improved sales process" (p.49). VicForests highlight a number of these statements to legitimise its performance.

What emerges is consistency on commitment to the wood products industry but ambivalence and ambiguity in relation to other goals that became secondary considerations. This attitude permeated beyond the agencies concerned into how the Auditor-General performed its task.

Mimetic isomorphism in an uncertain policy environment

It is precisely this ambiguity that sees organisations model themselves on known entities, in this case, the Forest Commission that was abolished in 1983. Uncertainty is a powerful force that encourages imitation or mimicry: "When organisational technologies are poorly understood, when goals are ambiguous, or when the environment creates symbolic uncertainty, organisations may model themselves on other organisations" (DiMaggio & Powell, 1983, p. 151). Despite the interruption of two decades, the Forest Commission provided a template for VicForests. Senior staff attracted to VicForests had worked at the Forest Commission and brought with them the culture of an organisation that was regarded as strongly managed. It adapted well to VicForests' purpose of harvesting trees and selling wood (interview 1/003). Greig (1986) described the Forest Commission as self-confident and powerful with little time for environmentalists. VicForests approached its task with the "aggression of the old Forest Commission culture" (interview 1/005).

There was uncertainty within the department forest function about its role and the relationship with VicForests. Not much time had been devoted to the department's ongoing functions: "[The departmental functions] had to be built while trying to implement the new model." This ambiguity fuelled a sense by some in the department that they were not the chosen ones ("we were not picked") (interview 1/003). Ambiguity was also evident in matters such as calculating sustainable yield where the department had responsibility for the calculation, but VicForests had the information required to make the calculation. By the second half of the 2000s, the need to address supply shortages brought the two agencies together to develop a Joint Sustainable Harvest

program (DSE, 2008). This further blurred the lines between regulator and regulated. Government encouraged prioritisation of industry survival in the *Timber Industry Strategy* and subsequent *Action Plan* (DPI, 2009, 2011), creating the foundation for regulatory capture.

Despite administrative changes in the 1990s and legislative change in the early 2000s, by 2010 a form of the old Forestry Commission had been restored in the form of VicForests, which had a relatively free hand in managing wood production. The market approach could have handled the wood supply problems but, as Samuelson (1976) pointed out, this would have meant an escalating price of wood. The industry fought back against commercialisation: “They represented people seeking economic rents and they had the ear of government” (interview 1/002). Industry and economy came first. But that didn’t create more wood to sustain the industry. The combination of government belief in industry survival, a strong agency focused on meeting customer demand and a breakdown in separation between regulator and regulated ensured regulatory capture.

Normative pressures on forest policy

Normative isomorphic change stems primarily from professionalization of an occupation, the struggle to define conditions and methods of their work and, the need for a cognitive base that provides legitimation for occupational autonomy. Two aspects of professionalisation are important: formal education or the legitimation of a profession in a cognitive base through university specialisation, and; professional networks. Both are vehicles for the creation of professional norms and create a pool of interchangeable individuals who can occupy similar positions in a range of organisations in a way that can override variations that might otherwise shape and define an organisation (DiMaggio & Powell, 1983). This is evident in the evolution of forestry in Australia and its influence on the management of Victorian State forests.

The Forest Commission was born out of a struggle over how forests should be managed and in whose interests they should be managed. Eggleston argues the Commission was the result of a battle “by a few resolute leaders against adverse forces” in the Lands Department and politicians “anxious to get the public estate for their constituents” (p. 188). The role of the Commission, he continued, imperfect as it was, was to control private interests who would cut the most valuable trees and leave the waste to cause fire and breed pests. The risk for the Commission was that its legislative authority permitted “the greatest enemy of the forest to flourish – the parochial politician” (p. 190). Over the ensuing decades, the Commission worked to establish legitimacy through professionalism and a strong culture. It ran its own schools whose graduate became leaders. It responded with professionalism and competence to the economic and development agenda of the time. In doing so, it moved from being a steward of the forest to the manager of industrial

processes for wood production. This attitude became part of the forester's world view that was reinforced by normative pressure within the profession.

The forestry culture was generally embraced by the relatively small, tight-knit and generally conservative profession. "This conformity of views arises easily as the great majority of Australian foresters are trained within the same institutions …" (Dargavel, 1980, p. 7). Authoritarian and hierarchical organisations, where foresters were often employed for their entire careers, "require conformity", he noted. The foresters receive the same publications that disseminate scientific and technical information but rarely question established policies or raise controversial issues. The Australian forestry community, Dargavel concluded, is one "knit close by common education, class, daily contact and personal friendship" (p. 8). The forestry profession became a strong normative force on forest management.

The attack launched on foresters in the 1970s by environmentalists, resulted in a closing of ranks and a shared mission with industry (Dargavel, 1980). McKelvey (1979) argues foresters were hurt and defensive when attacked as they thought "that they knew best what the public needed from their forests" (p. 4). Others saw this attitude of foresters to community debate as professional arrogance: "Given a firmly hierarchic structure led by a professional elite, the role of the general public seems limited to being the grateful led" (Dargavel, 1980, p. 11). By the 1990s, the culture was coalescing around the need for decisive action to "advance the cause of forestry in a professional manner" (McKinnell, 1993). Foresters moved from being victims of changing community attitudes to combatants in a struggle for professional survival.

4.5.2 Summary

The institutional lens is a useful one through which to view the evolution of forest governance; the interaction of political forces, development of professional norms, and the failure to adapt to changing community expectations or protect a core community asset. Success provided the seeds of failure through the ability of the Forest Commission and the forestry profession to resist change (*lock-in*) while political ambivalence allowed industry to capture the regulator. The failure of those who introduced changes in 2003 to fully appreciate the strength of *institutional lock-in* provides an important lesson although, as Willmott (2015) would argue, not necessarily a way forward.

4.6 Choice considerations

The third analytical lens developed for this investigation is choice and influences on choice. This lens will be further developed for water in the next chapter and applied to the two case studies that follow. This case will only briefly review choice considerations for FSC collaborative governance.

The choice for the forest companies that adopted FSC certification was largely driven by either immediate or perceived market opportunity through the value chain. Early adopters were plantation companies supplying woodchip to international markets where FSC was an important consideration for customers and the market was undersupplied. Rapid adoption of FSC in Tasmania was also driven by market considerations when the supply-demand balance changed in the wake of the Global Financial Crisis. Once Gunns decided to seek FSC certification, this created a breakthrough with Forestry Tasmania. For Victoria, growth in demand for FSC certified paper (driven by environmental advocacy) and the availability of imported FSC certified paper, drove Australian Paper to seek to develop products for this market. This caused Australian Paper to push VicForests to achieve FSC certification. Despite two attempts, State forests were not able to meet FSC requirements due, in particular, to management of *high conservation values*. Nevertheless, this raised awareness in the community and government about high conservation values and placed the Victorian Government in a position where they accepted that large-scale clear-fell forestry was incompatible with protecting these conservation values (a point Ferguson had made almost 30 years earlier). This contributed to the decision to end logging of State forests in Victoria.

These observations suggest choice about FSC participation was rational because participants were seeking to gain, hold or improve market share. Advocacy by environmental groups who raised forest issues in consumer and processor markets created opportunities for FSC certified products. Nevertheless, consumer-purchasing decisions were dependent on the strength and recognition of the FSC brand in these markets. The more customers who chose FSC certified products, the more products would be available and the greater the demand for FSC certified wood. As brands such as Kimberly-Clark began to feature FSC branding on popular products such as Kleenex personal care products, awareness of the FSC brand grew. One of the most successful campaigns was a collaborative effort between environmental group WWF, Kimberly-Clark and FSC with a message that buying FSC labelled products would ensure forests were protected. This influenced a virtuous cycle of awareness that influenced choice decisions of others.

4.7 Forest case study summary

This case study reviewed the evolution of State forest governance in Victoria, and the emergence of various forms of collaborative governance through the lenses of the analytical framework. The historical lens revealed a series of inflection points that influenced forest governance: British invasion, establishment of Australian institutions and industrialisation, emergence of environmental institutions and conflict between environmental and forestry institutions. The dominance of economic and wood production objectives eventually drove a *tragedy of the commons* outcome. Collaborative governance emerged but was either overshadowed by government (RFAs), over-

powered by outside interests (WFS) or relatively successful but marginalised by mainstream institutions (FSC). The strength of forest institutions was demonstrated in their ability to resist imposition of market-based governance. However, their strength was also their weakness as institutional lock-in tied them to a path that would eventually over-exploit the resource on which their industry depended. This was aided by policy coercion and ambiguity from government as well as the normative pressure generated through a strong forestry profession. FSC was relatively successful because of the strength and consistency of its brand and its connection to the wood and paper products value chain. Whether this approach can hold for another stewardship system (AWS), at an earlier stage of development than FSC, will be tested in the following case studies.

5 From forests to water: understanding choice

The previous case study has pointed to FSC, a *civil society-led network* governance model (Kekez et al., 2019), as an approach that successfully engaged diverse stakeholders in conflict-riddled relationships, to collaborate for *stewardship* of forests. It identified markets as a key driver of choice by forest owners, and businesses in the supply chain, to participate in the FSC certification system. This suggests choice was rational, in search of market opportunities based on the strength of the FSC brand in consumer markets. The following case studies will take that experience and test it with water management to understand the potential of this form of governance in a different domain, in the early stage of development, and without a strong brand. It will also test it in different jurisdictions with different cultures and institutions.

In order to understand the drivers and constraints on participation in collaborative water governance, an empirical tool has been designed to understand the attitudes of water-using facilities[22] to participation in the Alliance for Water Stewardship (AWS) certification system. AWS emerged from drought conditions experienced in Australia during the 2000s and a desire by water-using businesses to protect their *social license* by demonstrating stewardship of water. This chapter provides background on AWS and explains the logic of the empirical tool. The tool is built around Simon's concept of *bounded rationality* discussed in the literature review (Simon, 1955, 1956, 1986). It asks whether adoption of AWS can be explained by rational choice or a wider set of drivers. First, the chapter will discuss the relationship between the social dilemmas of forests and water and outline the challenges facing water as a natural resource.

5.1 Forests, water and the Alliance for Water Stewardship

Like forests, water is, at times, subject to intense conflict. This conflict has its origins in both competition for water (for example, upstream users versus downstream users) and in values (for example, conflict over the economic use of water versus the maintenance of natural ecosystems). Both forests and water are resources that in pre-industrial times were regarded as more or less limitless. Although there are cases where forests and water may be pure *private goods*, they are discussed here as *public goods* and that category of public goods Ostrom refers to as *common pool resources*. For forests, growing demand and mechanised harvesting techniques have caused many forest areas to diminish and pushed others beyond their capacity to maintain ecosystems. For water, pressure can be more varied and complex. Water suffers from problems of scarcity,

[22] The terms 'site' and 'facility' are used interchangeably to describe an operating unit based primarily at one physical location. It may be a factory, a farm, an institution or commercial facility. It is distinct from a company that may have several physical locations.

pollution, loss of ecosystem health and poor distribution that create inequality of access and public health problems. Forest and water challenges are compounded by climate change.

5.1.1 Water crises

It is well documented that the world is facing a water crisis, or more accurately crises, and that new approaches, as well as new actors, particularly business, need to be engaged in the solution (2030 Water Resources Group, 2009; Bull, 2018; High Level Panel on Water, 2018; World Economic Forum, 2018). In 2018, 11 national leaders, the World Bank and United Nations, said water was one of the greatest risks to economic progress, poverty eradication and sustainable development. This is due to major gaps in access to water supply and sanitation, growing populations, pollution, degrading ecosystems and the effects of climate change (High Level Panel on Water, 2018). The risk of water crises has featured prominently in the World Economic Forum Global Risk Index since 2012, where it remains in the top 10 in terms of likelihood and impact (WEF 2019).

In 2009, the 2030 Water Resources Group, a collaboration between business and the World Bank, analysed global demand and supply of freshwater (2030 WRG, 2009). The headline from the report was that by 2030, demand for freshwater would be 40 per cent above current accessible and reliable supply and in some areas, particularly developing countries, the deficit would be more than 50 per cent. It argued historic rates of supply expansion and efficiency improvement would only close a fraction of the gap. The Asian Development Bank (ADB) notes that the Asia-Pacific region cannot sustain economic growth unless water stress is addressed (ADB, 2016). China Water Risk, pointing to Asia's dependence on melting glaciers of the Hindu Kush Himalaya, found "China, India and Pakistan simply do not have sufficient water to ensure food and energy security plus develop under the current export-led economic growth model" (Hu & Tan, 2018, p. 10).

The need for collaborative approaches

A consistent message of these reports has been the need for different approaches to water and the engagement of a broader group of actors, including business. 2030 Water Resources Group (2009) argues demand and supply forces are failing for water, and scarcity is not drawing sufficient new investment nor changing water management behaviour. The Group found that, in China and India, there was a need to move beyond central decision-makers towards solutions that included behavioural change from millions of farmers and industrial or domestic water users. The private sector will be "critical to the transformation of water use" and government policy could help align industrial behaviour with the broader objectives (2030 Water Resources Group, 2009, pp. 122-123). This suggests a greater role for collaborative governance.

Newborne and Dalton (2016) argue collaboration between government water policy-makers and industry leaders is needed to achieve change. The Asian Development Bank (2016) similarly argued for greater collaboration between government, private industry and civil society. The High-Level Panel on Water emphasised the importance of a shared understanding on water noting that "unilateral, isolated approaches are limited in their ability to address the complexities inherent in water" adding "collective efforts and wide alliances between the public and private sector, and civil society are required" (p. 30). The Panel recommended motivating "all water use sectors to embrace water stewardship, strengthen their collaboration, and participate in integrated water resources management" (p. 31). AWS offers a framework for collaboration between diverse actors.

5.1.2 Alliance for Water Stewardship (AWS)[23]

AWS was developed by civil society and business on a similar basis to FSC; it was intended to improve the health of water catchments through engaging major water users (agriculture, industry, institutions) in achieving catchment-level water stewardship. The requirements for water-using facilities to contribute to catchment water stewardship are defined in a normative standard developed by a multi-stakeholder group and implemented through a system for certification and endorsement of water stewards. AWS defines water stewardship as the use of fresh water in a way that is "socially equitable, environmentally sustainable and economically beneficial achieved through a stakeholder-inclusive process that involves site and catchment-based actions" (AWS, 2015).

AWS is a relatively new program still in start-up. Unlike wood, water not confined to a narrow supply chain (as, for example, paper and wood products) such as those where FSC operates. Water is ubiquitous influencing a wide range of industries and supply chains. AWS does not have a monopoly on the term water stewardship. The general term is also used by government agencies, firms making self-declarations, World Wildlife Fund (WWF)[24] and the UN Global Compact CEO Water Mandate[25]. However, AWS is distinguished by multi-stakeholder governance and membership of the ISEAL Alliance[26] (ISEAL) - an umbrella for social and environmental standard-setting and labelling initiatives. ISEAL provides a form of meta-governance (M. Spencer, 2008) for its 19 members[27] who subscribe to ISEAL Credibility Principles and a set of guidance documents dealing with standard-setting, assurance and impacts (ISEAL, 2019).

[23] As well as sources acknowledged in the text this section will also draw on the investigators personal experience as a founding director of AWS.
[24] Also known as the World-Wide Fund for Nature (WWF)
[25] A United National Global Compact initiative that mobilises business leaders on water, sanitation and the Sustainable Development Goals. See: https://ceowatermandate.org
[26] See: https://www.isealalliance.org
[27] At the time of writing January 2019

The AWS International Water Stewardship Standard

At the core of the AWS system is the International Water Stewardship Standard (the Standard), launched in April 2014. It applies to an operating facility. Facilities are required to understand water issues in the catchment where they operate, water issues associated with their operations, water in their supply chain and water issues raised by stakeholders. Based on this examination, *shared catchment challenges* are established, and site water risks and opportunities defined. This analysis forms the basis for a prioritised list of actions for the site to address catchment challenges, both within its boundaries and in the broader catchment, known as a *site water stewardship plan*. The facility then follows a continuous improvement loop with the plan being implemented, evaluated and reviewed annually by an external auditor. The Standard offers rewards for higher levels of performance through points awarded for gold, silver and platinum level certification. Points recognise achievement of non-compulsory indicators, mainly outside the factory gate, that contribute to catchment goals.

Version 1 of the AWS Standard sets four objectives: sustainable water balance (water quantity within a catchment); good water quality (pollution); good water governance (legal compliance and participation in catchment governance), and; healthy important water-related areas (for example, wetlands and cultural sites). The Standard promotes collaborative action with other stakeholders within a catchment (AWS, 2014). Independent conformity assessment bodies (CABs) verify compliance. At the end of 2018, 24 sites in 13 countries had been certified against the Standard including farms, food processing, chemicals and bottled water. Pre-COVID-19, there was evidence of an acceleration in adoption with more than 60 sites preparing for certification and Nestle announcing a plan to certify 85 bottled-water facilities by 2025 (AWS, 2018). Version 2 of the AWS Standard was released in 2019, in compliance with ISEAL requirements for regular review, and added good water sanitation and health as an objective of water stewardship.

5.2 Understanding choice decisions for participation in AWS

The section describes the design of an empirical tool to allow, as Ostrom (1998) proposed, assessment of rational choice and, more importantly, the gap between rational choice and what actually happens in the field. As noted, the AWS experience compared to FSC suggests rational choice alone cannot explain participation. In both case study jurisdictions (Australia and China), AWS does not have a presence that could create strong business-to-consumer or business-to-business benefits (this also explains limitations on building the sample size). As Ostrom (1998) noted, it is important to understand not only why collective action succeeds but what retards success and why projects might never get going or fail. It is hoped this study may contribute to better understanding of collaborative governance in different institutional settings.

The following will briefly review, from the literature, the range of costs and benefits associated with participation in forms of collaborative governance similar to FSC and AWS, and issues raised in the water stewardship literature. From this it will build a set of propositions to be included in a questionnaire seeking to understand choice decisions of water-using facilities that are considering participation in AWS. That is, propositions that could help to understand choice in the context of *bounded rationality* and the gap between theoretical rational choice and actual choice in practice.

5.2.1 Club benefits

Scholars point to a range of intangible and some tangible benefits from participation in stewardship systems. Potoski and Prakash (2005, 2013; 2007) argue *voluntary environmental programs* represent a form of *club*, after Buchanan's economic theory of clubs (1965), where participants (club members) receive an affiliation with the club's positive brand reputation in return for producing positive externalities or addressing negative externalities[28]. A form of brand association in return for complying with club rules. Brand association benefits include goodwill, reputation and social licence. Firms identifying as a *club members* allows stakeholders to identify them and bestow appreciation on them for addressing externalities.

Being a *club* member may improve relationships with customers, neighbours, community groups, regulators and environmental groups. Rewards may be either monetary (selling more products) or non-monetary (avoiding negative publicity). This may result in facilities spending less time on regulatory compliance, having fewer visits from regulatory authorities and, in some cases, less stringent regulations from government agencies. Firms may see these benefits as a lower cost alternative to the state imposing heavy coercive rules (Potoski & Prakash, 2005; Prakash & Potoski, 2007). The value of being part of a club (as opposed to unilateral declaration that a firm is producing environmental public goods) is that it has more credibility, is more transparent and has an economy of scale.

5.2.2 Legitimacy, brand and reputation

Legitimacy theory highlights a desire of industry to understand and respond to stakeholder pressure and for corporations to achieve and maintain organisational legitimacy (Farooq & Maroun, 2018). In the marketing literature, legitimacy has a parallel in corporate reputation or *corporate*

[28] Externalities refers to situations when the effect of production or consumption of goods and services imposes costs or benefits on others which are not reflected in the prices charged for the goods and services being provided (OECD, 2002a)

brand and this is seen as having an impact on the brand equity[29] and therefore sales. Building corporate brand requires a company to subject itself to more scrutiny and have greater transparency in its values, activities and programs. (M. Heinberg, Ozkaye, & Taube, 2013; Keller, 2013). Practitioners add that these programs create a platform for collaboration with communities that build employee motivation (staff feeling better about where they work) (Cameron, 2015).

Network theory points to a snowball effect as participation of a firm is influenced by the participation of other firms, creating opportunities for synchronisation around a set of normative requirements such as a standard (Druzin, 2017). Potoski and Prakash (2013) argue that the size of a club's membership affects the value of the club's brand. Reputational benefits grow as participation grows and the brand of the club or system is built (Figure 6). A firm that values its brand highly and may be facing threats to its brand as a result of externalities, will value membership more than firms that value their brand less and have no immediate threats.

5.2.3 Private benefits

There is less agreement regarding operational or *private benefits* to individual firms from participation. Prakash and Potoski (2007) dismiss private benefits as not having any analytic value. They recognise three types of benefits: externalities (the public benefits); club goods (shared reputational benefits), and; private benefits (operational benefits to a single member firm). They argue a profit orientated firm is likely to take action on private benefits unilaterally without joining the *club* and, if those private actions produce positive externalities the club would not be necessary.

A contrary view, attributed to Porter and van der Linde (1995), argues that firms are not aware of all profitable opportunities for innovation and that organisational incentives are not necessarily aligned with adopting innovative opportunities. In other words, firms may only become aware of or be motivated to embrace innovative opportunities to address externalities through participation. Indeed, in Gutman et al. (2018), it is stated one of the attributes the AWS stewardship system brought to its work in China was knowledge and understanding of innovation opportunities for improved water management. Hence, private benefits are relevant to this analysis.

[29] The value of a firm's brand. See: (Keller, 2013)

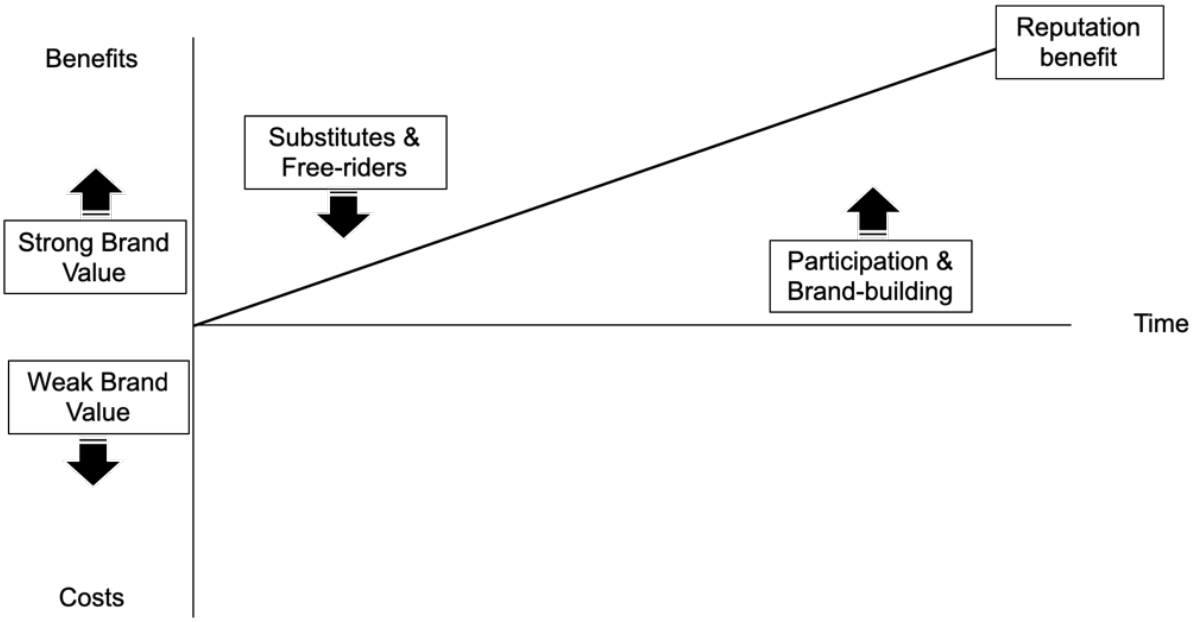


Figure 5: Club benefits (reputation) growing as the size of the club grows (Potoski & Prakash, 2013; Prakash & Potoski, 2007) influenced by the value a company places on its reputation.

5.2.4 Costs of participation

Ongoing costs associated with participation in a certification program fall into two categories: the cost of complying with the rules of the system (compliance costs), and; investment costs for new equipment and technology or process improvements to implement stewardship commitments. In addition, Potoski and Prakash (2005) identify an initial start-up cost to establish systems that align with the normative requirements and costs associated with the first audit. They include in compliance costs regular (generally annual) audit costs and management and staff time to monitor and document compliance. They quote managers reporting substantial costs associated with paperwork to achieve and maintain certification, with some having to engage additional staff. Cashore et al. (2007) make the point that stewardship systems ask profit-maximising firms to undertake costly reforms that they would not otherwise undertake. Prakash and Potoski (2007) note that, unlike traditional clubs, the main cost is not payments to the club (fees) but costs of adopting and adhering to the club's membership requirements (rules).

5.2.5 Supply or value chain pressure

Supply chain or value chain and market pressure is a recurring theme in much of the literature on stewardship systems. Research on stewardship systems is often contextualised by international trade (globalisation) and multilateralism and the need to manage impacts of production beyond an individual jurisdiction (Abbott & Snidal, 2009; Dupuy, 1991; Kirton & Trebilcock, 2004). Cashore et al. (2007) argue environmental campaigns by non-government organisations (NGOs) are important in building supply chain pressure that influences major retailers to require compliance with

certification systems through their supply chains. Auld (2014) hypothesises factors favouring global stewardship systems include high levels of international trade, concentrations of multinationals and companies involved in global supply chains as well as high barriers to market entry. Barriers to entry may provide some protection from higher costs associated with stewardship compliance.

Market demand for stewardship-*certified* products is important but not sufficient to guarantee firms will participate or that a system will achieve the momentum required for self-generating growth (G Auld, 2014; Darnall, Potoski, & Prakash, 2009). Other conditions include: stakeholder pressure, peer pressure and credibility of the system with stakeholders (Darnall et al., 2009). Potoski and Prakash (2013) add that larger firms are more likely to participate as are firms supplying goods to final consumers, foreign-owned firms and firms with poor records of negative externalities. Potoski and Prakash (2005) found that the best performing firms were less likely to join although moderate to high performers were more likely to join. They also found firms subject to more inspections and a more stringent regulatory regime were more likely to join with a view to seeking relief from costs of compliance-heavy regulatory environmental governance.

5.2.6 Water risk

There is considerable discussion in the water stewardship literature in relation to water risk as a driver for participation (Levison et al., 2008; Morrison & Gleik, 2004; Pegram, Orr, & Williams, 2009). Water risk includes: (1) physical risk associated with water availability; (2) regulatory risk associated with increasingly onerous statutory requirements; and (3) reputational risk to corporate brand, legitimacy and social license. To help business understand water risk, NGOs developed online tools for evaluating water risk based on industry and site location (WRI, 2013; WWF, 2018). These tools have been cited by some multinationals and global retailers as influencing their engagement with water stewardship (Nestle, 2018b; WWF, 2014).

Economics would suggest that water cost could be a proxy for physical water risk in that, as water stress increases due to scarcity or pollution, costs would increase as investments are made to address the causes of water stress. As costs increase, firms would pay more attention to how they manage water, and this may increase interest in water stewardship. Zhang et al. (2016) show that different industries place different value on water, and that this may be related to direct and embodied water use in the production processes. However, Guan and Hubacek (2008) point out, while water is a critical natural resource it is not usually considered as a factor of production. This is indicative of what Sharp refers to as the *invisibility of water* (Sharp, 2017). Water does not appear to respond in the manner predicted by market economics (2030 Water Resources Group, 2009) presumably because it many countries it is seen as a government service.

5.3 Testable hypotheses for participation in AWS water stewardship

From this review of factors that may or may not influence the decisions of water-using facilities to participate in the AWS water stewardship program, the following hypotheses have been developed for testing through a questionnaire. This will be administered to facilities that have had some contact with the AWS system, either through attending an information session, participation in training or, becoming or starting the process to become certified against the AWS standard. As stated at the outset of the investigation and in the questions posed, the goal of this empirical investigation is to test hypotheses of what drives participation in a program such as AWS.

5.3.1 Rational choice

The starting hypothesis is that participation in AWS water stewardship can be explained by rational choice. It is assumed this involves an assessment of tangible and intangible costs and benefits that is, perceived benefits exceed perceived costs. To understand how costs and benefits are perceived, facilities were asked to score a list of benefits and costs on a scale from zero to five where zero meant that the benefit or cost was irrelevant to their site and five meant it was a key consideration. Benefits were categorised as *operational* (tangible business benefit), or *intangible* (reputation, social license etc.). Costs were categorised as *investments* (infrastructure or other operational modifications) and compliance (management, people and time).

Scores given to each potential cost or benefit were used to calculate a *net benefits index*. This was calculated by aggregating and averaging scores for costs and benefits in each of the four categories (operational benefits, intangible benefits, investment and compliance costs). From this, each category is scored. The index was created by subtracting average score for perceived costs (investment + compliance costs) from average perceived benefits (operational + intangible benefits). Sites scored between +5 (all benefits given the highest score and no perceived costs) and -5 (all costs are given the highest score and no perceived benefits).

The *net benefits index* can be expressed as follows:

$$NB = (Bo + Bi) - (Co + Cc)$$

Where:
NB = Net benefit value impacting the probability of a site participating
Bo = average score for operational benefits
Bi = average score for intangible benefits
Co = average score for operational costs
Cc = average score for compliance costs

The net benefits index scores were evaluated against intentions to adopt[30] or not adopt AWS water stewardship. If the choice is simply to participate or not (rational choice), it is a binary choice that can be tested as follows:

Let 'x' stand for participation and 'y' for not participating. Then, if
NB>0, then x is preferred to y.
If NB<0, then y is preferred to x.
If NB= 0, then the firm would be indifferent between participating or not.

The list of benefits and costs tested is set out in Appendix 1. In some cases, different terms have been used to describe similar concepts. Also, it should be noted that the number of potential benefits and costs is not the same for *Bo*, *Bi*, *Co*, *Cc*. Hence, average scores were used for each of the four categories.

5.3.2 Bounded rationality

Adopting a *bounded rationality* approach involved creating a series of hypotheses for other factors that may influence decisions to adopt or not adopt. These may be either internal or external to the facility. Building on issues reviewed above, it was hypothesised that choice may be influenced by:

(1) Pressure from markets, customers and NGOs, through the supply or value chain

(2) Current water risks facing the facility and the potential for business impacts

(3) Desire to lower or mitigate water risks (regulatory, physical, reputational)

(4) Pressure on the facility from rising water costs

(5) Pressure from regulators and agencies on industry water management

(6) Desire to enhance brand or reputation with stakeholders (customers, government, community)

(7) Current water performance in relation to that required to comply with the AWS Standard

To understand how water institutions may influence choice, the questionnaire also sought to understand facility perceptions of how responsibility for water and catchment health is shared among stakeholders (government, industry, agriculture and households). Participants were asked to weight the importance to water and catchment health of each of these stakeholder groups.

[30] Some had already adopted

Figure 7 synthesises these hypotheses as a model for testing. At the centre is rational choice (perceived benefits minus costs). This is contextualised by culture or beliefs about stakeholder responsibility for water. The boxes marked risk and reward represent the business threats and opportunities associated with water (hypothesis 1 – 6) and achievability, the performance gap (hypothesis 7) between current performance and that required to join the AWS club.

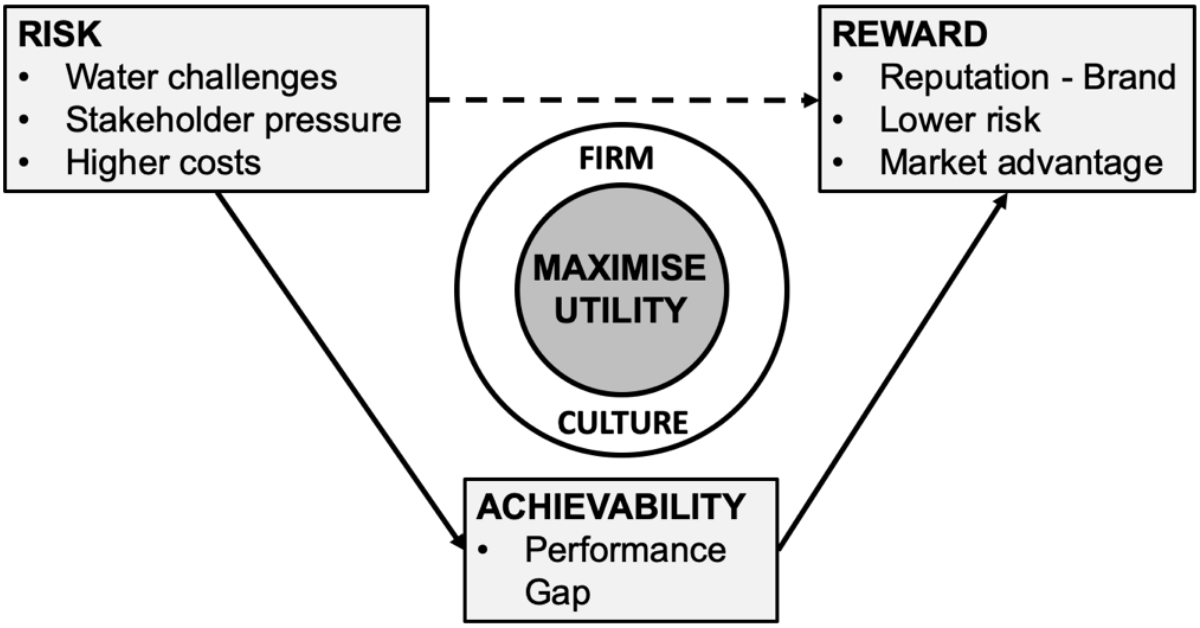


Figure 6: Hypothetical model to be tested through questionnaire

There is a slight risk that responses to the question may represent an ex-post rationalisation of choices made – in other words, that having decided to participate, facilities are merely echoing the main requirements of the AWS system back to the researcher. However, this risk is diminished by the relatively immature status of AWS and lack of familiarity with the detail of its requirements. It is more likely for the small number of facilities (about four of the total sample) that had already progressed through the certification process and were therefore more familiar with requirements.

5.4 Administration of the questionnaire

The questionnaire developed from this analysis is attached at Appendix 2 (Australia) and Appendix 3 (China). There is a very slight variation between the two as a result of a further question on reputation being added to the Australian survey, which was completed after the China survey. Participants in the survey varied and were approached based on past participation in an AWS activity or meeting. It was an opportunistic sample of facilities already interested in AWS and therefore does not constitute a random sample of water-using facilities.

In China, the questionnaire was administered through face-to-face interviews with senior staff from 34 facilities located in two regions: northern China (n=16), mainly Tianjin, and the Yangtze Delta

(n=18), mainly Kunshan. Respondents included senior managers reporting to the CEO or Board Chair, general managers and people who led Corporate Social Responsibility (CSR) or Health, Safety and Environment (HSE) functions. Facilities ranged in size from 78 employees to 12,000 with a bias, as indicated in Figure 8, toward microelectronics companies in the Yangtze Delta[31]. Chinese-speaking staff associated with AWS in China and TEDA EcoCentre administered the questionnaire in Chinese on the investigator's behalf.

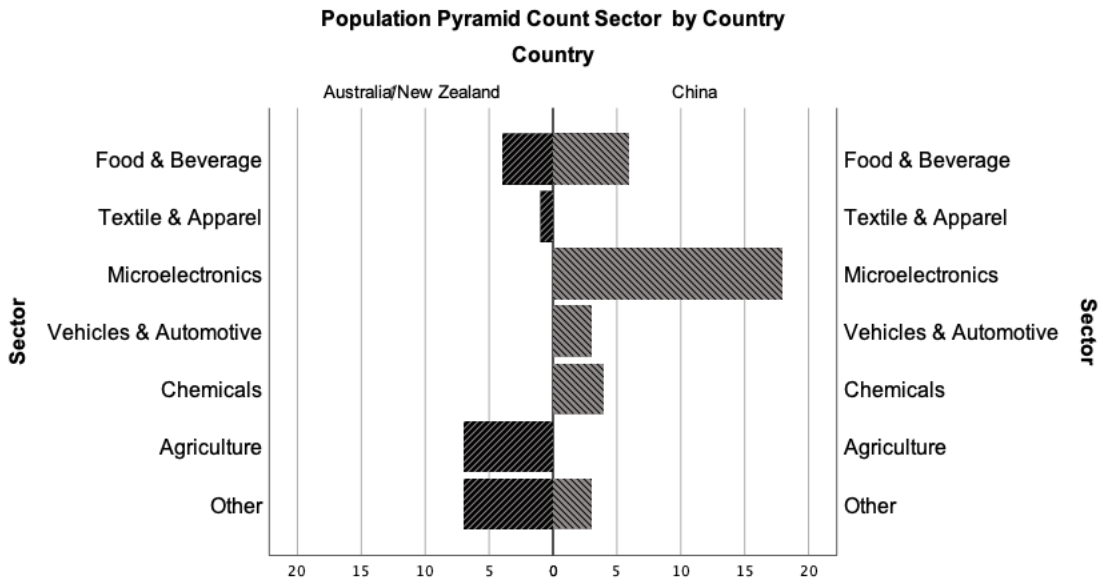


Figure 7: Industries represented in the two water case studies (China and Australia)

For the Australian case study, the questionnaire was administered to 19 sites at various locations with a high proportion of respondents being farms associated with the Renmark Irrigation Trust in South Australia and the Western Port Biosphere water stewardship project on the Mornington Peninsula near Melbourne. The sample included three facilities in New Zealand that had participated in AWS activities. Interviews were mainly with owners or managers in the case of small to medium-sized enterprises and environmental or water managers in the case of larger enterprises. There was a considerable variation in size from small family farms to large industrial enterprises employing several hundred people.

5.5 Summary

This chapter explains the transition from the forest case study to two water case studies (Australia and China) and underlines two differences between FSC and AWS; (1) AWS is a relatively new program with little accumulated brand value and, (2) water is a ubiquitous public good that impacts most industries rather than a particular supply chain. These considerations are likely to increase

[31] Due to a focus on that industry by AWS at the time of this research.

the difficulty of engaging rational actors seeking to maximise utility. The questionnaire will test hypotheses developed from the literature to understand decision-making about participation in this new collaborative governance program. Being administered in two jurisdictions with different institutional arrangements will help to assess the influence of jurisdictions on decision-making.

6 Water management in Australia (Case study 2)

This case study will examine governance of water in the Murray-Darling Basin of Australia. As with the previous case study, it will do this through the three lenses of the analytical framework: evolution of water governance, institutions of water governance and, choice and decision-making about participation in collaborative water governance. The goal being to respond to the four questions posed for the investigation: how do governance and collaborative governance evolve; does collaboration offers better opportunities for stewardship; what are the impediments faced by collaborative governance, and; how can these impediments be overcome?

This case deepens the investigation of decision-making by firms considering collaborative water governance (AWS) as outlined in the previous chapter. The chapter follows a similar structure to the forest case study starting with setting the scene by outlining water challenges facing Australia. It will the document the genealogy of water governance, evolution of collaborative governance, outcomes of water governance, institutional analysis of water governance and, in the final section, will engage in an extended examination of business attitudes to participation in water stewardship.

6.1 Water in Australia

Australia is the driest inhabited continent with the largest variability in rainfall and runoff. For three-quarters of the land area, evapotranspiration limits runoff to less than five per cent of rainfall (D. I. Smith, 1998). The continent has minimal snowfall and snowmelt and long periods of drought interspersed with shorter periods of flooding. At any point in time, the continent may face multiple hazards from drought, wildfire and flood. About 60 per cent of Australia is dependent on groundwater and, in a further 20 per cent, groundwater is the dominant use. These groundwater systems are under stress and poorly understood (Pigram, 2006).

The Millennium Drought (2001 – 2009)[32] underlined the problem of water scarcity in both rural and urban areas where water storages approached critical levels. When drought returned to the Murray-Darling Basin in the second decade of the century, the devastating impact was brought home to city dwellers by stories of mass fish extinctions (A. Davies, 2019) and hardship faced by rural communities (Doyle, 2019). A South Australian Royal Commission into the Murray-Darling Basin made the following observation in 2019:

[32] Published drought assessments use different criteria to determine the start and end of the drought some offering a start date in the mid-1990s. The period from 2001-2009 was the longest uninterrupted series of years with below median rainfall in southeast Australia (van Dijk et al., 2013).

> *It should by this juncture in our history be beyond dispute – scientific, economic, social, political ethical or spiritual – that the Basin is in danger of being run down. (One heartfelt colloquial response could be, "The poor bloody Darling!"). The threat of its degradation being irreversible is greater than ever. Climate change, alone, has that clear potential. Our exploitation of its water resources magnifies that threat.* (B Walker, 2019, p. 35)

As will become evident, water management in Australia is fraught with political rivalry between upstream and downstream, between regions, between states and between economic interests and the environment. In a manner not dissimilar to forests, limited resources were over-allocated to private interests and warriors emerged to protect what they saw as their entitlement.

6.2 Evolution of water governance

The genealogy of water governance follows a similar although not identical pattern to forest governance. It can be divided into five periods: (1) governance adopted by Indigenous people who occupied the land prior to European settlement; (2) a frontier period from the arrival of Europeans in the 18th century; (3) the establishment of state regulatory governance from the early part of the 20th century; (4) introduction of market-based governance from the late 1990s, and; (5), a form of contested governance following release of the Murray-Darling Basin Plan in 2012, where command-and-control seeks to influence, subvert or over-rule the market-based governance.

6.2.1 Indigenous water governance

Indigenous Australians and Europeans have both confronted the challenge of water on the continent in different ways. For Indigenous Australians water was central to life and protecting and managing water was a custodial and intergenerational responsibility. (WQA, 2012). First Peoples' constructed hydrological engineering projects adapted to local circumstances. Fish traps, for example, were integral components of regional economies that helped maintain distinctive ways of life (Powell, 1989). Natural resource governance systems existed, as discussed in the forest case study, based on Indigenous ontology, reflecting the natural systems from which they emerge (Burdon, Drew, Stubbs, Webster, & Barber, 2015). Water governance was built around cultural and spiritual values, belief systems and relationships evidenced in language, song lines, stories, sacred places, customary use, plants and animals associated with water, drinking water, recreational and commercial activities (WQA, 2012). Belief systems underpin an understanding of relationships and continuities, the integration of land and water (often expressed through the concept of 'country') and an understanding of water flows and cycles. Built on these belief systems were codes and socio-political demarcations and the ongoing relationships between these demarcations.

As for traditional Indigenous forest governance, traditional water governance was built around belief systems (*rules of the game*) and responsibilities to those who had gone before and those who would follow. It was implemented through customs, ceremonies and elders with responsibility for law (institutions). *Country*, and the water that sustains it, needed to be looked after for both the ancestors who came before and still dwell on the land, as well as descendants who will come after. This system of Indigenous water governance led to conflict during European settlement as colonial governments "had no regard for Indigenous interests in water", including sacred places such as water holes. (Burdon et al., 2015, p. 337).

6.2.2 Frontier water governance

Europeans brought their own otology to the management of the continent's scarce water, as well as a sentimental idealisation of English landscapes and ways of managing water and landscapes. Belief in English agriculture, in many areas, had disastrous results, causing extensive soil erosion, salting, pasture deterioration, landslips, introduction of pest plants and animals and confusion of the hydrological system. Europeans often underestimated the level of flow variability (Pigram, 2006). Annual variation in maximum and minimum flows in Europe range from 3:1 to 10:1 but in Australia from 300:1 to 1,000:1 (Powell, 1989). Early settlers or squatters initially lacked security of tenure to invest in water infrastructure to even out these flow differentials.

The impacts of early pastoralists were compounded in the middle of the 19th century with the arrival of miners determined to make their fortune with little regard for land, water and landscapes. Swarming gold miners were "like a flight of locusts, who tear up and leave the earth a desert in a few weeks" (Powell, 1989, pp. 46 - 49). Many of the miners arrived from America where water rights, like mining claims, were allocated to whoever made the claim first. Miners saw water as a private right which some attempted to trade. However, this was short-lived when politicians exerted the power of the state and adopted the principle of *public ownership* over water resources.

Governance, where it existed in this period, was from colonial authorities with major decisions often made on the other side of the world. For example, English authorities attempted to impose a rigid rectangular grid on the Australian contours for subdivision even though locals argued it would ensure "monopolistic water access to a fortunate minority" (Powell, 1989, p. 39). Despite these interventions, water governance was initially a very light touch by government with individuals left relatively free to access available water and little control or support from government. Drought and the desire to build a local economy would start to change this in the second half of the 19th century.

6.2.3 Local representative government takes control

Two factors beside the recurring droughts inflicted on settlers would drive the transition from relatively unregulated frontier water governance to greater government involvement and the establishment of regulatory institutions. One was the development of cities and their need for both reticulated water and sewerage services. The second was the British dream to create idealised yeoman farming communities based on closely settled smaller family-run farms. Central to achieving both would be a water culture based on engineering solutions.

Irrigated agriculture

Victoria played a leading role in the development of both urban and rural water management policies. In the early 1880s, facing renewed drought and committed to breaking up large acreage occupied by squatters into smaller allotments for new settlers, the Victorian Government set up a Royal Commission to examine opportunities for irrigated agriculture. Government was particularly, although not exclusively, interested in areas north of the Great Dividing Range (the Victorian Murray-Darling Basin). The Commission was headed by Water Minister, Alfred Deakin, who had been influenced by the success of irrigation in the United States. Deakin visited the United States and brought back experiences, positive and negative, that would accelerate developments already underway in Victoria and influence the development of irrigation in other states. Deakin has been called “the father of Australian water legislation” (D. I. Smith, 1998, p. 150).

Deakin originally proposed a dual track of command-and-control for major infrastructure and a form of collaborative governance for water distribution through local trusts (Deakin, 1885) based on public ownership of water rights by the state. In Deakin’s model, the state owned and controlled water and major infrastructure, while promoting local management of distribution. The Victorian *Irrigation Act 1886* became a model for other Australian states (Pigram, 2006; D. I. Smith, 1998) and was significant for its rejection of the principle of *first come first served* for water. That is, it rejected the doctrine of *prior appropriation* that allowed any person who was there first, whether riparian owner or not, to claim as much water as they wanted from a river (D. I. Smith, 1998). This would ensure control of water by the state and create the foundation for regulatory governance.

To encourage local governance of water distribution, Deakin built on the provisions of the *Water Conservation Act 1881* that had established local *waterworks trusts* to manage town water. The Royal Commission proposed extending this arrangement to irrigation settlements (Deakin, 1885) and the *Act* was amended to establish *irrigation trusts* for agriculture. However, toward the end of the century, irrigation trusts were unravelling due to financial pressure and trustees who didn’t share the yeoman farmer vision. Local trusts lacked both funds and technical knowledge. By 1899,

there were approximately 90 irrigation and water trusts in Victoria and “most were in grave difficulties” (Powell, 1989, p. 118). With the trusts struggling, the state assumed greater control.

Urban water

As urban populations grew from the middle of the 19th century, major engineering works commenced with construction of Melbourne’s first reservoir in 1857, followed by a series of dam’s for Sydney’s water supply (Pigram, 2006). In capital cities, water governance was led by state governments while in smaller centres it was led by local government. However, local governments were constantly seeking loans or grants from the state for water infrastructure. Demand for water infrastructure accelerated as sanitation soon became a problem for all urban centres, with the typhoid mortality rate in Melbourne being four to five times that of London and in provincial Victorian centres well above the then benchmark of 12 deaths per thousand (Powell, 1989).

Government investment in infrastructure led to the establishment of new institutions to both build and manage this infrastructure. Entities such as the Melbourne and Metropolitan Board of Works (MMBW) and the Sydney Water Board were large and professionally resourced statutory authorities (D. I. Smith, 1998). Eggleston (1932), describes the MMBW as a “success”, in part, because its scope was limited to sewerage and water supply and, in part, because its governance structure “eliminated” political influence. He noted professional staff played a key role and government control was “completely absent” (p. 211). As with the Forests Commission discussed earlier, it would develop its own source of authority based on professional and technical competence. Most urban centres followed a similar pattern (D. I. Smith, 1998).

6.2.3 Establishment of institutions for regulatory governance

By the turn of the century local governance of irrigation water had largely[33] failed; “the irrigation trusts became bankrupt, they had to be relieved of their debts and their share of the head-works” (Eggleston, 1932, p. 81). Trustees had different priorities and did not share the government commitment to intensification of agriculture and using more reliable water for higher value crops. Trust members used irrigation merely as a supplement to continue existing practices (wheat, fat lamb) rather than invest in crops that justified the additional investment (horticulture). As a result, trustees avoided costly infrastructure by using existing water channels with high evaporation and seepage such that when the water was needed during drought it was not available (Powell, 1989).

[33] Not all irrigation trusts failed as will be discussed later in examples of collaborative governance.

The failure of irrigation trusts paved the way for command-and-control governance through all aspects of water management and agricultural land development. Just as with urban water, large powerful statutory authorities took charge. In Victoria, the State Rivers and Water Supply Commission (SRWSC) and in New South Wales the Water Conservation and Irrigation Board (WC&IB) assumed control of water and associated engineering works. They became the instruments through which the *closer settlement* vision would be implemented. With a culture developed from their core engineering competence, they built and planned compact irrigation blocks for family-run farms. They not only planned and constructed dams and channels, but "progressively controlled rural settlement patterns, farm sizes, and the nature of crops, together with most other aspects of rural development" (D. I. Smith, 1998, p. 163).

These large authorities were able to secure the financial resources required for major dams, irrigation and water resource developments during a global capital shortage (D. I. Smith, 1998). By the time of the Great Depression, Victoria had 200,000 hectares of land under irrigation and the SRWSC had subdivided 80,000 hectares into 4,118 blocks for 3,921 families and supplied water to one quarter of the State. The Commission acted as a land-settlement authority (Eggleston, 1932). While the private sector would have been able to manage land subdivision and sale, only the state at that time would have been able to secure funds for such massive dam building and water infrastructure. Equally, only the state would have been able to endure the consistent losses on both capital and operating costs (Eggleston, 1932).

State management of water buffered irrigators from cost or price signals resulting in an ongoing dispute between irrigators and the state over who should pay for irrigation (Eggleston, 1932; D. I. Smith, 1998). Eggleston argues the balance between the state and irrigator for the cost of irrigation was not resolved. Smith points out that almost without exception, soldier settler blocks were too small to support a family or for owners to repay their debts to the state. Settlers resisted efforts to place irrigation communities on a "self-supporting economic basis" through political influence (Eggleston, 1932, p. 79). Though technically efficient, these large authorities took responsibility away from settlers and laid themselves open to political influence (p. 84). Trusts would have provided a model to share responsibility but were given too much responsibility too early.

Relations between irrigators and the state influenced attitudes and belief systems of Basin communities. Smith (1998) argues that while irrigation contributed to agricultural production and economic development in the Basin, irrigation did not *drought-proof* agriculture. Despite massive investment, irrigated farms continued to place demands on government for assistance during drought. A 1936 Royal Commission appeared to recognise the problem over over-allocation of water when it said attention should turn to consolidation rather than continuing development of new irrigation areas. While it highlighted the cost to taxpayers of providing water to irrigators, it

accepted that this might be a price government paid for rural development. Political intervention continued to prevent charges being set at a level sufficient to defray costs (Powell, 1989). Water politics became embedded in Basin communities and government with little scope for resolution.

Basin governance

Water governance evolved from very weak frontier governance to strong command-and-control led by technically proficient powerful institutions that influenced life, economy and development. As with forestry, one driver was national economic development. For water, this was complemented by a vision of English-style yeoman farmer communities. The strength of regulatory governance at the start of the 20th century was such that it took responsibility away from irrigated farmers who became dependent on the state to provide water and overcome the natural deficiencies of the Australian continent in the form of droughts and flood. However, these institutions were state-based, and this created a further challenge in a Basin that crossed four states and a territory.

Bridging the division between states required new institutions. The first interstate agreement was signed in 1914 at the start of World War 1 when drought was again an issue and demand for produce was at “unheard-of levels” (Eggleston, 1932, p. 83). The idea had been progressing since before the Federation Drought (1895-1902) (Bull, 2018), but war and drought pushed the Commonwealth, New South Wales, South Australia and Victoria to bring it to fruition. The Murray Water Agreement provided for locks and weirs, storage facilities, a navigation channel and regulated flows to the three states (Powell, 1989) and a new Murray River Commission.

The agreement was a defining moment for the Basin, its governance and the engineering profession. The engineering work would regulate the Murray initially and subsequently begin the regulation of the Darling. The agreement stipulated costs of works would be shared among the four governments (D. I. Smith, 1998). Powell (1989) argues the works program, that ran through to the Great Depression, had historical significance for the engineering profession. The agreement was tested on a number of occasions, “when the tumult of politics submerged the engineers” (p. 144). As with the state institutions, the Commission was built around an engineering culture to promote development. It survived almost a century until challenged by drought and changing expectations.

6.2.4 Evolution of market-based governance in the Basin

By the 1980s, water management faced new pressures as the limits of irrigation development became apparent. A cap was placed on water extraction from the Murray River in 1992. The context was similar to forests with an increasingly influential environmental movement and new environmental institutions challenging older institutions established to promote national economic

development. Three issues would have a pervasive influence: (1) new public sector management (NPM); (2) concern about ecosystem health, and; (3) changing weather patterns as a result of carbon pollution. These issues appear against a backdrop of more intensive agriculture, expanding markets in Asia and, new water-intensive crops such as cotton and almonds.

New Public Sector Management (NPM)

Victoria kicked off a period of frenetic water management reform in the 1980s and other states soon followed a path toward corporatisation and the application of NPM to water management (D. I. Smith, 1998). The Victorian Parliament's Public Bodies Review Committee drew attention to the number of statutory authorities managing water in 1980, many were water trusts created a century earlier, and that the state had enough dams but far too little direction in water matters. Within four years the number of authorities was reduced from nearly 400 to 160 (Paterson, 1989). The *Water (Central Management Restructuring) Act 1984* abolished the powerful SRWSC, the Ministry of Water Resources and Water Supply and the Water Resources Council to create a single Department of Water Resources and a Rural Water Commission. The other pillar of water management in Victoria, the MMBW, survived for the time being, although its influence was reduced and its planning powers transferred to the Ministry of Planning and Environment (Powell, 1989).

The reform agenda was soon taken up by the Commonwealth and water was swept up in a *microeconomic reform* agenda promoted by Federal Treasurer, Paul Keating. Australian financial markets had been liberalised and opened to foreign capital creating a highly competitive market with investors looking for new opportunities, including in previously public sector activities. For Keating, microeconomic reform was a catch-all for removing unnecessary and unproductive transaction costs, improving efficiency and freeing capital and space for the private sector. He broke with the old national economic development agenda to promote markets and competition, as advocated originally by Hayek (2005), but now part of the ascendant Western paradigm. It provided the philosophical foundation for experimentation with private rights and market-based solutions in the public sector, including water. Such was Keating's success in promoting the agenda that in 1989 he boasted "if you walk into any pet shop in Australia, the resident galah will be talking about microeconomic reform" (quoted in Cahill & Toner, 2018). Under Keating, Australia embraced the idea that the private sector was, by definition, an efficient user of capital and markets were efficient pricing mechanisms, while the state was inherently inefficient and expensive.

This philosophy was reflected in the changes to water management that occurred relatively quickly during the 1990s and 2000s. In 1991, the Industry Commission was asked to report on institutional,

regulatory and other arrangements that had contributed to inefficient and unsustainable water resource use. The report was highly critical of past practices, arguing:

> *… for much of our history, little thought has been given to the efficient provision and use of water resources or to the impact of water use on the environment. The legacy has been much wasteful investment in water infrastructure, charging arrangements that do little to encourage people to use water services efficiently and a host of water-related environmental problems.* (Industry Commission, 1992, p. 1.21)

The Commission argued "reform is urgent" (p. 1), but warned change continued "to be thwarted by the outcomes of past policies and the attitudes those policies have engendered in both water users and government" (p. 1.21). It recommended pricing reform to recover the cost of providing water services, privatisation of irrigation distribution systems and extension of tradeable water entitlements to permanent water rights. Subsequently the Council of Australian Governments (COAG) adopted recommendations of a Working Group on Water Resources Policy in 1994, outlining a strategic framework "for the efficient and sustainable reform of the Australian water industry" (COAG, 1994, p. 1). The framework provided for pricing reform including: full cost recovery; separation of water property rights from land title; the facilitation of water trading, and; formal allocations or entitlements to water, including allocation for the environment. COAG acknowledged the changes would have consequences for rural water users but argued:

> *… the framework is intended to generate the financial resources to maintain supply systems should users desire this and through a system of tradeable entitlements to allow water to flow to high value uses subject to social, physical and environmental constraints.* (COAG, 1994, p. 2)

The framework was regarded as "ground-breaking recognition of economic and market principles in water policy" (Willett, 2009, p. 3). It opened the yeoman farmer communities fostered by Deakin and the powerful state agencies for new investment opportunities - infrastructure investment, water management and tradeable water rights - promoted by a new breed of merchant bankers and other managers of capital. The bankers and others who promoted these investments had much in common with the technocratic public sector managers who implemented the changes on the basis of delivering greater efficiency and as a better way to manage environmental impacts. Both groups shared a university education that promoted the efficiency of markets and the superiority of private rights governance. However, it would still require new institutions and institutional arrangements to implement this agenda. COAG anticipated a five to seven-year implementation period.

6.2.5 New Institutions for market-based governance

Unbundling water and land, that is, creating the ability of water to be traded independently of land, was central to a market-based model for irrigated water. While water was tied to land, more productive users were restricted in acquiring water rights from less productive users. Less productive users were restricted from selling permanent or temporary water entitlements if the market price was higher than the marginal value of water to the landholder (Pigram, 2006). However, water was a state responsibility and states had different views of unbundling. The Standing Committee on Agriculture and Resource Management attempted to overcome this with a National Framework for the Implementation of Property Rights in Water in 1995. At the same time, a cap on water diversion agreed in by the states, pushed irrigators to obtain additional water through the market rather than increased withdrawal (Willett, 2009). But some states constrained markets by allowing irrigation trusts to impose contractual restrictions on the ability to transfer or trade water beyond the trust's area of operations, thereby limiting "the efficient functioning of the water market" (ACCC, 2012, p. 3).

Despite some successes, it became clear in the early 2000s, that many of the COAG reforms had not been implemented or not implemented well. Interstate trading in particular, was hindered by different state trading rules and barriers (Willett, 2009). At the same time, reform fatigue had started to emerge (Samuel, 2001). Further reform was needed. In 2004, COAG agreed to the National Water Initiative (NWI) under which a National Water Commission (NWC) was created as a governance mechanism to oversee the reform agenda (Australian Government, 2004). The NWI and NWC were to provide a consistent and continuing national focus on the goals of the reform agenda including sustainable use of freshwater, the principles of user-pays, pricing transparency and facilitation of the efficient functioning of water markets (Willett, 2009).

As the Millennium Drought reached its zenith in 2007, there was grave concern over the health of the Murray-Darling and the pace of reform. The Commonwealth took the initiative and announced a *National Plan for Water Security* to be followed later that year by passage of the *Water Act 2007 (Cth)*. These went beyond the NWI and sought to implement an integrated and consistent approach to the management and trading of water resources in the Basin. For example, the Act allowed the Commonwealth Minister to make rules to ensure that water markets in the Murray-Darling Basin operated efficiently and without inappropriate barriers to trade (ACCC, 2012). The Act achieved the goal of *unbundling* as the basis for a market to trade water rights. Cooperation of the states was secured through promises of significant funding.

Creating a water market

Promoters of water markets argued markets ensure water flows where “it does the most economic good, which in turn spells greater prosperity” (Segerfeldt, 2005, p. 32). The National Competition Council (NCC) argued it would “maximise the return to Australia” from water use (NCC, 2003, p. ix). For Pigram (2006), it enabled “the resource to move to its highest value use, both within specific water sectors and inter-sectorally” (p. 69). Young (2013), who advised government on the 2007 *Act*, believed the potential benefits were significant where sufficient attention is given to the allocation and entitlement regime. Even when irrigators were facing tough times due to volatile commodity prices and low water availability, it was argued “water markets can offer irrigators the means to get the water they need and/or provide them with additional sources of funds” (Willett, 2009, p. 11). Development of a market for trading water rights accelerated following passage of the *Water Act* 2007 and subsequent water trading rules developed by the Australian Competition and Consumer Commission (ACCC). Water rights and trading were seen as a modern rational policy toward water that would deliver benefits for the nation.

Over two decades, the Basin water market grew to an estimated annual value of more than $1.5 billion (ACCC, 2020). By 2020, businesses such as *Waterfind* were serving 12,000 clients with an electronic trading system (Waterfind, 2020). Grafton et al. (2011) found that the Australian system compared well to five other countries that had embarked on a rights-based approach to water. They found the Australian system had strong institutional foundations and delivered economic efficiency. However, the system was yet to prove it could deliver environmental sustainability. Grafton and White (2013) argue that, while water trading helped ensure efficient allocation of water, it could only prevent overuse “if withdrawals are capped at a sustainable limit” (p. 147). In other words, if a cap-and-trade system was introduced and was working effectively. The return of drought conditions would test both commitment to that system and the integrity of the system.

The ‘cap’ in cap-and-trade

Cap-and-trade is a market-based mechanism for dealing with over-allocation. It places a science-based cap on total withdrawals from the system, with users offered an entitlement representing their share of the cap. There are different forms of *entitlement*: permanent and temporary, for example. The water market is used to trade this share or *entitlement* allowing entitlements to pass to the highest value use. Where a system such as the Murray-Darling Basin is over-allocated government can buy back water in the market for environmental purposes. Success is dependent on the cap being adequate, being enforceable and being enforced. The introduction of a cap and, subsequently the buying back of entitlements was intended to restore environmental balance.

A cap was introduced to the Murray-Darling Basin in the early 1990s with mixed success. After more than 100 years of development based on water extraction, the NCC described this as a

“landmark decision” (NCC, 1999, p. 270). Pittock and Finlayson (2011) argue this initial cap on surface water extraction merely increased the use of groundwater and environmental commitments were poorly implemented by the states resulting in inadequate progress to address over-consumption and environmental conditions. The NCC made a similar observation finding that environmental flow regimes in stressed and overallocated rivers were “not sufficiently advanced” (NCC, 2003, p. x). Resolution would require a plan for managing the river within the cap.

A Basin Plan

The final piece of the market-based governance regime was the development of a plan that would set water extraction limits and guide environmental watering. The *Water Act 2007 (Cth)* recast the Murray-Darling Basin Commission as the Murray-Darling Basin Authority (MDBA) and required the Authority to prepare a Basin Plan for water management. The *Act* was intended to return the Basin to environmentally sustainable levels of water extraction, protect, restore and provide for the ecological values and ecosystem services of the Basin and, subject to these objectives, maximise returns from use of the Basin’s water resources (Clause 3d). The Basin Plan (Part 2) was to give effect to these objectives by establishing how much ground and surface water could be taken (*sustainable diversion limits*) from the Basin as a whole and from different regions. The Basin Plan became a major point of contention as it was developed over the following five years.

The Basin Plan was to be complemented by an environmental watering plan (Part 2, Subdivision C). The watering plan would guide the Commonwealth Environmental Water Holder (CEWH) (Part 6) in managing and administering water rights acquired by the Commonwealth. To facilitate cooperation of the states and other parties, the Commonwealth offered $13 billion to implement the Basin Plan including $3.1 billion to purchase water entitlements for the environment plus amounts to modernise infrastructure and for other initiatives aimed at recovering water (PC, 2018).

Having established the mechanisms for market-based governance, governments continued to play a central role and therefore continued to be a lightning rod for conflict as stakeholders jostled for advantage or protection.

6.2.6 Stakeholder conflict and retreat

Market governance manages contracts between rights holders such that the resource, in this case water, would flow, with minimal transaction costs, to its highest value use. The Basin Plan, released in 2012, did not resolve contestation over water (PC, 2018). As a result, during drought when the market price of water rose, irrigators priced out of the market engaged through the same political processes they had used under regulatory governance. Between 2016-17 and 2019-20

water prices rose from a median price of $48 per megalitre (ML) to peak at $610 in 2019-20 (BOM, 2020). Angry irrigators lobbied for change. The loss of irrigated farms when permanent water rights were sold left economic and social holes in Basin communities that fuelled anger with both the management of the Plan and the Plan itself and began to influence elections.

Constraining the Plan

Faced with revolt from Basin stakeholders, politicians began to lose enthusiasm for market governance. Two years after the Plan was released, the Commonwealth announced that buying water rights for the environment would be the least preferred mechanism for meeting Plan targets and efficiency gains through infrastructure investment would be the preferred mechanism. A limit was placed on the volume Commonwealth agencies could buy (Birmingham, 2014). The Plan would be implemented “in a way that would minimise impact on Basin communities” (DOE, 2014). In September 2020, further water buybacks were ruled out altogether (Pitt, 2020b). This was at odds with allocating water to the highest value use and other principles of the market approach.

Government also meddled with the Plan’s water-saving targets. In 2018, the Basin recovery target was reduced based on the expectation that infrastructure investment by the states would reduce the loss of water through the irrigation system. The target was reduced further following a review of water-saving measures expected in the northern Basin (MDBA, 2020b). Despite the central role of these infrastructure efficiency targets, in 2018 the Productivity Commission found they were not showing the impacts required for the environment (PC, 2018). Two years later, the MDBA found only a very small amount of water had been recovered under the infrastructure program with very little progress since it was announced (MDBA, 2020a). Government found it easier to miss targets than undertake water buybacks with risky political consequences.

Regulatory capture

In addition to making changes to the market mechanism, in 2017 it emerged that the cap was not being enforced adequately. A series of media reports alleged “water theft” in NSW (McCarthy, 2017) and meddling by NSW politicians and public servants that may have facilitated or turned a blind eye to non-compliance. Investigations into the claims identified longstanding problems with compliance and enforcement in NSW. While the NSW government established an independent Natural Resources Access Regulator to improve enforcement, one investigator remained concerned about reforms being *watered down* (K. Matthews, 2017b). Subsequent investigation found that in NSW, “the evidence established that the rights of productive water users were given priority over the rights of other stakeholders and that there was a clear alignment between the department’s strategies and goals and those of the irrigation industry” (ICAC, 2020, p. 9).

A range of problems have been identified with the way the Plan is implemented, managed and policed, including how investments in efficiency improvements are managed (see for example Q. J. Wang & Horne, 2019). Some argue the Plan is a victim of *regulatory capture* by industry which they describe as a form of corruption (Moggridge, Carmody, & O''Donnell, 2020). The Productivity Commission found there was a role confusion with the MDBA acting as both an agent for the states and as a regulator. It recommended separating the two roles (PC, 2018). Two years later this was still to happen (Pitt, 2020b). Others argue that the problems relate not so much to the primary legislation, *Water Act 2007*, but to implementation "when political considerations are given precedence". They question whether "short-term demands placed on politicians are compatible with the long-term focus needed for … environmental decision-making" (Walmsley & Brennan, 2019).

6.2.7 Walking back from the market

Publicly, politicians remained committed to the market-based system, but criticism increased in the lead-up to the 2019 Federal election. Irrigators had a long list of complaints: speculators who didn't own land seeking arbitrage in a shallow market and pushing up prices (14 per cent of trades do not own land); lack of transparency in the market (who is participating, real-time price and availability); hydrological obstacles to moving water through the system and losses due to evaporation; loss of income to local communities if farmers decide to sell their water rather than farm, and; mental health issues for farmers as a result of additional complexity and fluctuating prices (Sullivan, 2019). The government sought a way past the election with a series of commissioned reviews.

The ACCC was asked to inquire into water markets (Frydenberg, 2019). An interim report accepted there were winners and losers but argued this was a policy issue which government should address "without negating the benefits water markets generate" (ACCC, 2020, p. 6). An Interim Inspector General of Murray Darling Water Resources was asked to examine water-sharing arrangements in the southern Basin (Keelty, 2020) and, an independent social and economic panel was asked to examine impacts of the Plan on communities (Sefton, 2020). The constant pressure from communities tested political resolve resulting in weakened reforms and missed targets. They may not have been walking away from market-based governance, but they were walking back from earlier goals and ambitions. Putting "communities at the centre of the Murray-Darling Plan" (Pitt, 2020b) was a long way from the stated goal of ensuring water flows to its highest value use or "protecting the water source and its dependent ecosystems" (ICAC, 2020, p. 9).

6.2.8 Summary evolution of water governance

Water followed a similar path to forests with traditional Indigenous governance dismissed and replaced by a form of colonial frontier governance. Unlike the United States, in Australia the state took ownership of water creating a firmer foundation for regulatory governance. Institutions formed in the latter part of the 19th century controlled both urban and rural water from the early 20th century as Australia entered a period of industrialisation and development. One goal was to develop irrigation communities of small farmers on inland waterways, particularly the Murray-Darling Basin. The institutions were dominated by engineers and subject to political influence. Their technocratic nature contributed to the separation of people and nature – in other words, to *making water invisible* (Sharp, 2017). With users shielded from the cost of water by the state, this encouraged inefficient use and investment as well as overallocation with serious environmental consequences. These matters came to a head with the emergence of environmental institutions and influence of international capital seeking investment opportunities in traditionally public sector areas of the economy. Water was a prime target. New public sector managers - seeking efficiency gains, greater private sector role in public services and market approaches to environmental challenges – promoted a market-based governance approach that was adopted by COAG. The goals of the market were at odds with the goals of the former regulatory governance. The backlash from rural communities and institutions restricted the effectiveness of market governance and undermined or rolled back the goals and ambitions of its promoters. With the momentum of private rights and markets weakened following the Global Financial Crisis, and a well-organised rural sector, Australia is left with a hybrid of market governance and meddling regulatory governance.

6.3 Collaborative water governance

The previous section pointed to the brief emergence of collaborative governance through the irrigation trusts proposed as part of Deakin's original plan for development of irrigation communities. This part will explore that development as well as a form of collaborative governance that started to develop following passage of the *Water Management Act 2000 (NSW)*. The final section will review the development of AWS water stewardship in Australia building on Chapter 5, where core elements of the water stewardship system were outlined.

6.3.1 Irrigation colonies

In the United States, Alfred Deakin had witnessed the emergence of religious or utopian irrigation colonies that appeared to be both profitable and secure forms of intensive farming (Powell, 1989, p. 110). The idea resonated with Deakin who was influenced by the egalitarianism of Henry

George and Alfred Russel Wallace, as well as by the colonial romanticism of English heritage and yeoman farmers working closely settled blocks. Belief in technology and egalitarianism gave rise to experiments with farmer cooperatives and local collaborative management through waterworks trusts and irrigation trusts. These provided local government (for waterworks) and groups of farmers (for irrigation) the opportunity, through elected trustees, to levy property and water rates and sell water through a form of local collaborative governance.

Deakin had also encountered the concept of a mutual water company and the idea that private capital could be used to develop new land for irrigation. In the United States, the Chaffey brothers acquired acreage as a gift from the government, invested and built the irrigation infrastructure and then sold irrigation blocks for intensive farming. George Chaffey followed Deakin back to Australia where he applied to develop an irrigation colony at Mildura. Deakin approved Chaffey's application but was required by Parliament to open the deal for public tender. With Chaffey threatening to return to California, South Australia offered land at Renmark for a scheme similar to the one proposed for Mildura. When the Victorian tender closed, no competing offer had been received so the Chaffey brothers pursued both opportunities (Pigram, 2006; Powell, 1989; D. I. Smith, 1998)

The irrigation colonies in Renmark and Mildura were initially based on the US water company model to implement government policy; the development of intensive irrigated agriculture in close-knit rural communities (*yeoman farmers*). The schemes were marketed in Europe and North America in a manner that sought to attract new settlers to an Australian utopia (Bull, 2018). However, the collapse of the Victorian land boom, rebellion from block farmers over water prices, an over-ambitious design and flow vagaries of the Murray River saw the Chaffey scheme file for bankruptcy after less than a decade. At Renmark, a Trust assumed control and in Mildura a ratepayer-appointed board took over management (Powell, 1989).

Private rights to collaborative governance

Despite the collapse of the Chaffey schemes, elements of the Deakin model continued under the Renmark Irrigation Trust (RIT), which evolved into a form of collaborative governance. RIT was a farmer-led cooperative (Trust) that provided governance to the irrigation district. Irrigators collectively owned the infrastructure and elected the RIT Board. Commitment to collective arrangements was reflected in RIT member involvement with cooperatives, including the Renmark Fruit Packing Union (subsequently Renmark Fruit Growing Cooperative) and a cooperative winery established in 1916, with 130 grower members (Bull, 2018). Producer cooperatives became well established in many Australian rural communities. In this case, the model was applied to the local distribution of water in a manner similar to Deakin's vision.

RIT became a leader in its own community and beyond. In the 1970s, it was one of the first to convert from open-channel irrigation to a piped system that reduced water loss from evaporation. In the Millennium Drought, RIT embarked on a course to ensure Renmark became a more sustainable community. It was the first irrigation area to sign an agreement with the CEWH to undertake environmental watering for floodplain rehabilitation. In 2018, it pioneered water stewardship and became the first irrigated agricultural collective in the world to achieve AWS certification and the first agricultural enterprise to achieve gold-level AWS certification. In 2020, the Interim Inspector General of Murray-Darling Water Resource singled out the RIT as a case study for its certification to the AWS standard and work with the CEWH (Keelty, 2020, p. 37).

6.3.2 Collaborative decision-making: NSW Water Management Act 2000

An example of a multi-stakeholder collaboration reaching agreement on water sharing is reported by Bell and Park (2006). Water management committees were established in 36 New South Wales catchments between 2002 and 2004 to involve stakeholders in decisions about water allocation and trade-offs between end-users and the environment. Describing this as an experiment “in collaborative, catchment-based water planning and allocation” (p. 69), Bell and Park observe that it ended badly because the relationship between stakeholders and government was poorly managed. Problems cited relate to the inclusion of relevant stakeholders; the specification of goals; inadequate provision of resources and information, and; discounting of stakeholder input. These problems “limited mutuality gains and ultimately the governance system’s legitimacy” (p. 70).

The critical issue was that the stakeholder committees thought their role was to make water-sharing plans for their catchments based on negotiation. Plans were successfully negotiated; however, once they were presented to government, they were overridden. The plans gazetted were drafted by the Department, not the committees (p. 76), and this “left stakeholders feeling frustrated and ignored”. One industry stakeholder commented: “The only thing worse than not consulting is to consult and then ignore the results” (p. 77). Bell and Park noted that the way this was handled undermined the legitimacy of the process in the eyes of stakeholders and would influence a future willingness to participate.

Government officials also lost interest in collaboration, citing impatience with the time and cost of the process as well as difficulties setting up and working with the committees. In future, decision-making would be “pulled more formally back within government and “conducted on a more *scientific and systematic basis*” (Bell & Park, 2006, p. 80). This highlights questions about both the ability and willingness of technocratic institutions to manage alternative governance approaches and deal with the ambiguity and uncertainty of such processes. Bell and Park concluded that, unless there was a political crisis and strong support from ministers, public participation would

remain advisory (p. 79). Similar issues arose in the Wombat Forest community forest program reported in the previous case study.

6.3.3 Water stewardship in Australia

Water stewardship emerged in Australia at the depths of the Millennium Drought in 2006. One driver was interest from a plantation company, that had been involved with FSC through its pulpwood operations and was facing criticism over water consumption at its almond plantation. Another driver was the finance industry, which was interested in a tool that could help to evaluate water performance of customers in the same way that FSC certification provided a guide to the sustainable performance of forest and plantation companies. A third was public scrutiny of major water users as a result of pressure on government to release names of the 100 largest water users in Victoria. Interest in being able to report and independently verify water performance against a multi-stakeholder endorsed standard had appeal to water-using businesses.

The initiative did not have the supply chain pressure evident in the development of FSC in Australia. When 80 people attended a seminar in 2007 to progress the idea, it was sponsored by one company, a water retailer, the NWC and a philanthropist. Attendees included food processor companies, a paper company, agriculture and consulting firms. NWC CEO and Chair, Ken Matthews, the keynote speaker, expressed support for the water stewardship proposal because of its ability to engage the private sector, harness market incentives, provide a holistic national solution and forge consensus about what good water management meant. He also warned the audience against thinking government would underwrite the initiative; he wanted it to be led by private industry, not government (K. Matthews, 2007).

NWC remained a key supporter[34]. In 2012, then Chair, Chloe Munro, told a group assembling the AWS Standard; “good [government] policy is necessary but not sufficient to achieve the goal of sustainable management of water”. She explained entities and individuals make choices in using water that may be constrained or incentivised by governments. However, within the guardrails of government policy, “there is enormous discretion to be prudent or profligate with the resource, to be considerate or careless of the interests of others”. She said the interests of the NWC coincided with those of AWS where government policy and regulation passed the baton of water stewardship to water users and water stewardship could influence the choices users made. (Munro, 2012). In other words, Munro saw AWS as a partner that could influence behaviour more holistically than regulatory compliance.

[34] Until it was abolished in 2014.

Reflecting on his early support for AWS, Ken Matthews believes the time was ripe. Community confidence "that water would always be there was shaken, and people were demanding it be better managed." (Forbes, 2018, p. 5). Another early supporter said she was concerned that her newly corporatized water retailer would have to start fining customers for using its product. AWS offered an alternative approach. It provided ways to reduce water consumption and allowed business "to demonstrate to the community that it was doing its bit for both consumption and discharge quality"(p. 5). However, as Matthews observed, when the drought ended, pressure for corporate engagement dissipated: "Crises do have their advantages, they can force attention to an issue that was overdue" (p. 5). The ending of the drought coincided with the Global Financial Crisis and private sector enthusiasm and funds largely disappeared.

Engaging irrigated agriculture

AWS continued to make progress with support from the NWC, the Murray-Darling Basin Commission (MDBC) and subsequently the (MDBA). The MDBC had an interest in voluntary stewardship as a tool to encourage irrigators to improve environmental performance. A report by Dames & Moore (later URS) and CSIRO (URS, 2000) pointed to the potential for voluntary environmental certification of irrigators to advance the objectives of the Basin Sustainability Plan (p.15). It argued the approach could "provide the missing link between policy, planning and practice in irrigated agriculture" (p. 23) and recommended the MDBC pursue an appropriate certification system for irrigation in the Basin through collaboration (anticipating AWS).

> *We would not recommend that the Commission pursue this opportunity directly, but we suggest that someone is likely to set up one or more such systems and, if it moves early and aggressively, the Commission could have a significant influence on the nature of such an arrangement.* (URS, 2000, p. 36)

Subsequent research by Andrew et al. (2007) explored the potential of an Environmental Stewardship System (ESS), similar to water stewardship, in regional industry-based trials. The study "revealed strong support for the ESS design and business case" (p. 246). However, it concluded: "Strong drivers, robust partnerships and favourable regional circumstances need to be in place if the [ESS] is to be successfully implemented" (p. 253). A business case assessment found the drivers were not sufficiently strong to drive voluntary uptake although farmers expected they would strengthen in future. The study maintained that support from government or industry, by using the stewardship system as a cross-compliance requirement for accessing benefits such as funding from existing programs, would help to address this problem.

Creating business drivers for AWS would be an ongoing challenge, despite public and private benefits including improved effectiveness of existing natural resources management investment

processes. Management and political changes saw interest from the MDBC wane. Nevertheless, staff continued to show interest by supporting a water stewardship forum in 2008 (M. Spencer, 2009). In 2009, the MDBC sponsored a research project by AWS and the Cotton Communities Collaborative Research Centre (Cotton CRC) that developed the world's first water stewardship standard, prepared a gap analysis with cotton industry best management practices (BMPs) and undertook some limited research on stakeholder attitudes.

The new water stewardship standard created opportunities for pilot trials and a clearer explanation of what water stewardship meant (M. Spencer, 2009). Requirements that water users understand catchment challenges and engage in water challenges beyond their fence line surprised some land managers, who did not see this as their responsibility. The gap analysis with cotton BMPs showed catchment level engagement was not included in existing BMPs, and discussion of how this could be resolved became a theme in most stakeholder feedback (Spencer Consulting Group, One World Standards, Pinnacle Consulting, & SGS, 2008). Bridging this gap between current practice and AWS requirements would require strong drivers for participation and this became an ongoing discussion, as did consideration of how the standard could be more accessible to smaller growers.

Despite these limitations, AWS was able to find water users interested in trialling the system.

Basin water stewardship trials

The most significant trial was with dairy processor, Tatura Milk Industries (TMI) in partnership with Dairy Australia and the Goulburn Broken Catchment Management Authority (GB CMA). The trial was intended to test the application of water stewardship to a group of 280 small farmers supplying milk to the processing factory. In particular, it was interested in how to overcome the problem of compliance costs for small farmers. It developed an approach based on the milk factory being certified and building water stewardship into its extension services with small farmers. This involved a gap analysis with the existing dairy BMP tool, the Dairy Australia Self-Assessment Tool (DairySAT). The trial also tested how water stewardship could build stronger collaboration between the catchment manager and the dairy industry in the Shepparton Irrigation Region (SIR).

In essence, the trial looked to build benefits for both government agencies and industry while ensuring low compliance costs for participants. Three areas examined were: Group certification[35]; linking water stewardship to existing farm management plans and DairySAT, and; linking water

[35] Group certification is available where enterprises with similar production systems and within the same catchment, subscribe to a group with a common water stewardship management system, overseen by a *group manager*. The group can then be audited at a lower cost per enterprise as the auditor only needs to inspect the group systems and processes and a sample of the participants.

stewardship to funding opportunities from the catchment manager. It looked at how the Standard could help the industry meet the emerging sustainability requirements of international customers and how a range of compliance requirements (industry, catchment authority, water stewardship etc.) could be bundled to lower the compliance burden on individual farmers. However, in the absence of a compelling business driver, farmers saw the program as adding to an already overwhelming compliance burden on family or small-farm operations.

For Dairy Australia, staff expressed the view that they saw the trial was an opportunity to test DairySAT against international best practice to help respond to expectations from international customers (WSA, 2012). Dairy Australia subsequently made improvements to DairySAT. Having substantially met their customer needs through these improvements, there was little additional incentive for Dairy Australia to continue beyond the trial particularly in the face of reluctance by farmers and processors to take on additional compliance responsibilities without a strong business case. In the absence of clear support from leading farmers and industry bodies, GB CMA, while enthusiastic supporters, did not push AWS on farmers and the project lost momentum.

Renmark Irrigation Trust

The Tatura trial did stimulate interest in water stewardship from the Renmark Irrigation Trust (RIT) and the umbrella group, South Australian Murray Irrigators (SAMI). Both were concerned about the loss of irrigation properties due to members selling their water rights. They were also interested in gaining credit for their good water management and influencing upstream users to practice water stewardship. Through RIT and SAMI, government stakeholders became involved and a project group was established that received some funding from the South Australian (SA) Government.

Participation of influential stakeholders in a steering group provided local legitimacy. The steering group included leaders of both SAMI and RIT, the water-trading business *Waterfind*, the catchment management authority, two government departments and the Goyder Institute (academic). Government funds were used to provide water stewardship training to SAMI and RIT staff so that they could offer local leadership with an understanding of AWS requirements. RIT became the first irrigation trust to be certified against the AWS Standard and this was celebrated with State and Commonwealth government officials in attendance. International attention served as reward and recognition for the project but failed to entice individual members of RIT to become AWS certified.

The RIT project helped build the brand of AWS water stewardship. The Commonwealth Assistant Minister for Agriculture and Water recognised the AWS certification, saying it was “a great opportunity for other regions and irrigation network operators to follow the lead of the Renmark Irrigation Trust" (Ruston, 2018). Engagement with the CHEW to replenish wetlands became a

national case study (Bull, 2018; WSA, 2018). National water figures such as the Interim Inspector General of Murray-Darling Water Resources became interested in the RIT case study (Keelty, 2020). Yet despite this, neither the State nor the Commonwealth were willing to support expansion of AWS water stewardship through the Basin.

Costs and benefits of AWS certification continued to present problems. Audit costs for RIT were subsidised. The gap between the cost of the program to farmers and the benefits received needed to be covered by an external source. It could be argued that this represents the cost of delivering the public benefits of water stewardship; however, in the absence of measures and quantification of those benefits, the argument was hard to sustain. A new generation of leaders at the MDBA appeared to be more technocratic, putting their faith in expert-driven solutions rather than bottom-up collaborative approaches. Simons (2020) found no interest from the MDBA CEO in developing collaborative governance to help resolve problems with the Basin Plan.

Engaging industry

While most interest in AWS fell away once the Millennium Drought ended, one company, Ingham's Enterprises, had experienced an epiphany during the drought and realised how dependent it was on water. The company's poultry-processing plants are major water users. It was introduced to water stewardship through its water retailer and undertook a gap analysis of its Melbourne plant against the first water stewardship standard. The analysis proposed a range of improvement initiatives that impressed both the corporate sustainability manager and the plant manager. The company began a water stewardship journey.

Ingham's engaged with AWS in a number of ways. Certification provided benefits including improved water efficiency, lower costs and risk. Water became visible to both management and staff (Cameron, 2015). The company began to engage with its community. The Western Port Water Stewardship Project, a partnership between AWS, the Western Port Biosphere and Ingham's, received philanthropic support to engage other water users around Westernport Bay (which contains a Ramsar wetland and a Marine National Park) in water stewardship. The project encouraged other businesses to follow the Ingham's path and brought together government agencies with an interest in water around Westernport Bay. It built a network of more than 100 local water users and trained them in how to incorporate water stewardship principles.

Ingham's sustainability manager would go on to become a chair of AWS and a financial supporter of projects such as the development of the AWS brand and the engagement of First Peoples in water stewardship. She used her networks to introduce new industrial businesses to water stewardship and committed to have all Ingham's poultry processing plants in Australia and New

Zealand certified to the AWS standard. Despite this leadership, and the introductions provided, no other industrial enterprise in Australia or New Zealand certified to the AWS Standard. None of the businesses engaged through the Western Port project progressed to AWS certification. Ingham's was a giant business in this area compared to most that were small or very small. Some used the AWS Standard for benchmarking or to identify risks but were reluctant to invest in certification.

6.3.4 Summary of collaborative water governance

From the time of Deakin, collaborative governance has been seen as an option for managing competing water interests. This disappeared with the rise of technocratic command-and-control governance other than in patches such as RIT. It should be no surprise that RIT was an early adopter of AWS, even though individual members were less interested. Member companies had concerns about compliance costs and lack of reward for participation. With some individual exceptions, collaborative governance was not encouraged by government. It was seen as less precise, more time-consuming and messier. Nevertheless, the case study shows that where it could break through (Ingham's), participants saw greater benefits than expected. Resistance was manifested in preconceptions about how water was managed (experts), institutional resistance and costs. Benefits were both practical and intangible. These issues are explored below.

6.4 Success of water governance

Success in this context is considered with reference to the concept of stewardship defined earlier in the literature review. In other words, is the Basin being managed in a way that respects the entitlement of future generations as well as the present? Is it being managed in a way that reflects the interconnectedness of ecosystems and, the interconnectedness of those ecosystems with human systems (communities)? Is it being managed in a way that reflects equity and fairness among the different communities? Keelty (2020) argues Basin mechanisms *have* managed variable flows although others, as discussed below, have been critical (at times damning). All note that long-term decline in water availability means the problems are not static but escalating.

The Wentworth Group of Concerned Scientists (Wentworth Group, 2020) argues the Basin Plan has not delivered water where it is needed. It found 20 per cent of river flows expected to benefit Basin ecosystems did not flow to sites that included Ramsar wetlands of international significance. Ten of the Basin's 14 Ramsar wetland sites received less than 80 per cent of expected flows. They argue success of the Plan is dependent on meeting obligations to maintain Ramsar wetlands.

> *If flow regimes are not improved, the ecological character of Ramsar sites, and other wetlands, will continue to degrade, signalling decline in ecological condition, with*

implications for Australia's responsibilities in adhering to its obligations under international agreements. (Wentworth Group, 2020, p. 12)

The South Australian Royal Commission put the situation bluntly: "There is no sensible prospect whatever of these objectives [of the *Water Act 2007*] being met by the end of the Basin Plan period" (B Walker, 2019, p. 41). A Productivity Commission review of the Basin Plan found water recovery plans "highly ambitious", "at risk" "behind schedule", delayed and not capable of being managed "under current governance and institutional arrangements" (PC, 2018, p. 2). A statutory review of compliance with the *Water Act (2007)*, found the recovery target (450 GL) was not on track and would not be achieved by 2024 (Farrier, Lewis, & Kelsall, 2020). The Commonwealth has acknowledged "slower than anticipated progress" (Pitt, 2020b).

In summary, water already recovered is not meeting its targets, and additional water still to be recovered is some way off. Compromises made in the Basin Plan continue to be brought to public attention through significant environmental events such as a 2018-19 mass fish kill in the Lower Darling River (Australian Academy of Science, 2019).

6.4.1 Failure of governance

The Productivity Commission (PC, 2018) noted an inability of *governance* to deliver the desired outcomes for the Basin. Other reports (Keelty, 2020; Sefton, 2020) remark on similar failure of governance to consider the human anguish caused by drought and uncertainty over water flows, as well as the failure of government to provide leadership, inclusivity, and clarity for Basin communities. The Productivity Commission noted communities felt governments had failed to provide clear and decisive leadership: "This has left a legacy of community distrust" (PC, 2018, p. 13). Communities felt governments did not listen, understand, investigate or explore alternative management options. Instead, "stakeholder engagement involved one-way communication (from government to communities), where government officials 'come out to tell the community what has already been decided'" (PC, 2018, p. 355).

The independent panel assessing social and economic impacts of water reform noted similar sentiment: "We heard from people caught in a one-way conversation – over-consulted and under-listened to. They were frustrated that decisions are being made *for* them, often with short-term objectives as the predominant driver." (Sefton, 2020, p. v). The Interim Inspector General of Murray-Darling Water Resources noted a lack of trust in Basin management, arguing greater unity and leadership would be essential in dealing with future challenges (Keelty, 2020). Pittock and Finlayson (2011) and Simons (2020) note that these failings pre-date the *Water Act 2007 (Cth)*. A key message is that communities needed to be at the heart of conversations that decide their

future. While government has accepted this (Pitt, 2020b) there is little evidence this can change under current governance arrangements. Simons (2020, p. 104) reported there was little interest from the MDBA in bottom-up governance.

6.5 Institutional considerations

Institutions at the centre of water management were formed in the latter part of the 19th century and early 20th century. They were *modern* technocratic institutions built around professional expertise, hierarchical regulatory governance and *instrumentalist* in their separation of humans and nature. Powell (1989) talks about the "sustained centrality of engineering approaches" (p. 3) and "modern engineering hegemony" (p. 14) as water was delegated to *experts* and *instrumentalities*. Pigram (2006) argues development of water resources in Australia "reflects a pervasive concern for technical solutions to the problem of satisfying water needs" with solutions "typically involving large storage reservoirs and extensive reticulation systems" (pp. 45-46). The original charter of the Institute of Engineers in the UK reads: "… a society for promoting the acquisition of that species of knowledge which constitutes the profession of Civil Engineer, being the art of directing the Great Sources of Power in Nature for the use and convenience of man (Charter of the Institute of Civil Engineers, 1828 cit. in Carr-Saunders & Wilson, 1933).

The development agenda of these institutions was relatively unconstrained by scarcity. They separated their customers, irrigators, from the cost of infrastructure and the source (surface water flows) through their control of investment capital. They built demand by creating supply. They made water less visible (Sharp, 2017). Costly infrastructure investments led to what Pigram (2006) and Powell (1989) saw as an entrenched assumption that public expenditure would be readily available to provide and correct water deficiencies. This played out through the political process as irrigators saw their relationship with water not in terms of financial and natural capital but political power. Hence, the Basin was managed through politics, disconnected from nature, with many irrigators developing a sense of entitlement to protection and state support for their enterprise.

Eggleston (1932) argues that the pre-eminence of experts was the source of ongoing political conflict over water: "A small band of capable and devoted expert managers [of the SR&WSC] … were opposed by the solid ranks of water-users, who, in the absence of responsibility, could be guided only by self-interest" (p. 83). Centralisation of responsibility, he believed, made for "technical efficiency but took responsibility away from the irrigators while opening the authority to political influence (p. 84). Eggleston believed returning responsibility to irrigators, as originally proposed by Deakin, could make the system a success, but too little attention was paid to governance when engineering solutions dominated.

6.5.1 Institutional isomorphism

As with the forest case study, this case study will briefly consider water management through the lens of institutional isomorphism and its three mechanisms (DiMaggio & Powell, 1983):

- *coercive* isomorphism that stems from political influence and the problem of legitimacy;
- *mimetic* isomorphism resulting from standard responses to uncertainty; and
- *normative* isomorphism associated with professionalization.

Coercive isomorphism and water management

There is a parallel with forestry in the emergence of water management institutions as technically competent hierarchical authorities, underpinned by strong professional organisations that created institutional norms and provided institutional leaders. There has been a political expectation dating from Deakin's period, that the goal of water management in the Murray-Darling Basin was rural development through public investments to build successful irrigation communities. Arguing the case in 1886, Deakin drew on the painful experience of drought for authority:

> *The experience from 1875 to this present day of those who have attempted cultivation in those areas is one of painful failure, deprivation and loss; and this will be the story in the future unless we endeavour to cope with it by utilizing the considerable stores of water which are to be found at times even in the most arid districts*. (Deakin, 1886, p. 427)

Deakin argued that without irrigation, agriculture would not survive in the Victorian Murray-Darling Basin and "many of the men who have contributed to make Victoria what it is", would be lost. Irrigation, on the other hand, offered a future of prosperity: "There is no doubt that this region will prove fertile beyond expectation whenever permanent water supply can be secured to it" (Deakin, 1886, p. 427). Fast forward to 2020 and, presenting yet another investment package in the Murray-Darling Basin, the Commonwealth Water Minister argued:

> *At a time when Basin communities have endured years of drought, a summer of terrible bushfires and while the COVID-19 pandemic continues to eat away at household confidence we need to invest in the people and the places that generate our nation's wealth. …We need a vibrant and profitable irrigated agricultural sector. … The Basin is an economic and ecological powerhouse and protecting it is a shared responsibility.* (Pitt, 2020a, p. iii)

The main difference between Deakin's argument and Pitt's argument was an acknowledgement of environmental context. This was inevitable as Pitt was discussing the Basin Plan. However, even in that regard, he chose to redefine the purpose of the Plan saying: "We need to remember the original purpose of the Plan – to ensure a certain and sustainable future for communities, industries and the environment" (Pitt, 2020a). The *Water Act 2007 (Cth)* prescribes the purpose of the Plan as to return to environmentally sustainable levels of extraction, to protect, restore and

provide for ecological values and ecosystem services and, subject to those requirements, maximise net economic returns. As with forestry, the economic priority came to dominate despite the Millennium Drought crises that temporarily moved environment to a higher priority.

Mimetic isomorphism and water management

Mimetic isomorphism appears through ambiguity and uncertainty when, faced with this uncertainty, organisations revert to type and model themselves on other organisations. There are undoubtedly inbuilt contradictions in the water policy settings that create uncertainty and ambiguity, for example: market-based allocation to the highest value use versus putting communities at the centre of the plan, or, focusing on jobs and economic activity in regional areas while recovering water for the environment. This uncertainty may create an environment where institutions revert to the sort of expert-driven organisations that managed water through much of the 20th century.

It could also be argued nothing really changed and there was simply a lock-in or *path dependence* as proposed by *historical institutionalism* - that is, actors and structures become mutually reinforcing in a way that resists redesign and ossify into world views that shape the preferences of actors involved (Hall & Taylor, 1996). Path dependency explains an organisation's lack of adaptive capability (Kuipers & Boin, 2009) with implications for the distribution of power and resources creating groups and individuals with disproportionate access to decision-making (Hall & Taylor, 1996).

In his Interim Report to the NSW Government that followed the media exposé on water theft, Ken Matthews observed a "group culture" among staff involved in water management: "a culture of tolerance for expedient work practices in the interests of *outcomes*" (K. Matthews, 2017b, p. 6). Elsewhere, Matthews was critical of the culture of exclusive and private consultation with selected irrigator interests in managing compliance (K. Matthews, 2017a). This view was reinforced by the Independent Commission Against Corruption (ICAC, 2020). These reports illustrate the difficulty of adapting from a role as a promoter and supporter of industry, to one that manages relations between industry and nature and is required to police compliance of its former customers.

The ACCC's interim report on water markets (ACCC, 2020) found many of the problems with markets were at least partly due to problems with governance. One example it highlights is the failure to deliver a National Water Market System (NWMS). This was announced in 2008 with a deadline for completion in 2012, and eventually terminated in 2014. Some $30 million was invested but the project could not be delivered because of problems with coordination, consensus-building and technology. The parties could not or would not agree the goals of an NWMS (allocating water to the highest value use) nor could it gain sufficient commitment to overcome technical barriers.

As the Basin reform process came under scrutiny, institutions focused on technical solutions finding it difficult to allocate time for collaboration with non-experts. “Consultation has been inconsistent and inadequate, and the community has often had little sense that decision makers have listened to their concerns” (PC, 2018, p. 13). When Simons (2020) asked the MDBA CEO if community leaders should be more involved in addressing water challenges, he resorted to the professional view that *experts know best* and the perspective that communities were collections of self-interested individuals who could not be trusted to solve complex social dilemmas.

Normative isomorphism and water management

Normative isomorphism stems from the professionalisation of an occupation in a way that defines conditions and methods of work and a cognitive base for the profession’s legitimacy. This legitimisation is achieved through formal professional education and professional networks. Professionalisation creates a pool of interchangeable individuals who occupy similar positions in a range of organisations. For water, the relevant professional disciplines are engineering and hydrology. Water engineers (male) dominate leadership positions in the water sector. A review of heads of major capital city water agencies in the six Australian states in 2019 showed all except one have an engineering background (often complemented by a business qualification). Water is an engineering domain, and its professionals tend to rise to the top.

Engineers attend engineering schools that produce people who have “mastered certain skills they utilise in their careers” (Kosovac, Hurlimann, & Davidson, 2017). Kosovac argued at a Melbourne University workshop that water management has for the most part been a technocratic field based on the provision of infrastructure, water balance calculations and the relentless reliance on objectivity. The interest of the workshop was on ways in which water could be reimagined to incorporate other facets of knowledge in particular, social science knowledge (Kosovac, 2020). A brief review of engineering curricula reinforces the observation of Costanza et al. (2015) that disciplines develop their own language, culture and ways of looking at the world.

Professional networks capture and reinforce the cognitive base and boundary rigidity of the profession. Engineers Australia is “committed to advancing engineering” as “a profession that shapes the lives of every Australian” and promotes “the dedication and accomplishments of engineers” (Engineers Australia, 2020). It is in the interest of a professional association to build and fortify its silo. Engineers Australia plays an important role in the professional development of engineers, provides normative control through professional registration and bestows status through recognition awards. Water specific organisations such as the Australian Water Association and Water Services Association of Australia also play a role in professional development.

Industry conferences provide networking, learning and recognition for the profession. OzWater attracts some 5,000 water professionals and focuses almost exclusively on technical solutions to water problems. A review using NVIVO of more than 200 papers presented at the 2018 and 2019 conferences found only 12 discussed behaviour change and eight stewardship. A review of paper titles highlighted words such as asset management (2019) and treatment management (2018) but not stewardship or behaviour (one mention). In 2019, words such as "customers," "partnership," "collaboration" or "engagement" featured in less than 20 titles, while fewer than 10 presentations appeared to actually discuss engaging customers in solving water problems. There would not be sufficient interest to warrant a presentation on water stewardship[36]. Yet papers that did deal with topics such as behaviour change and engagement stressed the central role these practices will play in solving water problems (particularly demand-driven problems).

In their survey of water professionals, Kosovac, Hurlimann and Davidson (2017) found professionals were concerned about dealing with the community in the context of innovative water initiatives. Water professions rated "community backlash and reputation to the organisation" as their highest risk (Kosovac et al., 2017, p. 2). Kosovac et al. said the finding was unexpected yet important, given the role risk analysis plays in decision-making on proposals for change in water management. They discuss attributes such as *dread factor* (sense of dread associated with risk) or newness (familiarity of the risk) and conclude new technologies and processes may be discriminated against in favour of existing business-as-usual approaches due to these risk perceptions from dealing with stakeholders. In the context of this investigation, this suggests water managers may prefer to engineer a solution than negotiate a collaborative outcome.

6.5.2 Summary of institutional considerations

There are strong institutional constraints on change to water governance given the powerful position engineers hold, the normative pressures around the solutions envisaged to water challenges and the traditional focus on economic outcomes. The experience of institutional lock-in is as strong as for forestry, albeit not as adversarial and therefore, perhaps not as obvious. However, the extent, manner and persistence of resistance to the introduction of market-based solutions is evidence of the strength of the traditional regulatory governance as recent reports from the ACCC, Productivity Commission and Independent Commission Against Corruption testify. This is despite these changes being introduced more than 20 years ago and strengthened in the *Water Act 2007 (Cth)*. Resistance to collaborative governance would be compounded by the intolerance of water experts for solutions that are imprecise, slow, risky and messy. Overcoming this resistance would have to start with the education and development of future water leaders.

[36] Personal conversation AWS staff member

6.6 Choice and decision-making in water stewardship participation

Mention has been made of the difficulties engaging water users in water stewardship because the benefits from water stewardship were not sufficient to justify the cost of participation. This was in contrast to the forest industry where the benefits of brand association with FSC in international markets were found to be important in gaining the participation of early adopters. Nevertheless, a major company such as Ingham's was prepared to invest in AWS certification and contribute to building AWS in Australia. Using the empirical tool outlined in Chapter 5, this section will explore motivations and constraints for participation in AWS.

The questionnaire copied in Appendix 2 was administered to 19 facilities (n=19) in Australia and New Zealand representing a mixture of agricultural enterprises, service providers and processing facilities (mainly food and beverage). Respondents include farms and businesses from Renmark, Westernport, Ingham's poultry processing plants as well as a steel and a wood pulp plant. While it is recognised circumstances of water management are different in New Zealand, participants from New Zealand have been included because of the relatively low levels of AWS participation in Australia explained earlier. There are jurisdiction and legal similarities given the level of collaboration between the two countries and, while New Zealand has in the past regarded itself as relatively immune from water scarcity, it has faced a growing community concern over water due to drought, pollution and competition for water.

6.6.1 Rational choice

The *Net Benefits Index* described in Chapter 5 provides a proxy for *rational choice*. If AWS participants were behaving as rational entities, those adopting[37] AWS would perceive positive net benefits and those not adopting would perceive negative net benefits. There is an important caution in these results because of the low level of participation; only four non-adopters in Australia and NZ agreed to participate in the survey. *Net Benefits Index* scores for the 19 facilities that participated suggest a level of rational choice in decision-making although it is clear this is only a partial explanation. The mean score is negative for non-adopters and positive for adopters. However, nearly half of adopting respondents attribute greater weight to the costs of AWS than benefits and 25 per cent of non-adopting respondents attribute greater weight to benefits.

[37] In reviewing results of the survey in both this chapter and later chapters where the survey is discussed, statements that a facility is adopting AWS is shorthand for the facility has said in response to the survey that it has been certified to the AWS Water Stewardship Standard or is considering becoming certified to the AWS Water Stewardship Standard. Not adopting or reference to a non-adopter means that the facility is not considering becoming certified to the AWS Water Stewardship Standard.

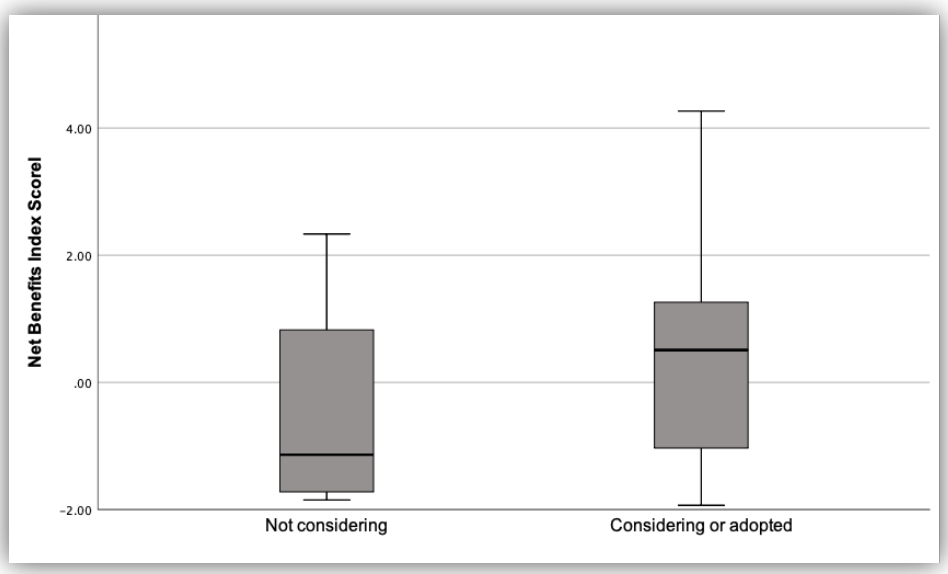


Figure 8: Net Benefit Index score for facilities considering and not considering adopting AWS in Australia and New Zealand

Breaking the *Net Benefits Index* into its four components (operating benefits, intangible benefits, infrastructure costs and compliance costs) provides more insight into what might influence decisions to adopt or not adopt. For example, adopting facilities value intangible benefits slightly more highly than non-adopters. Non-adopters see operational benefits as more important and they are also more concerned about the investment required for their facility to meet the requirements of the AWS Standard and the cost of compliance. Concern about investment costs is the area where there is the greatest difference between adopters and non-adopters.

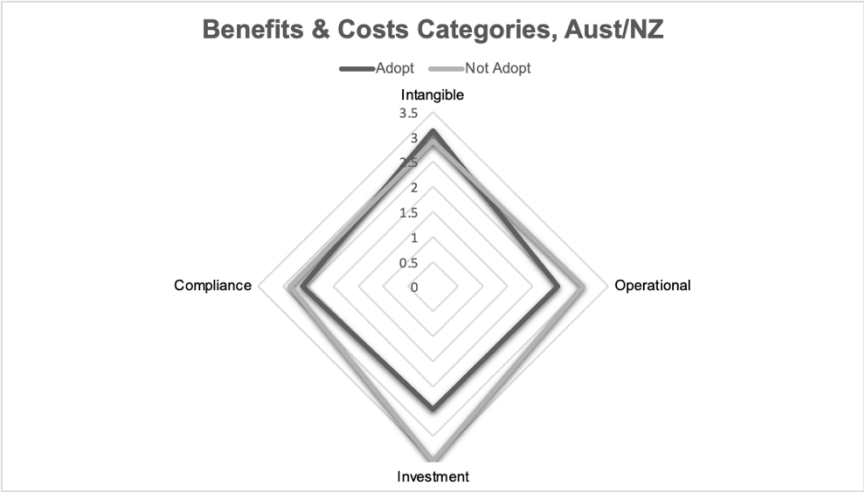


Figure 9: Comparison of adopters and non-adopters on four elements of Net Benefits Index: intangible benefits, operational benefits, investment costs and compliance costs.

In summary, adopters are interested in gaining intangible benefits but concerned about compliance costs associated with AWS (audit costs, etc.) while non-adopters are concerned about investment costs, such as upgrading infrastructure, and would want to see clear operational benefits as a

result of such an investment. This could be expressed as non-adopters have a greater focus on transaction costs whereas adopters have a greater focus on intangible benefits.

6.6.2 Other choice considerations

Having established that rational choice does not provide a complete explanation of decisions to adopt or not adopt AWS, the following section will explore the space between rational choice and what actually happened (Ostrom, 1998). It will explore both factors internal to the organisation and its *life's space* or the environment in which decisions are made (Simon, 1955, 1956).

Facility water culture

Organisational culture is a pervasive influence on decision-making; *the way we do things around here* (Trevelyan, 1999). It is a dynamic process of accumulated shared learning that becomes a "pattern or system of beliefs, values and behavioural norms that can come to be taken for granted as basic assumptions" (Schein, 2017, p. 6). These assumptions orient the choices of an organisation (Gagliardi, 1986). The investigation was interested in the responsibility a facility accepts for water and catchment health. Facilities were asked to rate the relative importance of different actors for water and catchment health by allocating 10 points between different groups of actors (government, business, agriculture, households, NGOs). For example, if one group received six points, that would leave only four to be allocated between the remaining actors.

Results show adopters and non-adopters see the importance of different actors to water and catchment health differently, with non-adopters attributing a stronger influence to government than adopters. This difference is more pronounced when an outlier adopter (who attributed all responsibility to government) is removed. Adopters attributed more influence to non-government-organisations (NGOs) than non-adopters. This may suggest that adopters saw a greater role for civil society or simply that they were concerned about their reputation being vulnerable to NGO criticism of water performance. This would be consistent with the observation that adopters see greater intangible benefits from participation in water stewardship.

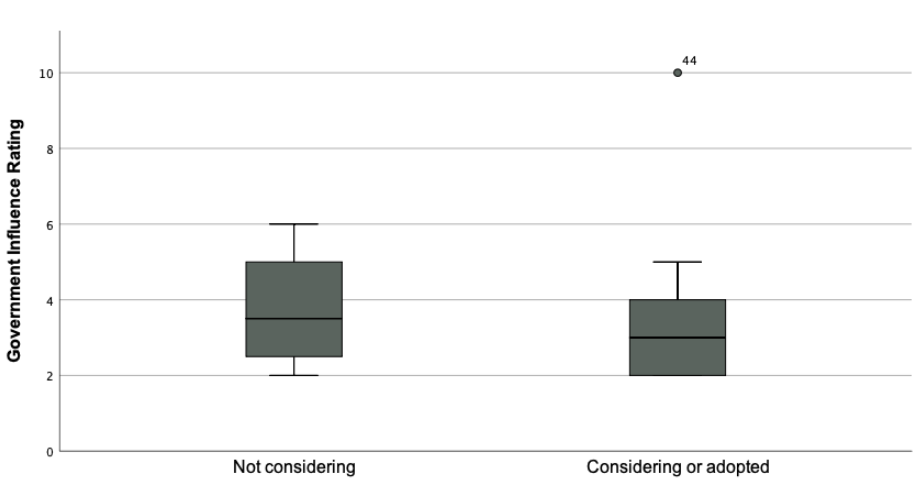


Figure 10: Rating of government influence on water and catchment health by adopters and non-adopters in Australia and New Zealand.

There are differences between adopters and non-adopters in the perception of responsibility for water and catchment health with adopters seeing responsibility more broadly dispersed.

Performance and achievability

The literature review indicated that the gap between current performance of a site and that required to comply with AWS may be a factor in determining whether a facility adopts or does not adopt. It suggests that the very best facilities and the laggards may be less likely to adopt whereas those at a mid to upper level of performance are more likely to adopt. In the Figure 12 below, performance is assessed based on responses to questions about current practice at each facility. The questions were framed to align with major requirements of the AWS Standard. An index score of 100 means the facility had adopted all the major requirements of the AWS Standard and zero means the facility has not adopted any of those requirements. Responses were consistent with the literature in so far as the median compliance for adopters is more than 70 per cent and the median for non-adopters less than 50 per cent of the performance required to comply with the AWS standard. All adopters achieved more than 50 per cent and all non-adopters less than 50 per cent.

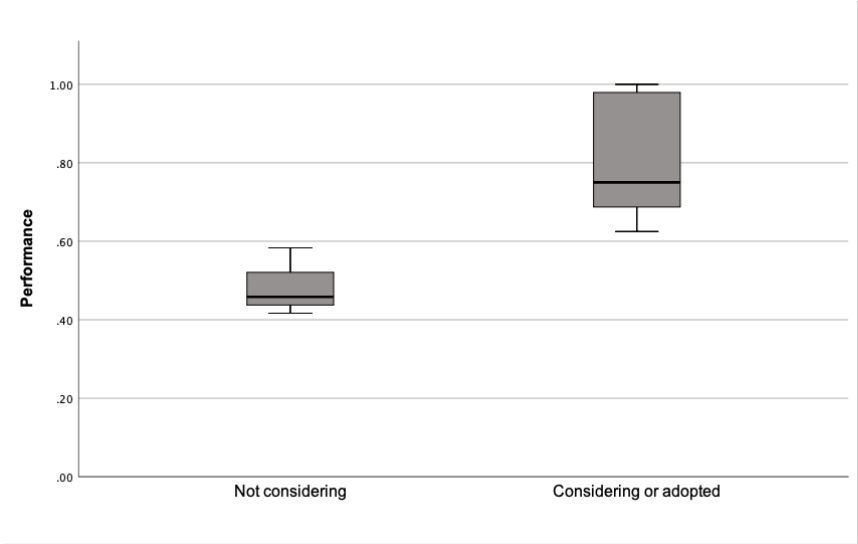


Figure 11: Gap between current performance and performance required for compliance with AWS measured by the current performance index for Australia and New Zealand.

These results support the view from the literature that the level of current performance may be an indicator of likelihood to adopt or not adopt.

Facility risk

The way in which risk influences decision-making is complex. Risk is a subjective concept influenced by heuristics and there is not necessarily an objective measure for risk awareness (Bohm & Tanner, 2019). Water literature points to three dimensions of water risk: (1) physical threats to operations (for example, scarcity); (2) threats of regulatory action (for example, fines, new laws), and; (3) threats to an organisation's reputation from how water is managed. To understand how risk may influence facility decisions, the investigation considers four perspectives: (1) independent observations of risk; (2) facility views on water challenges; (3) facility risk analysis and water plans, and; (4) actions taken to address water risks.

Independently observed risk

To consider observed risk, the investigation needs to consider that facilities included are in different sectors and locations; agriculture in South Australia, Victoria and New Zealand, industry in Melbourne, Brisbane, Auckland and New South Wales.

Figure 13 shows the World Resources Institute (WRI) country risk analysis for Australia (separated by state) and New Zealand (WRI, 2019). Victoria has high baseline water stress, South Australia and New South Wales are medium, while Queensland has low baseline water stress. A state is considered to have high baseline water stress when, on average, more than 40 per cent of available supply is withdrawn every year. WRI argues such a gap between supply and demand

leaves states vulnerable to fluctuations like drought or increased withdrawals, making them more vulnerable to “Day Zeros” and other crises” (Hofste, Reig, & Schleifer, 2019). The high-risk rating for Victoria applies particularly to agricultural use, while NSW agricultural water use is approaching high. New Zealand on the other hand, has very low baseline water risk for both agriculture and industrial water use.

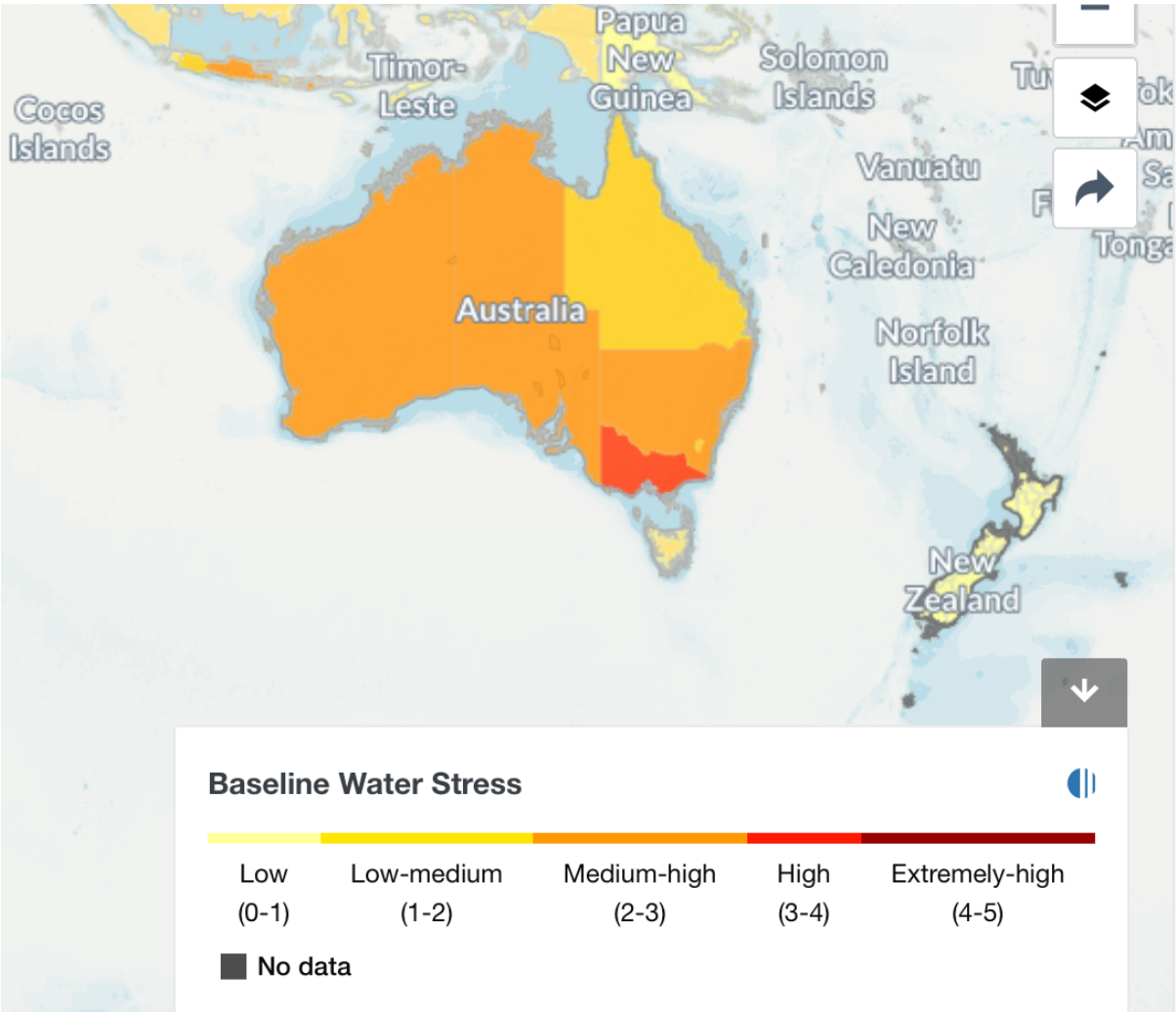


Figure 12: World Resources Institute Aqueduct Country Rankings (Source:WRI)

The WWF Water Risk Filter provides additional insight across physical, regulatory and reputational water risk. In Table 2 below, risk assessments for China and the United States have been included for additional perspective. A score of 4 or above is classified as high to very high risk, 3 and above is some risk to high risk and above two is some risk. It shows that reputational risk in Australia is high while in New Zealand it is moderate or limited. Reputational risk is based on a combination of predictors (cultural and media coverage), and evidence of conflict (WWF, 2020). The high rating for Australia is related to conflict in the Murray-Darling and Great Barrier Reef in particular. Physical risk in Australia is limited and, in New Zealand very limited. However, it should be noted that this broad categorisation can be misleading in a country such as Australia where there is such variable rainfall. New Zealand has also experienced extreme drought, particularly on the North Island.

Reports suggest these conditions are to be expected worsen under climate change (AingeRoy, 2020).

Table 2: WWF Water Risk Filter rating by risk category for selected countries

	Australia	New Zealand	China	United States
Overall	2.53	1.93	2.84	2.68
Physical	2.43	1.95	2.67	2.42
Regulatory	1.27	1.59	2.19	2.33
Reputational	4.08	2.21	3.98	3.79

Australian participants face a mixed risk rating, with physical and reputational risks relatively high and having the potential to escalate under climate change. The New Zealand participants would face lower risk, although this is changing.

Facility-identified challenges

Adopters are more focused on cost and efficiency challenges while non-adopters are more conscious of scarcity and the attitudes of people to water. This suggests non-adopters may be more concerned about how others might impact their operation, whereas adopters are more likely to see a problem such as scarcity as part as something for which they need to manage by, for example, improving water efficiency. Interestingly, while non-adopters ranked water scarcity highly as a challenge (75 per cent), only 25 per cent saw this as something they needed to address.

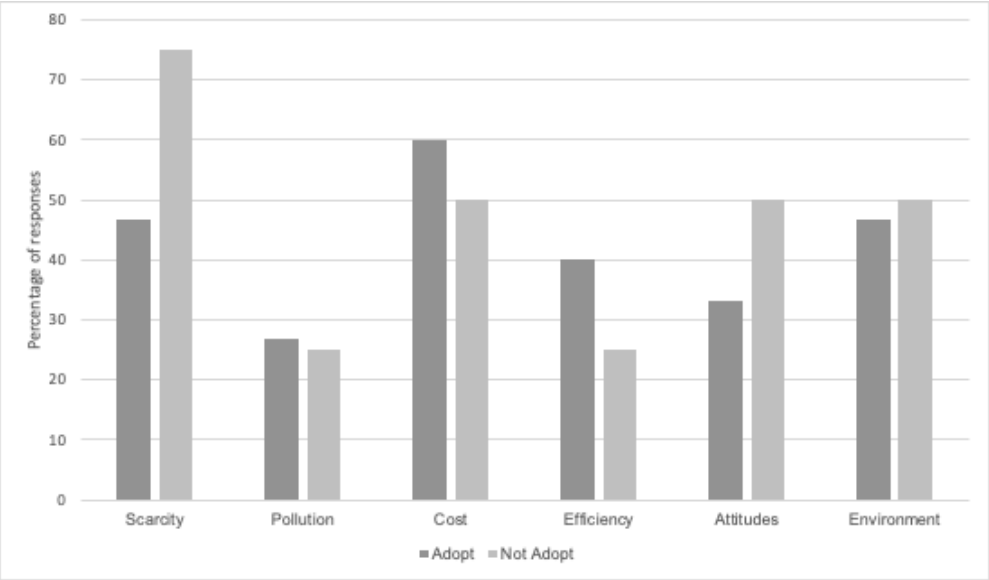


Figure 13: Facility water challenges (per cent) for adopters and non-adopters

The picture that emerges is that catchment risks are seen as external to the business by non-adopters and part of the business by adopters.

Water costs

Respondents were asked about water costs on the basis that, if price is a proxy for risk, where water is critical to a facility, it may be more inclined to adopt AWS as the price of water rises. The result of this question did not reflect this theory as most adopters said they could withstand a 200 per cent increase in the price of water because any increase would affect their competitors equally and simply force an increase in price to their customers (particularly for agricultural commodities). For others, the cost of water was a relatively small component in their input costs.

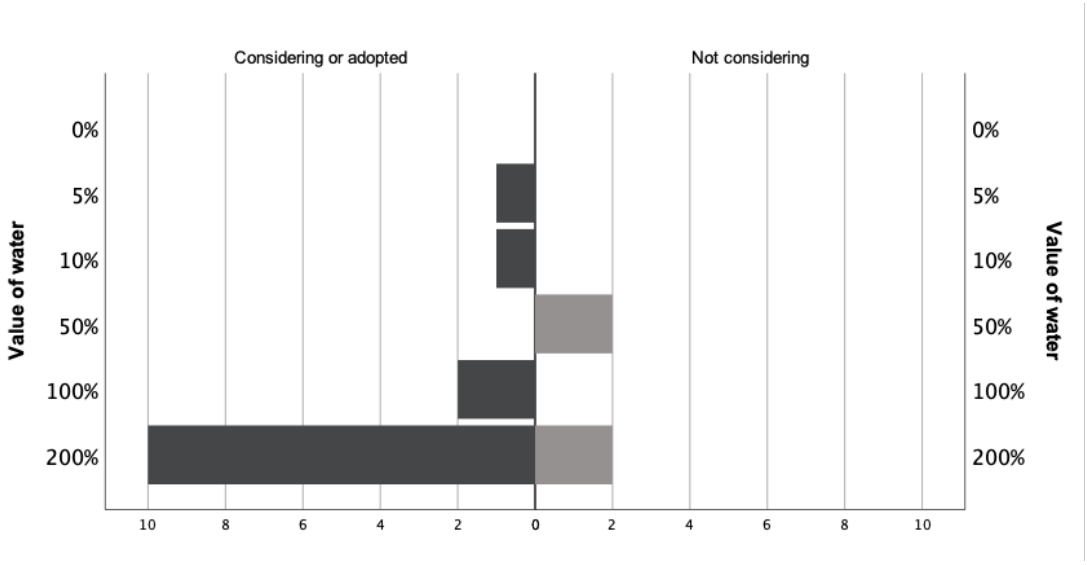


Figure 14: Cost of water; price increase at which a facility would need to relocate or close.

There is no evidence of water cost being a driver for adoption.

Risk assessments and water plans

Most facilities reported having a risk assessment and a water plan that, at a minimum, considered operational issues. What distinguished adopters from non-adopters was the breadth of these assessments and plans. For example, half of the adopters considered supply chain or stakeholder risks (in line with the requirements of AWS), whereas non-adopters did not consider these risks. Furthermore, adopters were distinguished from non-adopters because their plans considered issues such as off-site water impacts, climate change, regional catchment issues and best practices, whereas none or very few non-adopters considered these issues.

Facility water initiatives

Adopters are distinguished from non-adopters by the breadth of water initiatives they have implemented or plan to implement at their facility. For example, adopters had implemented measurement and monitoring improvements whereas non-adopters had not. Adopters paid attention to waterway protection and enhancement whereas non-adopters did not. Non-adopters were more focused on efficiency improvements than adopters and were investing more in wastewater treatment than adopters. These results are consistent with earlier finding that non-adopters are more focused on projects offering tangible returns whereas adopters are also interested in intangible or reputational benefits. Figure 16 shows considerations included in facility water plans for adopters and non-adopters while Figures 17 and 18 illustrate past and planned future investment in water improvements.

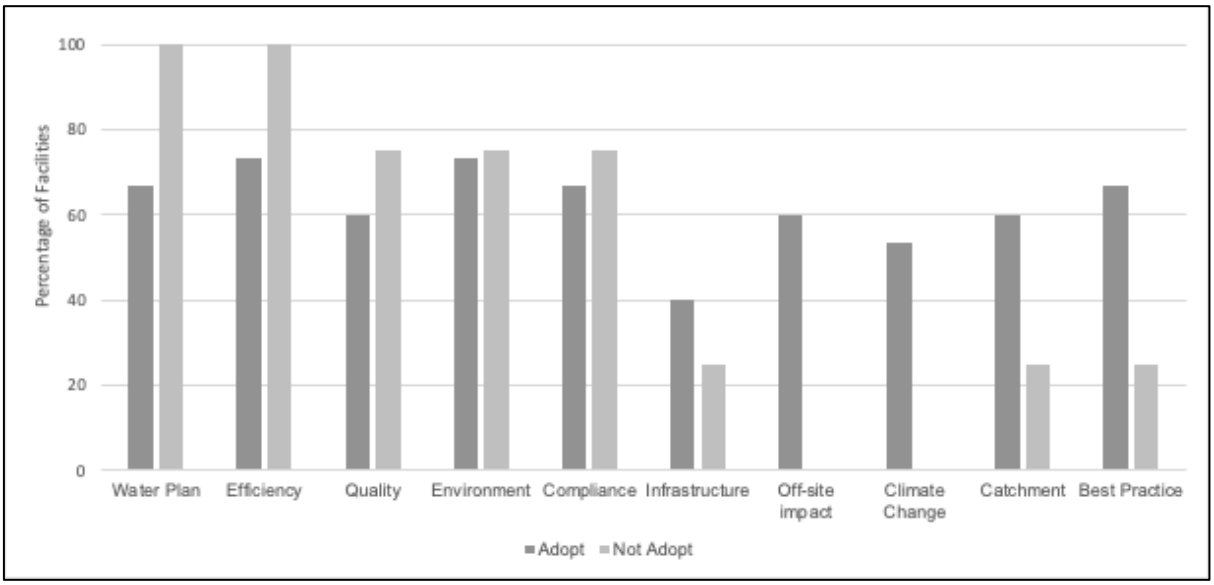


Figure 15: Facility water plans; areas considered and included (percentage of respondents)

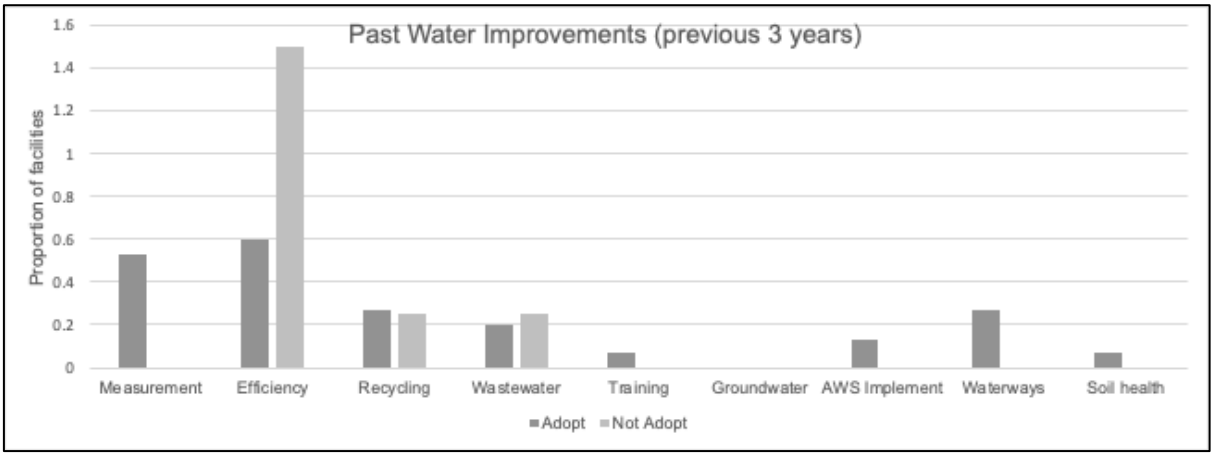


Figure 16: Water improvement projects undertaken (past three years) by adopters and non-adopters (proportion of respondents by category of improvement).

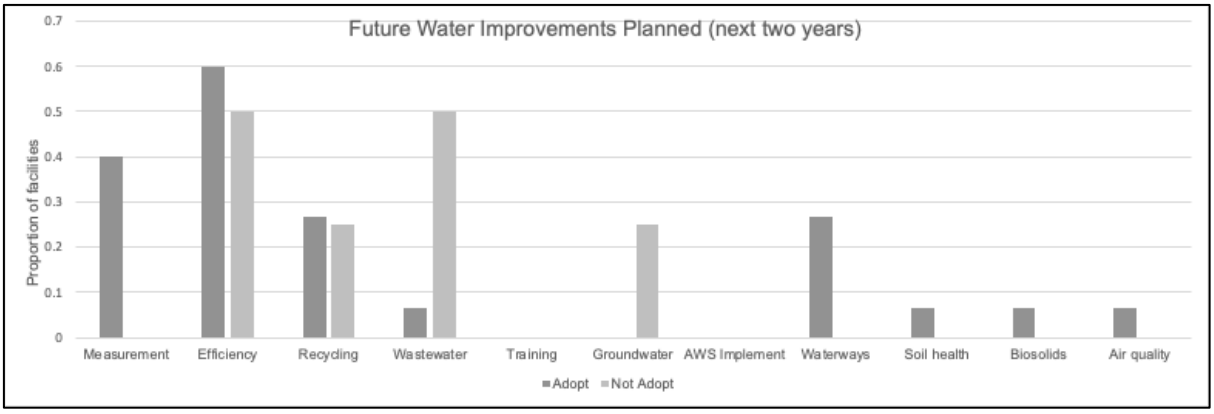


Figure 17: Water improvement project planned (next two years) by adopters and non-adopters. (proportion of respondents by category of improvement).

Influence of risk

These results need to be treated cautiously given: (a) the small sample size particularly for non-adopters, and; (b) the variety of regions from which the sample is drawn. However, in general adopters view risk more broadly than non-adopters, they plan for a broader range of water challenges and invest in a broader range of water management improvements. Non-adopters show a strong focus on business challenges (and risks) and the evidence suggests they are less likely to consider and engage in water management improvement outside their site fence line. In general, these results suggest adopters see risk more broadly than non-adopters and are prepared to invest in a broader range of mitigation measures, including measures that achieve less tangible benefits.

Reputation

The literature highlights enhanced reputation as an important benefit from adopting a program such as AWS. This has already been reflected in differences between adopters and non-adopters in relation to costs and benefits, culture and risk. Here the investigation considers the importance of reputation to adopters by examining: (1) pre-AWS drivers for water improvements; (2) motivation for participation in water stewardship briefings and training; (3) reasons for adopting or not adopting water stewardship, and; (4) intangible benefits adopters expect from water stewardship.

Water improvement drivers

Adopters are almost three times more likely to cite protecting the environment and being a responsible business as reasons for investing in water improvements. Those adopting are also more likely to cite customers (either pressure or opportunity) and reputation as drivers for site water improvements. Facilities not adopting generally list tangible business drivers for their facility water management improvements; efficiency, business sustainability, productivity and business

expansion are the most frequently citied reasons. They are more inclined to cite legal compliance as a driver than adopters. Non-adopters do not cite customers and reputation as drivers.

Reasons for participating in AWS training session

All participants in the survey had had some contact with AWS, generally, through a training or information session. The survey asked what had motivated them to attend. Most adopters were looking for ideas to improve their management of water (54 per cent); the next largest group were interested in business improvement or wanted to find out more about the program. Only adopters cited reputation (either with government or customers) as a reason for attending. Non-adopters attended hoping to find business opportunities (50 per cent); some were curious to find out what it was all about, others were interested in improvement ideas or were responding to an invitation.

Reason for adopting or not adopting AWS water stewardship

The most popular reason for adopting AWS was to enhance reputation (80 per cent) followed by improve water performance (73 per cent). Lesser reasons (25 – 33 per cent of adopters) were to exceed regulatory requirements, verify performance, benchmark performance and meet customer expectations (20 per cent). Non-adopters gave reasons for not adopting as the costs of complying or achieving AWS certification (either time or money). One non-adopter felt they did not know enough about AWS while another did not want outsiders (auditors) looking at their operation.

Water stewardship intangible benefits

As noted earlier, benefits valued most highly by adopters are intangible benefits. Table 3 breaks this category down to show: the different options provided for intangible benefits; the average score (out of 5) given to each benefit; the standard deviation on this score; the split between adopters and non-adopters, and; the difference between adopters and non-adopters. The data reveals there are points of difference and points of similarity between adopters and non-adopters.

Points of difference are: (1) Improved community relations showed the greatest difference in importance between adopters and non-adopters with adopters valuing this more highly although, for the small group of non-adopters, the standard deviation was high indicating weak consensus; (2) avoiding tougher regulation by government was valued more highly by non-adopters and more than they value improved community relations; (3) the environment, interpreted broadly as both managing natural capital and implementing CSR strategies (recognising CSR would include social programs), was a major point of difference with adopters valuing this benefit more than non-adopters. If managing natural capital is looked at on its own, the difference between adopters and non-adopters is greater; (4) improved customer relations and potential new markets had low

consensus. Non-adopters saw this as a potential benefit from AWS certification and adopters less so. This result needs to be treated with caution given the different industries included (agriculture and industrial) and whether products are sold into commodity markets (such as wine grapes).

Points of similarity are: (1) Reputation showed the least difference in importance between adopters and non-adopters. They both valued it highly affirming that it is an important consideration for all participants. The standard deviation is relatively modest suggesting greater agreement on this benefit that any other. Reputation is the benefit to which facilities attached the greatest importance[38]. (2) Business sustainability is valued most highly by both adopters and non-adopters with a relatively low standard deviation suggesting less divergence among respondents although adopters value this benefit more highly than non-adopters.

Table 3: Preference for different types of intangible benefit from AWS for adopters and non-adopters.

	Mean and SD of Importance for Facilities (0-5 rating)						
	Total	SD	Adopt	SD	Not Adopt	SD	Diff
Sustainability	4.32	0.82	4.47	0.74	3.75	0.96	0.72
Reputation	3.92	0.75	4.00	0.73	3.63	0.85	0.38
Community	3.61	1.21	3.90	0.89	2.50	1.73	1.40
Environment	2.97	1.35	3.23	1.27	2.00	1.35	1.23
Government	2.45	1.74	2.30	1.67	3.00	2.16	-0.70
Employees	2.29	1.45	2.23	1.43	2.50	1.73	-0.27
Customers	2.17	1.84	1.87	1.80	3.06	1.88	-1.20

Diff. represents the average score of adopters minus the average score of non-adopters. SD = Standard Deviation. Rating is based on 0-5 scale where 0 means the attribute is not a consideration for the facility and 5 means it is a key benefit for the facility in considering AWS water stewardship.

The role of reputation in considering water stewardship

Adopters and non-adopters can be differentiated by the importance they attach to reputation. Adopters are conscious of reputation before they engage with AWS, as evidenced by the reasons cited for investment in water improvement. Adopters invest in water improvement for reasons including reputation, protection of the environment and customer expectations, whereas non-adopters are motivated by issues such as business efficiency and productivity. This is also reflected in reasons for participating in AWS training where adopters were interested in learning about business improvement whereas non-adopters attended in search of business opportunities. While both adopters and non-adopters can see reputation as a benefit from participating, it is more important for adopters to seek reputational benefits than for non-adopters. So, while non-adopters see reputation as an important benefit, it is not sufficient for them to adopt AWS.

[38] For this analysis, reputation, brand and social license have been aggregated as they relate to a similar concept.

6.6.3 Summary of survey findings

The survey has helped to understand decisions about participation in AWS. While there was a strong element of *rational choice* (benefits exceeding costs) other factors, both internal and external to the organisation, were relevant. In general, adopters are more likely to be facilities with a culture of thinking broadly about their role in society and their reputation. They see responsibility for water and catchment health as spread between more stakeholders with less emphasis on government; they are more advanced in terms of current water performance, see risk more broadly and plan for a wider range of water challenges. Adopters see reputation as important to their business and are prepared to invest in a broader range of measures, inside and outside their fence line, to manage risk and enhance reputation.

Non-adopters are more transactional, less likely to undertake activities for which there is not a clear financial business case and place a greater emphasis on government being responsible for water and catchment health. They understand reputation but it is not sufficient for them to invest in AWS certification given their concerns about compliance costs.

6.7 Case study summary

Evolution of water governance following the British invasion saw institutions of command-and-control settle in the late 19th and early 20th century to support national development through expansion of irrigation communities (*yeoman farmers*). Both urban and rural water institutions were products of the post-enlightenment industrialisation with a focus on technical competence, engineering precision and professional leadership. At the end of the 20th century, this stability was disrupted as overallocation from the Murray-Darling Basin resulted in scarcity (accentuated by drought) and ecological damage. This coincided with opening Australian capital markets, adoption of NPM and market-based solutions by Australian governments. Market-based governance was introduced to deal with scarcity and improve allocative efficiency of water while opening the sector for private investment. It has so far founded as a result of political power exercised by irrigation communities and resistance from the institutions locked-in to old practices. Lock-in was fostered by the priority attached to economic over environmental values and ambivalence of political leaders.

Collaborative governance emerged as an alternative to both market-based and regulatory governance however, the expert-driven, technocratic nature of existing institutions left it little scope for it to grow and develop. While government officials were happy to encourage industry to self-fund collaborative governance and receive benefit from industry addressing water externalities, it was not prepared to invest in the resources required for it to fully develop. For industry, with some

exceptions, the benefits of participation were not sufficient to off-set the costs of compliance or additional investment. Water lacked the supply chain pressure of forests that could reward those who adopted AWS. Analysis of those that did participate, suggests they were enterprises with a broader view of their social responsibility and risks. They paid attention to intangibles such as reputation and had a track record of investing in water improvements both inside and, importantly, outside their fence line. They had broader, longer-term perspective that allowed them to invest beyond projects justified with a short-term business case.

Where implemented, AWS showed it was able to deliver a range of outcomes not achieved by regulatory or market-based governance. Adopting facilities saw an opportunity for collaborative programs such as AWS if this was in combination with philanthropists or agency leaders willing to *think outside the box* to support the program. Supportive agency leaders are likely to be from outside the water professional cohort or feel less constrained by professional norms in terms of the solutions they are willing to consider. Effort will be required to grow the number of officials in that category through broadening the perspectives of engineers and water officials particularly in their early career education and professional development. To ensure collaborative governance is seen as an option, it needs to be recognised as part of the toolbox of solutions. This will require overcoming fears of dealing with an unpredictable public and being prepared to work toward solutions that may be less precise, less certain, more time-consuming and messier in order to arrive at robust collaborative solutions.

The next chapter will test the same ideas and concepts in a different jurisdiction, with different institutions and approaches to the exercise of political power – China.

7 Water management in China (Case study 3)

In this case study the investigation alters parameters of the external environment (Simon, 1956) or structural variables (Ostrom, 2010), by examining water governance in China; a country with a different culture, history, political and judicial system to Australia. It will explore the evolution and success of water governance, institutional constraints and, opportunities for collaborative governance. It will explore what is similar to Australia and what is different with a view to understanding how structural variables may influence water governance. Two regions of China are the focus for this case study; the Lower Yangtze region near the cities of Shanghai and Nanjing and the industrial region of Tianjin near Beijing. The case study will employ the empirical tool utilised in the previous case study to understand decisions by firms to participate or not participate in AWS water stewardship. The investigator received assistance with the China surveys from AWS Asia Pacific and TEDA EcoCentre in Tianjin.

The case study use the same structure as the Australian case studies beginning with a short description of the water challenges facing China.

7.1 Water in China

Post-1949 industrialisation changed China's relationship with water profoundly. In Hsiao Tung Fei's celebrated account of peasant life in China in the mid-1930s he speculates the Tai Lake (*Taihu*) region of the Lower Yangtze had become the centre of silk production because; "according to the local people, […] the good quality of the water" (Fei, 1939, p. 16). By 2007, with 30 million people dependent on water from the lake, the National Government declared the lake a natural disaster. Algal blooms and bacteria pollution left more than a million people in Wuxi City short of drinking water. The price of bottled water soared and the government froze new developments. Tai Lake, China's third largest freshwater reservoir and its most heavily polluted, became a symbol for the water challenges facing China (Duan et al., 2009).

Jiang (2018) argues post-revolutionary development had seriously over-stretched China's natural resources and the country was facing one of the world's most severe water crisis. China's renewable freshwater resources per capita is less than a third of the global average and only about one eighth of North American availability (The World Bank, 2019). Geographic distribution of water between regions, urbanisation, the impact of climate change on retreating glaciers as well as putrefaction and eutrophication[39] of rivers and lakes compound China's water problems. In 2011,

[39] Eutrophication is characterised by excessive plant or algal growth due to increased availability of sunlight, carbon dioxide and nutrients. Human activity accelerates eutrophication through both point-source and non-point discharge

two thirds of cities suffered water shortages, more than 40 per cent of rivers were severely polluted, 80 per cent of lakes suffered eutrophication and about 300 million rural residents lacked access to safe drinking water (J. Liu & Yang, 2012).

Water challenges facing the country were evident from the late 1990s when Water Minister Wang anticipated that water stress would constrain China's long-term development. After a decade of the new century, Prime Minister Wen Jiabao said water shortages threaten "the very survival of the Chinese nation" (*The Economist*, 2013). Local water challenges are compounded by global challenges. Hu and Tan (2018) point to the impact of climate change on the glaciers of the Hindu Kush Plateau, also referred to as the third Pole because of the volume of water stored as snow and ice. This water is vital to regional economies and people. They argue that the loss of these glaciers means that China will not have sufficient water to maintain its current economic growth model and ensure food and energy security.

7.2 Evolution of water governance

Water governance in China has followed a different path to that of Australia from its beginning, when agricultural communities began to form in the river basins of ancient China. Drought and flood have always been major challenges and ancient China valued engineering mastery over water. The revolution in 1949, and perhaps more importantly the industrialisation of China in the second half of the 20th century, saw the evolution of *modern* technocratic command-and-control water governance. While China has been interested in alternative governance possibilities such as market-based governance and collaborative governance over the past decade, regulation remains the dominant approach to water governance.

7.2.1 Feudal water governance

Water is ingrained in Chinese culture, its economic prosperity, its statecraft and, indeed, its very existence. It is said that the founding father of China's Yellow River civilization, Yu the Great, was a water engineer who mastered the waters of the Yellow River Basin and made them habitable for human society (Solomon, 2010). The Ch'in dynasty, from 221 BC, said to have given China its name, was brutal but left behind a legacy of sophisticated irrigation and transport waterworks that linked the Yellow River and the rice-growing areas of the Yangtze basin. Solomon (2010) argues the transformational event that catapulted Chinese civilisation above all its contemporaries was the

---

of products such as fertilisers (nitrogen and phosphorus) with consequences for drinking water, fisheries and recreation. During the 1960s and 1970s, scientists linked algal blooms to nutrient enrichment as a result of agriculture, industry and sewage disposal (Chislock, Doster, Zitomer, & Wilson, 2013). Putrefaction is the decomposition and decay of the organic matter.

completion of the Grand Canal in the seventh century AD: “By bridging China’s north-south hydrological fault line, it synergised the natural and human resources of the two diverse geographical zones to help launch China’s brilliant, medieval golden age” (p. 111). Water governance focused on control of nature and rested on the power and authority of the emperor.

The mandate of Chinese rulers over millennia, *heaven’s mandate*, depended on controlling the waters from droughts and flood; it shaped the political organisation of the state (Ball, 2017, p. 100). Water management defined the ebbs and flows of China’s progress as a nation with icons such as the Grand Canal falling into disrepair during periods of external domination and being restored and improved when China was in command of its own destiny. Leadership on massive hydrological works rested with the emperor who was responsible for managing floods and drought as well as creating transport and irrigation infrastructure. However, not all power was exercised centrally.

Traditional governance in China was decentralised and hierarchical. Plurality of governance is expressed as *shang you zhengce, xia you duice* or *there are policies above, counter measures below*[40]. The emperor would use central authority to implement major engineering schemes by forcibly mobilising masses of peasants for public projects. Ball (2017) argues this form of servitude was exercised with total disregard for personal rights and human life itself. However, both Ball (2017) and Jing (2015) note that China was too large and complex to manage centrally and further down the administrative hierarchy there was greater scope for local and collective action to produce public goods. The second tier of water governance was practiced at a village level.

Agriculture was the most important village activity, engaging two thirds of households, who depended entirely on the produce of their farms. “Water is the most important thing in the farm,” one rice farmer in the Lower Yangtze remarked; too much and the rice dies, too little and the rice dies (Fei, 1939, p. 155). Village land was divided by streams, cultivated so as to improve access to water through irrigation and managed using dykes and pumps. Operating this system required collaboration with each household contributing to teams that worked pumps to regulate the water. Each team took a turn to manage the group and these managers took turns to be the chief manager deciding when pumping should start and stop.

Local or village water governance had its own institutions and *rules of the game*, as well as consequences for not following the rules. For example, in the Tai Lake village studied by Fei (1939), if a team member did not respond to the call to start pumping, the team would stop work, feast on fruit, cake and wine and charge the cost to the absent member. Collective responsibility worked for managing the system however, Fei, who was critical of China’s slow development,

[40] There are variations of this translation in the literature.

argues it slowed change and improvement because investment in new capital equipment required the unanimous consent of all teams.

Rules of the game for village collaboration were established through local practices based on experience, a form of science and, where these failed, superstition and magic. Water was common property (*commons*) including all the natural products of water (fish, shrimps and weeds used as fertiliser). Rules restricted access to the village water for outsiders and determined how water was shared (equal access and equal contribution). This combination of legal and customary rights depended on collaboration and hierarchical authority. A local magistrate had oversight where systems failed including, as Fei recounts, to "act as the district magician" during times of drought (Fei, 1939, p. 167).

By the time Fei's account of peasant life in China was printed in 1939, the village on which he based his observations had been destroyed by Japanese invaders. After 10 years of war, the Chinese Communist Party (CCP) ruled China and, 40 years later, the country embarked on a period of intense industrialisation. Through all this, water remained central to Chinese culture. Mao Zedong used mastery of water, for example swimming the Yangtze, as a symbol for the strength of his leadership and used water metaphors to illustrate the direction of the nation (Ball, 2017).

7.2.2 Industrialisation and technocratic command and control

China joined the rest of the world in developing new institutions for environmental governance in the 1970s. Pollution controls were introduced following the United Nations Conference on the Human Environment in Stockholm in 1972. In 1974, a National Environmental Protection Office (NEPO) was established and in 1979 the *Environmental Protection Law* was promulgated. In 1984, environmental protection was defined as a national policy, with principles such as 'prevention is the main, then control', 'polluter is responsible for pollution control' and 'strengthening environmental management'. In 1988, NEPO became the National Environment Protection Bureau and received ministerial status as the State Environment Protection Agency (Mol & Carter, 2007).

Ho (2006) argues, it was not for a lack of institutions or regulations that rivers, soils and air were degraded; rather it was in the attitude of *pollute first, clean up later* that allowed regulations to be ignored or not enforced and offenders to be treated leniently. To illustrate, he quotes a local Communist Party committee official in one of China's poorest regions who argued in 1994 that environmental protection policies needed to be eased and emission permits needed to be issued more leniently or not issued at all. "Small-scale projects with few investments and under-developed environmental technology should be developed first and controlled later (*xian fazhan*

hou zhili)." Ho positions this, variously, as a clash between central and local, environmental and economic interests or between China's First and Third World. (Ho, 2006, pp. 13-14).

China's industrial revolution accelerated from the mid-1990s as private ownership and capital formation grew. China recognised the efficiency of markets but did not want to lose state control, particularly of key sectors. Elements of NPM emerged in reforms of government administration; bureaucracy was slimmed, administration decentralised, and non-core business separated from government (D. L. Yang, 2004). Environmental governance followed this path (Mol & Carter, 2007) with greater responsibility moved to the provincial and municipal level. Over time, a form of civil society emerged with environmental non-government organisations (ENGOs) playing a role in engaging citizens (J. Y. Zhang & Barr, 2013). However, from the turn of the century it was apparent China's regulatory governance was not able to balance growth and ecology.

Promoting balanced growth

Recognition that water governance was not working emerged in the 1990s. Water Minister Wang Shucheng argued in the late 1990s China needed to move on from a philosophy that man can conquer nature, with its fixation on engineering projects, to seek harmonious coexistence between people and nature. He advocated a stronger emphasis on how water is allocated, conserved and protected (S. Wang, 2006). Conflict between economy and ecology was of growing interest. The Minister of Environmental Protection lamented ecological decay and the obstacle it would pose to future economic and social development: "If your homeland is destroyed and we lose our health, then what good does development do?" (J. Y. Zhang & Barr, 2013, p. 116). A move to shift in the balance between development and ecology was emerging.

The growing sense of crisis surrounding water and air pollution in China saw moves for institutional change. The regulatory system in the first decade of the 21st century, was seen as having reasonable laws that were poorly enforced, and with inadequate consequences when they were enforced[41]. The need to change the balance was captured in the concept of *ecological civilization* articulated by President Hu Jintao at the 17th Party Congress in 2007. Hu coined the term to reflect change in the Party's understanding of development. "Rather than emphasising economic construction as the core of development as it did in the past, the Party authorities have come to realise that development, if sustainable, must entail a list of elements including the right relationship between man and nature" (China Daily in J. Y. Zhang & Barr, 2013, p. 121). The Prime Minister declared war on pollution and the national government stepped up the pace of change.

[41] Personal conversation with Ma Jun, Founder, Institute of Public and Environmental Affairs, Beijing

By the 18th Congress in 2012, *ecological civilisation* had become a national strategy that warranted an entire section of Hu's speech: "China has resolved to abandon the same old path [as Western countries] that goes from environmental deterioration to rehabilitation, and it now advocates ecological progress to save energy, protect the environment and develop its economy at the same time." China was abandoning the "outdated view … that man can conquer nature" and adopting a new approach "characterised by coexistence with nature". (G. Zhu, 2016). A remarkable shift was emerging within the two pillars of Chinese philosophy, from the Confucian view of nature being at the command of humans to the Taoist view of humans living in harmony with nature. The challenge would be to bring about change within existing institutional structures.

7.2.3 Changing priorities through regulatory governance

Unlike Australia where the change of policy priorities at the turn of the century was to be brought about through new market-based governance systems, in China change was to be implemented through strengthening command-and-control. From 2012 the national government approved more than 40 national environmental laws and regulations. The Water Ten plan was released in 2015[42] followed by the *Water Pollution Prevention Law* (Water Ten law) in 2017[43]. China's *Environmental Protection Law* was updated for the first time in two decades in 2015 and provided for public interest litigation by NGOs to protect the environment (Pang, 2020). The following year a new environmental tax was introduced. The Water Ten plan included action to clean-up water quality, reduce the proportion of severely polluted water bodies and improve drinking water quality. (State Council, 2015). The Water Ten law provided for the suspension of new projects in regions that failed to achieve the pollution discharge quota or water quality improvement targets. Penalties were increased ten-fold to one million RMB. The new tax law allowed provincial governments to impose water taxes based on local environmental conditions (Xu, 2018) – a form of polluter pay.

While these regulatory changes were important, it was the stepping up of enforcement from 2016 that cut through cosy relationships between industry and provincial as well as municipal government. A research institute, peripheral to the existing institutional structures, was charged with organising national environmental inspection groups, supported by armed law enforcement officers, to undertake rolling two-year enforcement inspections in provinces with pollution issues. These resulted in factory closures, suspensions, charges, arrests and hundreds of imprisonments (including party officials). The crackdown left few in China, or in the global supply chains that had

---

[42] The *Water Pollution Control Action Plan* (2015). See: http://www.mee.gov.cn/zcwj/gwywj/201811/t20181129_676575.shtml

[43] The *Water Pollution Prevention Law* was approved by the Standing Committee of the National People's Congress on the 27th of June 2017 to become operational from the 1st of January 2018. See: .http://www.mee.gov.cn/ywdt/hjywnews/201706/t20170628_416809.shtm

come to rely on China, in doubt that the government was serious about change. It was reinforced when national inspection groups revisited the provinces in 2018; 1494 people were held accountable in Yunnan; 162 people were detained in Guangdong, and; fines totalling 240 million yuan were issued in Jiangsu (M. Spencer & Ge, 2019). Provincial institutions, and those who populated them, were forced to align with the national policy direction or risk imprisonment.

New institutions were developed to place further pressure on provincial and municipal government, as well as party officials. The River Chiefs program had evolved out of the Tai Lake disaster when Wuxi appointed officials at various levels of government as River Chiefs to take responsibility for a certain stretch of river or lake. It was adopted by the national government in 2016 who made provincial, urban, county and township-level officials accountable for water health in their specified water area. A disclosure platform provided public supervision of the program and officials had lifetime accountability for environmental performance of their jurisdiction (Xu, 2017a). By 2018, as some provinces extended the system to village level, the number of River Chiefs was approaching one million (Huang & Xu, 2019). River Chiefs spread responsibility and accountability for water management and engaged people outside of water institutions in water health.

Institutional change

The River Chiefs program was only one of a series of institutional changes. In 2018, machinery of government changes were announced to deal with fragmented water governance by creating two new super-ministries of natural resources and ecology and environment. New laws had given the Ministry of Water Resources and Ministry of Environmental Protection “more teeth” while the environmental tax law had engaged the Ministry of Finance and other departments in addressing water scarcity and pollution (Tan, 2018). The 2018 changes consolidated these dispersed initiatives and effected a major shake-up in the old institutional structure. This included the insertion of vertical power (*chui zhi quanli*) to assert direct national control over local Environment Protection Bureaus removing provincial government from environmental enforcement (Zhou, 2020). China’s State Council said the change recognised the need to overcome duplication and separate policy or management functions from regulatory functions (W. Yang, 2018). It created the possibility of holistic management of natural resources and stronger enforcement.

The new super Ministry of Ecology and Environment, which was responsible for enforcement, needed to exercise its new power wisely; the expectation of economic development did not disappear. The Ministry needed to bring industry along with the changes taking place. The Minister defended environmental inspections saying they were not contradictory to economic development even though there may be some impact on enterprises at a micro-scale. He said change needed to be handled sensitively and the Ministry was opposed to *one-size-fits-all* enforcement. Instead, he

argued, violators should be given time to improve so that only those with no value or hope of improvement should be shut down (Xu, 2017b). In 2020, with a trade war with the United States raging and the outbreak of COVID-19, China continued to evolve ecological civilisation by de-prioritising its GDP target in favour of stabilising employment and ensuring livelihoods. However, environmental conditions remained poor and pollution severe, The Minister announced further change to environmental governance based on accountability, awareness, monitoring, rewards, regulation and use of markets for environmental services (Xu, 2020).

7.2.4 Summary of governance evolution

Engineering solutions to major water challenges has been central to China's water governance from the dynastic period to the current one-party state with its powerful command-and-control governance. This has been hierarchical with major projects initiated and managed centrally and local management of issues such as village-level water management. Governance at a local level was more collaborative. Industrialisation saw the modernisation of institutions. As with other developing countries, economy was prioritised over nature in the process of modernisation with catastrophic results for the environment. Climate change has and will continue to influence water stress. From the 1990s, China's leaders began to realise this was unsustainable and incompatible with social stability. Altering direction and institutional change was a challenge particularly given the different priorities for central and provincial government – *China's First and Third world* (Ho, 2006). From the 2000s leaders attempted to reset China's narrative based on a new balance between economy and nature (*ecological civilisation*). Institutional change faced *lock-in* barriers and, particularly at the local level, institutions continued business as usual. In the mid-2010s, new laws, strong enforcement and punishment for environmental offences started to turn the situation. This was followed by a shake-up of national level institutions. However, the changing global situation (US trade war and COVID-19), appears to have slowed progress toward *ecological civilisation*. China's strong commitment to regulatory governance meant there was limited use made of market-based and collaborative governance although the Minister indicated China may seek to expand trials of alternative governance in the next five-year plan.

7.3 Collaborative water governance

Shifting priorities and approaches to environmental management coincided with the development of AWS and global recognition of the need for new approaches to water management and the engagement of industry. The 2030 Water Resources Group (2009) had argued the gap between water demand and supply in China "could not be filled at all using supply measures currently [available]" (p. 95). The private sector was "critical to the transformation of water use" (pp. 122-123). Reflecting on the increase in regulation and expansion of infrastructure discussed earlier,

researchers argued that, in addition to increasing coordination between multiple government agencies, China needed to urgently involve both corporate and “the grassroots level” to ensure sustainability of the country’s water resources. They argued collaboration between government, corporations and grassroots organisations would promote water resource sustainability more efficiently (H. Yang, Flower, & Thompson, 2013).

7.3.1 Collaborative traditions in China

China presents a contrasting case study with Australia on collaborative governance. Ball (2017) argues Chinese traditions promote a collaborative culture and identifies “deep-seated patterns of social cooperation and negotiation” in southern rice-growing culture (p. 106). Fei’s (1939) first-hand account of pre-revolutionary peasant life suggests it is not rice growing *per se* that encourages collaboration; rather the need for cooperation to operate pumps and irrigation infrastructure. However, others argue the system of imperial government provides little support for a pre-existing inclination toward collaborative governance (Jing, 2015).

Romantic notions of self-governing communes were associated with China after the communist revolution in 1949, when the new regime was seeking to replace rural landlords with collective ownership. However, as Oberschall (2018) notes, the struggle for survival faced by most peasant households encouraged rivalry as much as collaboration. He argues that while collectivisation achieved some high points, by the mid-1970s farming was based on households effectively being tenant farmers with the state as landlord. Households largely managed their own affairs based on achieving a contracted output in return for an allocated amount of land. Beyond the contracted output the farmers could sell surplus into the free market.

7.3.2 Collaborative governance in contemporary China

Experimentation with alternative governance appears to be constrained by a top-down hierarchical tradition and commitment to social stability; “there remains a deep-rooted and genuine fear that alternative means of governance, whether of water or society, will bring about social dissolution” (Ball, 2017, p. 104). However, Jing (2015) believes collaborative governance has a place in dealing with widening distribution of interests and powers and interaction between those interests. He points to a statement of the Central Committee of the CCP in 2013 referring to deliberative democracy six times in the context of discussion on political reform and welcoming greater power sharing. He highlights the role of collaborative governance in building public-private partnerships for improving government performance and public satisfaction with government. Guttman et al. (2018) highlight the increasing role of non-state actors in environmental governance although they see the role as different to Western nations. The authors discuss NGOs operating in the *shadow of*

the state. Jing sees the trend toward collaboration as emerging from the opening-up that started in 1978 and the accompanying political reforms in the 1980s. He argues “state-led collaborative governance” can maximise the complementary relationship between government and non-state actors (Jing, 2015, p. 3).

Certainly, attitudes within the Chinese government vary. Jing sees China’s problems as being insurmountable without collaboration between the state, private industry and non-state actors. Examples cited in Guttman et al. (2018) testify to a complementary role for non-state actors. However, these changes need to be seen as occurring at the margin of entrenched regulatoryl institutional structures. For example, at a workshop in Tianjin to introduce and discuss AWS, the very respectful but blunt assessment of a local Environment Protection Bureau official was that China was managed through top-down laws and regulations and she could not see a role for collaborative governance in this context. Nevertheless, as Jing (2015) points out, the political environment in China is not monolithic and is constantly evolving.

Diversity of perspectives within the apparently monolithic Chinese bureaucracy became apparent to the investigator in 2010 during a Sino-German workshop on corporate social responsibility. The topic was international voluntary standards. One group was adamant that any use of environmental standards in China would be restricted to Chinese standards. Another official, who had more exposure to international trade, felt that as China lost its low labour cost advantage it would need to compete in global markets on a wide range of matters including environmental performance. He saw it as important to understand how China could work with international standards to maintain and build its markets. Exactly where things stand in the wake of a trade war with the United States, rising global tensions and COVID-19 remains to be seen.

One high profile example of how new forms of collaboration are being adopted is outlined by Liu and Xu (2018) in a case study on forced evictions due to urban development. What the authors refer to as *violent demolition* arises where there is conflict between residents or farmers and land developers supported by local government. It can lead to violence, murder and property damage. In Caojiaxiang, local government was willing to share power and benefits with the public, respect rights and undertake the project in a transparent way to convince the public of its legitimacy. Local officials referred to this as the three 100 per cents; willingness, contracts and residents voluntarily vacating. They facilitated establishment of an *Autonomous Redevelopment Commission* (ARC) of elected residents to represent and work with residents and engage in the redevelopment process. In return, they compromised beyond national legal obligations. The ARC allowed residents to retain autonomy and helped to overcome the asymmetry in power. The authors observed that this collaboration turned a unilateral government policy goal into a collective goal; a win-win “instead of a zero sum game” (p. 34). The project received national attention.

7.3.3 AWS in China

Interest in AWS started in the Lower Yangtze in 2012, where engineers were continuing efforts to resolve Tai Lake pollution. Although nutrient levels had stabilised, the underlying drivers remained; land-use change, industrialisation, urbanisation, climate change, and agricultural run-off. Non-point-source pollution in particular was difficult to control using existing tools, leading one engineer to question whether engineering solutions alone could address the problem. He proposed a tri-partite governance arrangement involving government, the private sector and the general public that would adopt the tools of multi-stakeholder dialogue, consultation and collaboration. He argued the new phase of environmentalism in China, particularly the commitment to an *ecological civilisation*, created opportunities for water stewardship (D. Zhu, 2015). Importantly for AWS, the national drive to improve management of water and air stimulated an appetite for innovation.

At the time, chemical multinational, Ecolab, whose financial support contributed to the development of the AWS Standard, offered its new plant at Taicang, north of Shanghai on the Yangtze, as a pilot for testing the Standard, and this became the first site in the world to be AWS-certified in 2015. The project led by WWF in the United States (a partner of AWS international) generated interest from WWF China. WWF Lower Yangtze Project Manager, Dr Ahui Yang, pursued this interest during a visit to Australia, where he reviewed projects underway in the Murray-Darling Basin and the Mornington Peninsula. He discussed the potential for collaboration with AWS Asia Pacific[44] to support the introduction of water stewardship into the WWF Lower Yangtze program.

During a reciprocal visit, the investigator, then CEO of AWS Asia-Pacific and Chair of AWS International, discussed opportunities in China with WWF and stakeholders from industry, government and academia. Based on this interest and other opportunities, AWS Asia-Pacific secured funding from the Australian Department of Foreign Affairs and Trade (DFAT) for an Indo-Pacific Water Stewardship Program. Zhenzhen Xu was recruited from the International Finance Corporation as Regional Director based in Shanghai. The collaboration between WWF China's Lower Yangtze program and AWS Asia-Pacific was formalised as the Taihu Basin Stewardship Network. The partners established a commercial entity in Shanghai to support the network's program by providing outreach, training and consulting services.

Early discussion focused on industries already engaged by WWF China; dairy and textiles were both under pressure over water impacts. Textile production is said to be responsible for 20 per cent of freshwater pollution in Asia (Sweden Textile Water Initiative, 2015). With most textile production

[44] Then knows as Water Stewardship Australia (WSA)

in industrial parks, attention turned to how water stewardship could be adapted to work with groups of companies in industrial parks. Industrial parks offered scale, coherence and the prospect of collaborating with park management. This created the potential to prepare a single catchment analysis for multiple sites, engage sites with similar water problems in training, sharing experiences and collaborating on solutions. However, the partners soon discovered the difficulty of engaging sites not familiar with collaborative governance and government officials more accustomed to top-down regulation and engineering solutions. There needed to be a more persuasive set of business drivers and measurable benefits to engage both industry and government.

In 2016, an opportunity arose in northern China when AWS signed a Memorandum of Understanding (MOU) with the TEDA EcoCentre in Tianjin to collaborate on developing and implementing a water stewardship program for industrial parks. It was intended that the partnership would start with Tianjin and then progress to work with other parks in China as well as internationally. TEDA EcoCentre is based in the Tianjin Economic-Technological Development Area (TEDA) and is related to the Tianjin Environment Protection Bureau (EPB). It is a lead organisation on environmental improvement for national-level industrial parks in China.

While the relationship between TEDA EcoCentre and AWS was strong, the program failed to gain momentum. Officials from TEDA thought this may have been because their region had a higher priority on air pollution than water issues. While water was a major challenge for the region, Tianjin had the benefit of large-scale government-funded infrastructure projects to address both scarcity and pollution. The Lower Yangtze, they argued, had a higher priority on water. The strong relationship was maintained and, indeed, supported the survey work for this investigation.

Building a local AWS network

Building a network with government officials, academics and business was an important part of developing of AWS in China. AWS Asia-Pacific co-sponsored an annual Taihu Forum, established by WWF China in 2016 that brought together stakeholders in the Tai Lake region. Regional Director Xu participated in Ecolab CEO water stewardship conferences with business leaders, academics and government officials. AWS trained staff from conformity assessment bodies (CABs), consulting firms, universities and non-government organisations. Three international CABs, or audit firms, who could see the business opportunity of a water certification program, offered access to training facilities, marketed AWS to clients and participated in training sessions.

AWS built relations with relevant government organisations. The China National Institute of Standardisation (CNIS) had an interest in the AWS Standard and joined the AWS Technical Committee. They assisted in providing domestic legitimacy through the development of a China-

specific version of the Standard. The engineer with Jiangsu Engineering Consulting Centre, mentioned earlier, looked for opportunities to apply water stewardship in the Tai Lake basin and provided introductions to officials in Jiangsu province as well as testing the application of the AWS Standard on his tea farm and the surrounding village.

Civil society organisations provided introductions to both government and potential adopters of water stewardship. Xin Hao, CEO of Green Zhejiang who had been a member of the AWS International Standard Development Committee, introduced AWS to key players in Zhejiang province, tested application of the AWS Standard at Green Zhejiang's educational farm near Hangzhou and promoted AWS through media and events. The influential Society of Entrepreneurs for Ecology provided in-kind support and collaborated on a water education tool in Guangdong.

In 2017, the first meeting of the China Water Stewardship Network brought together stakeholders with an interest in AWS and its potential application in China. The network became a mechanism to share experiences and promote interest in water stewardship. These connections gave AWS a seat at the table in a number of forums on water and assisted with the engagement of industry.

Building on global connections

AWS was able to build on connections outside China to influence participation through global supply chains. This provided a starting point for engagement in three key water-using sectors; food and beverage, textiles and fashion and micro-electronics. In food and beverage, relationships with multi-nationals such as Nestlé and General Mills translated into domestic projects in China and demonstration sites that could sit alongside the Ecolab Taicang site. Nestlé had committed to having its plants certified to the AWS Standard and this brought two water-bottling plants into the system; one in the north, and one in southern China.

In fashion and textiles, AWS Asia-Pacific established a collaboration with the Australian Fashion Council in 2015 that introduced Australian brands to their supply chain water risks. They were encouraged to look beyond their buying agents and CMT (cut, make, trim) factories to identify textiles suppliers, dyeing and washing plants. They received a risk analysis of their textile suppliers that considered both catchment risk and individual site risks, allowing brands to prioritise attention to suppliers that posed the greatest water risks. For one brand, AWS provided training to in-house auditors from China and Bangladesh to support them promoting water stewardship. AWS encouraged collaboration between brands and linked Australian brands with other international fashion and textile environmental programs.

Working with fashion and textiles built new connections and extended AWS' influence. AWS was invited to contribute to the sustainable supply chain program of the China National Textile and Apparel Council (CNTAC). It built the relationship with the Better Cotton Initiative (BCI), resulting in collaborative projects with cotton farmers. BCI subsequently included water stewardship principles in the BCI standard and invited AWS to provide training on water at BCI training sessions. In micro-electronics, strong relationships were built with local representatives of multinational brands. These were reinforced by relationships with head office sustainability leaders. This led to a substantial project with Apple to engage their suppliers in water stewardship.

Breakthrough in Kunshan

Insofar as there was a breakthrough in the development of AWS water stewardship in China, it came from work within the municipality of Kunshan, near Shanghai, and a partnership with the Kunshan Environment Protection Bureau (EPB). Jiangsu province, where Kunshan is located, has the largest direct industrial water use in China and the highest rate of embodied water use (B. Zhang et al., 2016). The aforementioned engineer, who had supported AWS, facilitated meetings between AWS and the Kunshan EPB who were dealing with forced shut-down of major plants because the water quality in local rivers and streams did not meet national government standards. As mentioned earlier, the national government was interested in giving firms a chance to adapt and the EPB saw an opportunity for AWS and WWF to encourage that adaptation.

It was recognised that not all of the plants would survive the heightened national focus on water and pollution, but AWS and WWF had an opportunity to offer facilities a pathway to improve. Initially, the EPB asked AWS and WWF China to work with major polluters in Qiandeng Town, where there had been compliance problems and past policies had not changed the situation. The project was initiated by a senior member of the EPB willing to look at alternative approaches to costly engineering and regulatory solutions. Firms indicated to the investigator that the regulatory compliance burden in the municipality was already high. They hoped AWS would provide a one-stop shop to address compliance. The project also benefited from a concentration of advanced manufacturing firms, mainly printed circuit board (PCB) linked to global supply chains.

The AWS-WWF team developed a multi-stakeholder platform for the project. They engaged three universities, a conformity assessment body (CAB), TUV Rheinland, relevant municipal agencies, including water and sewage, as well as industry associations and grassroots environmental organisations. With the EPB, 12 enterprises were selected to participate. The trial drew technical support from the universities as well as the expertise of AWS and WWF staff on opportunities for improvement. Over 12 months, the team provided training sessions, visits to water infrastructure sites as well as the Ecolab Taicang plant to understand both the opportunities and the business

case for making improvements. After this pilot phase, the project was independently evaluated before being extended to the main industrial area, Kunshan Economic-Technological Development Zone (KETD) (A. Yang, 2017).

As the project developed in the KETD, water stewardship began to build credibility with major players in the industrial area. KETD covers an area of 115 km2 and houses industries such as electronics, automotive components and logistics. The major water challenge facing the zone is pollution. Plant shutdowns due to pollution had impacted global microelectronics brands and so the trial attracted their attention. The program grew to involve 32 facilities, many of which were advanced PCB providers to global brands. Apple, for example, already had a Clean Water Program operating within its supply chain and this very quickly became linked to the Kunshan water stewardship collaboration and a partnership developed.

Apple became a member of AWS and the two organisations developed plans for longer-term collaboration to promote water stewardship in the company's supply chain. AWS was already providing training for Apple suppliers, but the parties soon recognised that realising their ambitions would require scaling-up AWS activities. Two Apple PCB suppliers in Kunshan became the first to embrace water stewardship and one became the second site in China to achieve gold-level certification. These companies became leaders within the zone working outside their fence line to engage other stakeholders, such as schools and peers in water stewardship. Other microelectronics brands worked with AWS to engage their suppliers although not necessarily with the same level of ambition as Apple.

While the relationship with Apple was a breakthrough, so too was the relationship with Kunshan EPB. In 2018, Kunshan municipal government announced, as part of a series of measures to improve water, that it would offer an RMB 100,000 (USD 15,000) incentive payment to sites that successfully achieved AWS certification (Forbes, 2018). This was significant for a number of reasons but particularly because it demonstrated a maturing relationship with government and the potential for AWS to work collaboratively to achieve shared water goals. As such, it begins to build a parallel with the case study of Caojiaxiang mentioned earlier in so far as it established shared goals between government, industry and civil society, with each contributing to the outcome.

7.3.4 Summary of collaborative governance in China

With its strong commitment to command-and-control, there has been limited scope for collaborative governance in China. Nevertheless, there have been experiments and interest at various levels of government in involving people in addressing shared challenges. AWS has been one such experiment, after entering China at the invitation of another civil society organisation and

building a network of relationships with, amongst others, entrepreneurial government officials seeking new approaches to intractable problems (social dilemmas). AWS was able to domesticate and become part of the water landscape in China. As a result, an opportunistic invitation arose to assist municipal government agencies address water challenges. This resulted in strong partnerships and a project that enabled AWS to prove its ability to engage industry in addressing water challenges. This created a virtuous cycle of support from government and global brands who were already conscious of water issues in their supply chain. Other global brands in both food and beverage and microelectronics have since joined the program and recently a major domestic food and beverage company joined as a result of the AWS network program. Despite its commitment to hierarchical command-and-control, China has been the most successful jurisdiction for AWS.

7.4 Success of water governance

As for the Australian case studies, success of water governance here is judged with reference to the concept of *stewardship* as defined in the literature review. That is, is water being managed in an interconnected systemic way, linking human systems and ecosystems for the current generation and future generations. Clearly, China's hydrological system had been mismanaged, with rising water stress due to scarcity and pollution. The current generation benefited in a way that will deprive future generations of the same clean water, for example, that once supported the silk industry around the Tai Lake. China is now attempting to reverse this situation through changes in laws, investment in infrastructure and institutional change.

The regulatory institutions in place at the start of industrialisation failed to balance the desire for economic growth with stewardship. Zhang and Barr (2013) argue concern for economic growth and short-term gains "cast a shadow on China's green initiatives at the national, local and personal levels" (p. 10). They describe "guilt free" polluters who, "inefficient as they are, still serve as essential bloodlines for local economies". These heavily polluting facilities provided local employment that was a source of social and political stability. For many, it was a simple trade-off between employment and the environment. As one business owner remarked in response to a student survey: "Of course business should take on their social responsibilities, but they are also pressured to generate revenue and keep up the local employment rate" (J. Y. Zhang & Barr, 2013).

Failure of governance was an important part of the explanation for China's water crisis. Xing (2015) for example, points to a range of contributing factors such as over-extraction and diversion for urban and industrial development, pollution, hydropower development and its relationship with international rivers that either source or flow to neighbouring countries. However, Xing argues China's problems are not just the physical availability of water but relate to its water governance.

He points to overlapping responsibilities of the Nine Dragons of Water (nine Ministries, since consolidated into two, with responsibility for various aspects of water), an inability to resolve competing interests in water, the priority placed on economic development and insufficient public participation and transparency, including inadequate monitoring and enforcement. China has been addressing governance failure since 2015, although the situation remains challenging.

Strengthening commitment

The leadership is attempting to change the national narrative to one that resembles stewardship. President Xi is portrayed as a long-term advocate for balanced growth. A 2005 comment that "green mountains and clear water are as good as mountains of gold and silver" is cited widely. His three-and-a-half-hour speech at the 19th Party Congress in 2017 was described as emblematic of China's bid to pivot away from smokestack industries to deal with public dissatisfaction over pollution and food scandals. It included 89 mentions of the environment and 70 of the economy. (Bloomberg, 2017). Xi reframed the *principal contradiction* facing China (a reference to Marxist dialectical materialism) from conflict between "rising needs" and "backward productivity" to one between "inadequate development" and "ever-growing needs for a better life" (Xinhua, 2017).

Whether the changes underway are sufficient to deliver stewardship remains to be seen, particularly in the face of a pandemic, trade war and global recession. As Wang (2018) has noted, the rate of deterioration in water has slowed, some areas have improved but the number of people living in areas of high water stress continues to grow. Looking forward, it is estimated demand for water will increase to 1,000 billion cubic meters by 2030, exceeding what "scientists believe" is the ceiling of 812.6 billion cubic meters (Xing, 2015). The Minister for Ecology and Environment (MEE) believes the situation facing environment protection work in China is "grim" due to the unstable external environment and domestic slow-down. He told his department to continue its pollution control work in a way that was sensitive to the needs of "high quality development". (Hou, 2020). MEE acknowledges there is still a long way to go (Xu, 2020).

7.5 Institutional consideration

There is a consistency through China's water institutions that appears to create a profound resistance to change and adaptation. This is not dissimilar to the institutional lock-in that was found in Australia, although its historical and cultural origins are different. Grand water-engineering projects, led and driven from the national leadership (whether that be in the form of emperors or presidents), would appear to be part of national culture, as is the expectation that local governance will oversee the details of implementation. These structures extend over millennia and are accompanied by varying forms of authoritarian rule through command-and-control systems.

Water is steeped in historic symbolism (Wishart, 2020). This is reflected in the name given to the powerful agencies that, until recently, controlled (and competed) over China's water; the Nine Dragons. Water has framed philosophical debate about how people should govern themselves and their relations with nature. This debate continues to the present day in the concept of *ecological civilisation*. In the sixth century BC, both Taoist philosopher, Lao Tzu, and Confucius drew heavily on the imagery of water but, while Lao Tzu believed humans should not interfere with nature, Confucius believed nature could be adapted to human needs (Li, Van Beek, & Gijsbers, 2004). Solomon (2010) argues Confucians believed that rivers had to be engineered to suit humans, as defined by rulers and technocrats. This view predominated from the third century BC to the start of the 21st century when the concept of *ecological civilisation* saw a rediscovering of Taoism.

China's obsession with great engineering projects to regulate the flow of water has been central to nation-building efforts of successive dynasties. This did not change under the CCP. Post-revolutionary China built more dams than the rest of the world combined. (*The Economist*, 2013). Ball argues Mao Zedong used eye-catching water projects to demonstrate, to a country that had been intimidated by its rivers, that the party and its leaders were in control not nature (Ball, 2017, p. 40). It was not surprising then that in 2011, as water challenges escalated, the government announced it would quadruple investment in water projects to four billion yuan (USD635 million) over the 10 years. This would include upgrading 46,000 of the 87,000 dams and reservoirs built since 1950, construction of new dams, reservoirs and canals and undertaking the world's largest and longest water diversion project, the South-to-North Water Diversion Project.

These engineering interventions were consistent with China's traditional approach to water but nevertheless, raised questions. Liu and Yang (2012) described the 2011 plan as laudable but not sufficient, noting a heavy focus on engineering but a failure to set targets for water quality. *The Economist* was more critical in saying it represented a continuation of China's fixation with engineering solutions and was likely to only provide a temporary reprieve: "By lubricating further water-intensive growth the current project may even end up exacerbating water stress in the north" (*The Economist*, 2014). The costs associated with engineering solutions have financial implications with estimates that more than two per cent of China's GDP is spent trying to address its water issues, one of the highest levels in the Asian region (ADB, 2016). Dealing with deep-seated problems would require institutional change, but this would be more difficult.

The strength and resilience of the institutions and culture of water is perhaps best indicated by the extent to which national government has gone to change direction toward a more balanced *ecological civilisation*. Water professionals and party officials who failed to implement the new approach were publicly exposed, fined or even jailed. The powerful nine dragons of water were

reduced to two: the Ministry of Natural Resources (MNR) managing all natural resources that "belong to the people" and, the Ministry of Ecology and Environment (MEE) responsible for compliance with environmental regulations (Xu & Chan, 2018). Vertical management of EPBs from the top, avoiding the interference of provincial government with environmental regulation, was introduced (Zhou, 2020). Fresh efforts have been announced to reform environmental governance, with "stronger government supervision" (Xinhua, 2020), and expanded use of market governance (Xu, 2020). Despite this, prospects for environmental protection still remain "grim" (Hou, 2020).

7.5.1 Institutional isomorphism

As with the other case studies, China's water management will be reviewed through the lens of institutional isomorphism - coercive isomorphism, mimetic isomorphism and normative isomorphism – to see if this helps to understand the behaviour of institutions.

Coercive isomorphism in China's water management

Insofar as coercive isomorphism relates to formal and informal pressure on organisations from politicians and others, as well as cultural expectations, China provides a different perspective to the Australian case studies. Both China and Australia started to modernise their institutions at a time when they were seeking to grow into modern advanced economies. In Australia, the development agenda was driven at a state (provincial) level whereas in China it was driven at a national level. China created institutions at provincial, municipal and city level that would parallel national institutions (for example, EPBs) but these were subject to direction (and funding) from provincial governments more interested in economic development than environmental management. Local level *lock-in* was evident when the national government attempted to change direction toward more balanced development. Lower-level institutions only paid lip service to pollution management.

This conflict was itself part of Chinese culture with sayings such as *Shan gao, Huangdi yuan*, the mountains are high and the emperor is far away, expressing the separation or perhaps the disdain provincial officials have for national government directives. National officials needed to overcome both an institutional preference for engineering solutions and institutional constraints within the hierarchy of government. Despite the extensive efforts discussed – prosecution of provincial officials, more clearly focused national institutions and vertical management – constraints on the national policy persisted and slowed the resolution of China's water challenges. As a result, there was growing interest in alternative forms of governance such as markets and collaboration.

Mimetic isomorphism and water governance

The ambiguity that would have existed as a result of competing policies between national and provincial governments would have been the sort of environment envisaged by mimetic isomorphism. That is, faced with ambiguity, organisations model themselves on known entities. However, the issue through most of the period was not that new institutions were reverting to a prior model; it seems more likely that, despite the changes that followed revolution, the institutional arrangements remained similar to the former dynastic governance model. National government focused on high-level major projects and allowed day-to-day water management to move to a local level. This fragmented regulatory regime allowed private entrepreneurs to operate with minimal constraint as local governments got on with the business of economic development. The business case for managing impacts on soil, water and air was not strong. Central government became distant and, when it attempted to address pollution through national environmental target-setting, it relied on local officials to enforce these targets. But these officials had other priorities.

Institutional structures were able to exploit ambiguity about where the boundary sat between development and environment to slow or resist change and maintain past institutional relationships - hence the need to remove provincial government from both budgetary and regulatory oversight of provincial, municipal and city-level Environment Protection Bureaus.

Normative pressure and water management

Once China embarked on its industrialisation process, professionalisation and the methods of work of water institutions shared similarities with the Australian experience; that is, the industry was dominated by professionally trained engineers focused on engineering solutions supplemented by regulatory control of issues such as pollution. As mentioned earlier, this was evident insofar as one official could only conceive of water and pollution being managed in a top-down hierarchical manner and could not see a place for collaborative governance. Another official (interview 3/002) pointed out that there would be a range of constraints on water professionals in their discretion to venture beyond approved strategies and approaches. These constraints were not dissimilar to Australia in that they involved internal performance metrics linked to budgets that would determine promotion and professional recognition. There would be little reward for an official who ventured into a program that may deliver long-term management change when they were being judged annually on performance metrics based on delivering engineering or regulatory outcomes.

While disinterest in collaborative governance was evident in Australia, in China the response was more to the effect that only government could make decisions. As with Australia, most officials believed water was a problem to be solved by professionals.

7.5.2 Summary of institutional considerations

Institutions associated with water governance have their origins deeply rooted in Chinese culture and millennia of practice. The concept of *lock-in* is of some use in describing the difficulty of achieving change in direction for water management. *Institutional isomorphism* was somewhat less useful as a framework for investigation in this case. Within the framework of *institutional isomorphism* however, the concept of *normative isomorphism* did provide some context to the reluctance of professionals to engage with AWS. This may be useful in understanding how to engage with the profession and the sort of officials to engage if AWS is to continue to build in China. For most in the authoritarian Chinese state, it was difficult to conceive of governance beyond state command-and-control. Yet, there is evidence elements of the state are prepared to test market-based governance and collaborative governance approaches. AWS will need to find its place among the institutions, and the professionals that inhabit them, to continue to evolve in China.

7.6 Choice and decision-making about water stewardship participation

With interest in AWS growing, there was both a need and opportunity to develop a more sophisticated understanding of how to leverage the Kunshan experience. This chapter discusses the results of a survey of water-using sites that arose to develop more systematic understanding of drivers and constraints affecting industry engagement with AWS. The questionnaire is described in Chapter 5. It should be noted that the range of potential influences used for the research model were from Western literature and may be less appropriate in a Chinese context. The reader is also reminded that the facilities surveyed were not a random sample but an opportunistic sample of facilities that chose to engage with AWS. It attempts to construct an understanding of motivations based on the lived experience of facilities that had interacted with AWS.

Chinese-speaking staff associated with AWS in China and TEDA EcoCentre administered the questionnaire through either face-to face or telephone interviews with senior staff from 34 facilities. Facilities were in northern China (n=16) and the Yangtze Delta (n=18). Industries were mixed, with a high proportion of microelectronics firms in the Yangtze Delta[45]. The questionnaire was supplemented by face-to-face discussions with municipal officials and academics to test and gain perspective on early findings. A copy of the questionnaire used in China is attached at Appendix 3.

[45] Due to a focus on that industry by AWS at the time of this research.

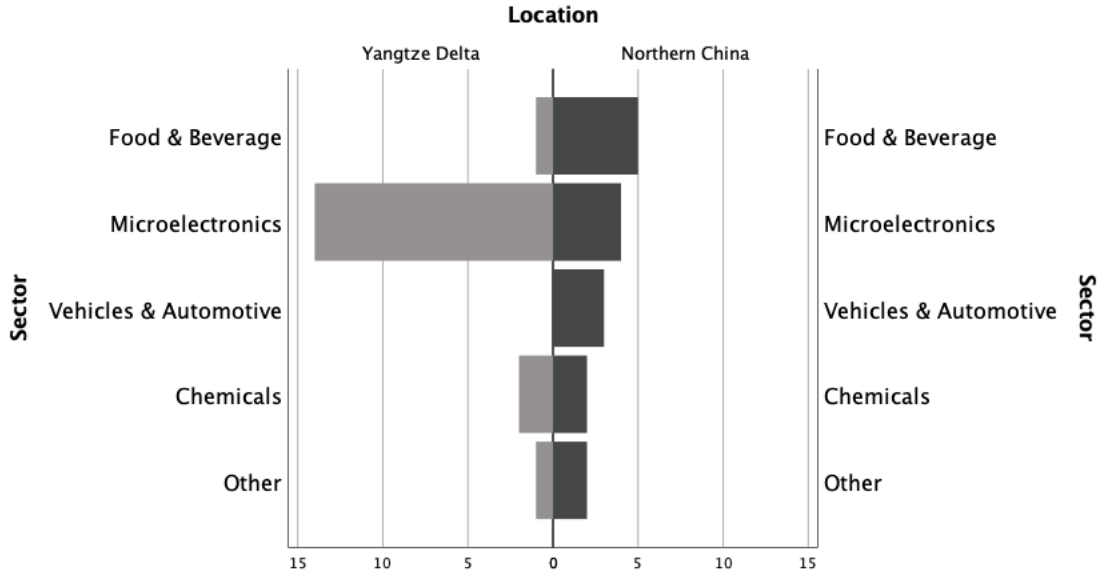


Figure 18: Facilities interviewed in China by sector and location

7.6.1 Study locations

Northern China is a highly industrialised water scarce region that suffers from both air and water pollution. Water supply is supplemented by China's largest infrastructure project the South to North Water Diversion Project that, over time, intends to transfer 45 billion cubic metres of water from the Yangtze Basin to Northern China. It supplies one third of Beijing's total supply. Government has experimented with water taxes to improve water management in this region as part of the Water 10 Policy announced in 2015 (Xu, 2018). Pollution is an important impact on water in the North with half of groundwater supplies said to be too dirty for use by factories *(The Economist,* 2018). Bohai Bay, the final discharge point for wastewater from the industrial centre of Tianjin, has suffered pollution issues for at least two decades (Gao & Chen, 2012; Lui, Wang, & He, 2003; Peng, 2015). As discussed, AWS Asia-Pacific has a collaboration agreement with TEDA EcoCentre.

The Yangtze Delta is also highly industrialised, with significant pollution. Lake Tai is in the middle of the region. Scarcity is less of a concern than for Northern China, however Zhang et al. (2016) expect the transfer of water from the Yangtze to the north to increase pollution because it will reduce flows and decrease the ability of the Yangtze to flush pollutants. Jiangsu province, where Kunshan is located, has the largest direct industrial water use in China and the highest rate of embodied water use. High pollution levels exceeding national limits in streams and waterways have caused facilities to close production for periods. AWS has a collaboration agreement with Kunshan EPB and a strong relationship with microelectronics brands sourcing from the region.

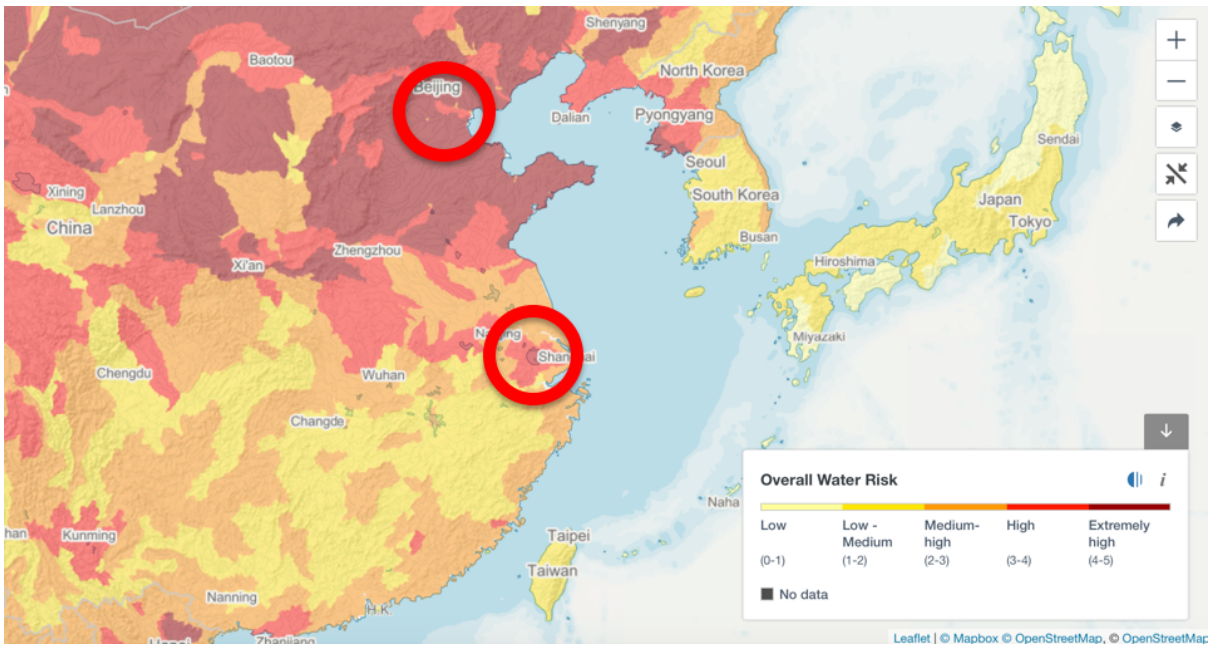


Figure 19: Map showing the two study areas in high to extremely high water risk areas of China. Source: World Resources Institute (WRI) Aqueduct water risk atlas: https://www.wri.org/aqueduct

The following section discusses results from the survey of facilities.

7.6.2 Perceived benefits (rational choice)

The first hypothesis tested was that decisions to adopt or not adopt were based on rational choice; if perceived benefits exceeded perceived costs a facility would adopt and if perceived costs exceed perceived benefits, it would not. Figure 21 shows a boxplot[46] of adopters (n= 21) and non-adopters (n=10) (indifferent (n=3) are not shown) using Net Benefit Index scores (described in Chapter 5). The Figure is not consistent with the rational choice prediction with both adopter and non-adopter median scores clustered just above zero. The main difference is the spread of scores for adopters compared to non-adopters. These results do not fully explain choices to adopt or not adopt AWS. As in the Australian case, study, a range of other potential influences will be explored.

[46] In the boxplot diagrams that follow, small circles represent outlier results and the accompanying number refers to facility case number

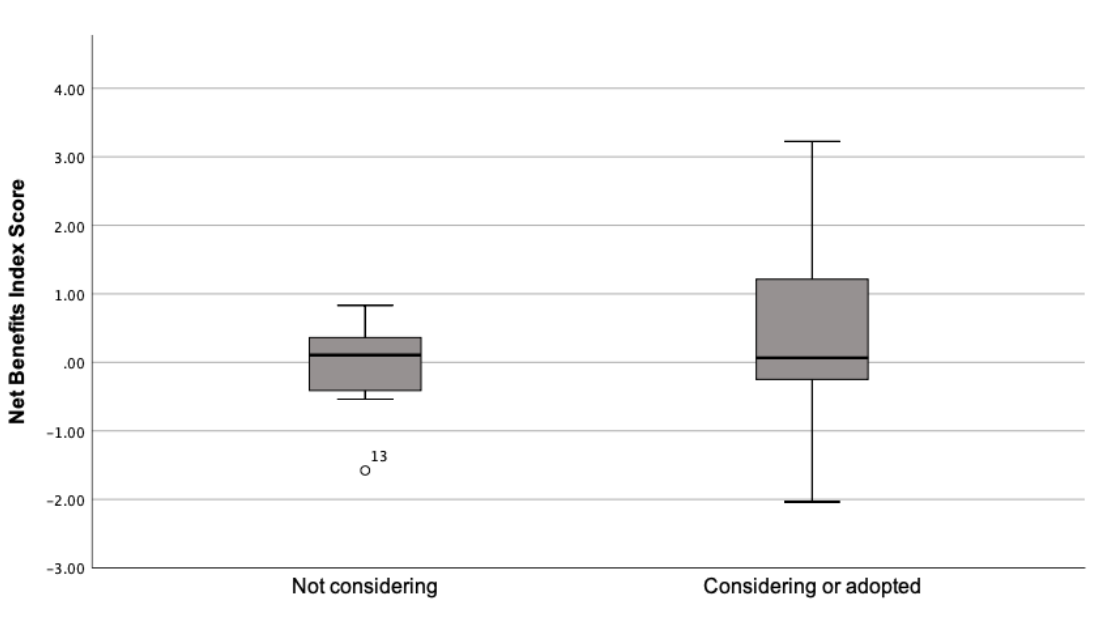


Figure 20: Boxplot of Net Benefits Index score for sites adopting and not adopting AWS in China.

When the equation is broken out into its four elements (operating benefits, intangible benefits, infrastructure costs and compliance costs), the picture is more informative. The greatest difference between adopters and non-adopters is intangible benefits. Adopters value intangible benefits such as brand and reputation more highly (mean = 3.67) than those not adopting (mean = 2.52). For all participants, the value of achieving operational benefits is high, regardless of whether they are interested in adopting (mean = 3.61) or not adopting (mean = 3.47). Facilities that were considering adopting were more conscious of compliance costs (mean = 2.73) than not adopting (mean= 2.13). Those not adopting (mean = 3.90) were more concerned about potential investment in water infrastructure needed to meet AWS requirements than adopters (mean = 3.59).

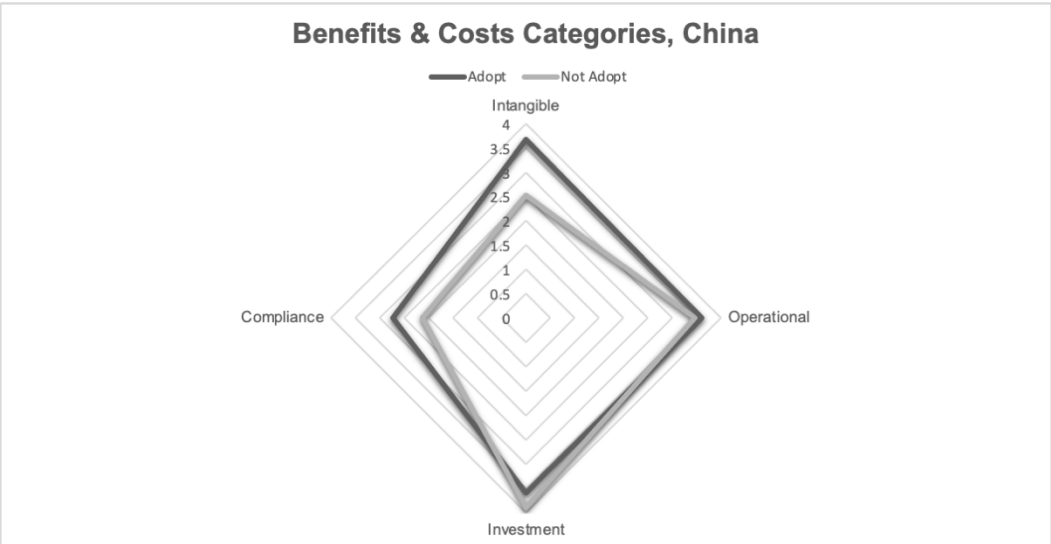


Figure 21: Comparison of adopters and non-adopters in China on four elements of Net Benefits Index.

The pattern differs from that for the Australian case study, with a larger gap for intangible benefits and compliance costs and with much greater concern about the need for investment in operational improvements for non-adopters. This may reflect the survey including more large facilities tied into global supply chains (customer reputation) and who are already conscious of compliance costs.

7.6.3 Other choice considerations

Having established that rational choice does not provide a complete explanation of decisions to adopt or not adopt AWS, the following will explore other factors that may influence choice.

Facility Water Culture

An element of facility water culture is explored through attitudes to responsibility for water and catchment health; that is, to what extent do facilities see themselves and others in the community as being responsible or, do they see these matters as mainly a government responsibility? It would be simplistic to say that for one group water was a social responsibility and, for the other it was a government responsibility, as it is more likely to be a sliding scale than binary. As for Australia, facilities were asked to allocate 10 points between different groups of actors in terms of their level of responsibility for water and catchment health. Options were business, government, farmers and agriculture, households and non-government organisations.

Non-adopters gave more importance to the role of government in water and catchment health, compared to other actors, than adopters. There was a clear difference between adopters (mean = 4.9) and non-adopters (mean = 6.5) in how they saw the importance of government in influencing water and catchment health. Having said that, it is important to note that all interviewees placed high importance on the role of government; however, adopters tended to see a broader distribution of responsibility. Figure 23 illustrates the different emphasis on the role of government by adopters and non-adopters in relation to water and catchment health.

Adopters are inclined to see water as a shared responsibility between actors, whereas non-adopters are inclined to see water primarily as a government responsibility. Facilities that see water as primarily a government responsibility would be less inclined to engage with a collaborative governance program such as AWS than those who see a broader social responsibility. Adopters (mean= 1.4) attributed greater influence to NGOs than non-adopters (mean = 0.3) and households (mean = 1.3 for adopters and mean = 0.6 for non-adopters). Both groups attributed similar weight to business. So, while adopters saw a slightly broader social responsibility for water, they also appear to be more conscious of the influence of NGOs and their ability to impact reputations.

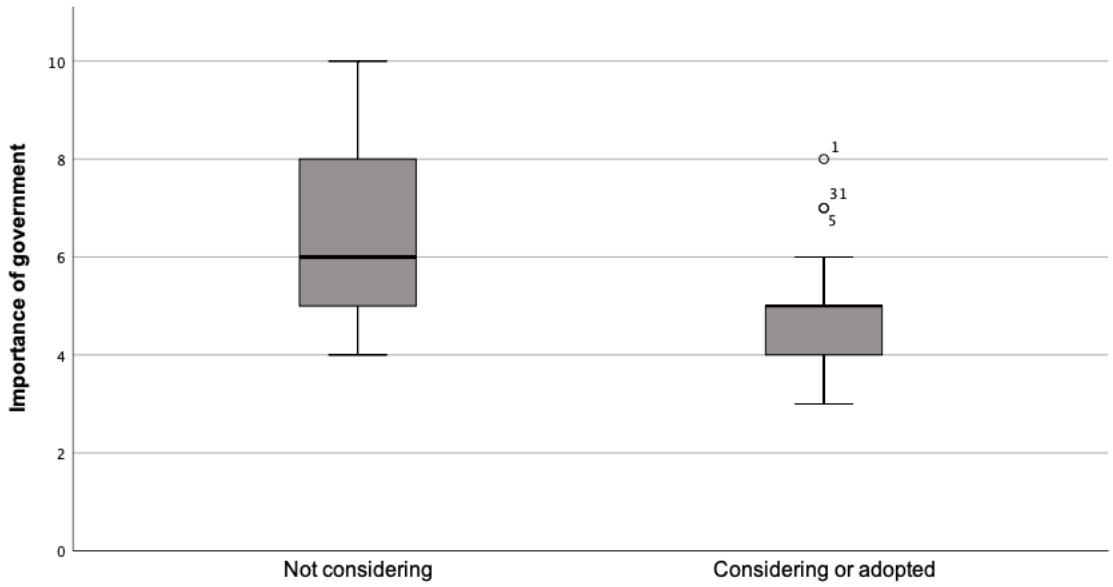


Figure 22: Indicated importance of government for water and catchment health.

Performance and Achievability

The literature suggests that the very best performers are less interested in voluntary certification; middle to upper-level performers are interested and lower-level performers are not. Figure 24, compiled using the current performance index described in Chapter 5, illustrates that this hypothesis holds for the Chinese facilities surveyed. With some exceptions, non-adopters have achieved less than 50 per cent of AWS requirements[47], most adopters are in the range of 50 to 70 per cent and those with a mean of 80 per cent are indifferent to AWS. There is some overlap in performance, particularly between adopters and non-adopters, but the majority of adopters have already achieved approximately half of the requirements for AWS certification.

A current performance index score of 100 means the facility had adopted all of the major requirements of the AWS Standard and a score of zero means the facility has not adopted any of the nominated requirements. The mean score for adopters is 58.2 (n=20) and for non-adopters is 42.5 (n=9). For the small sample that is indifferent, the score is 79.8 (n=3). These results are at a slightly lower level than for Australia although it should be noted that the Australian case study included a higher proportion of facilities already certified to AWS.

[47] This questionnaire process does not represent a verification of compliance with the AWS Standard.

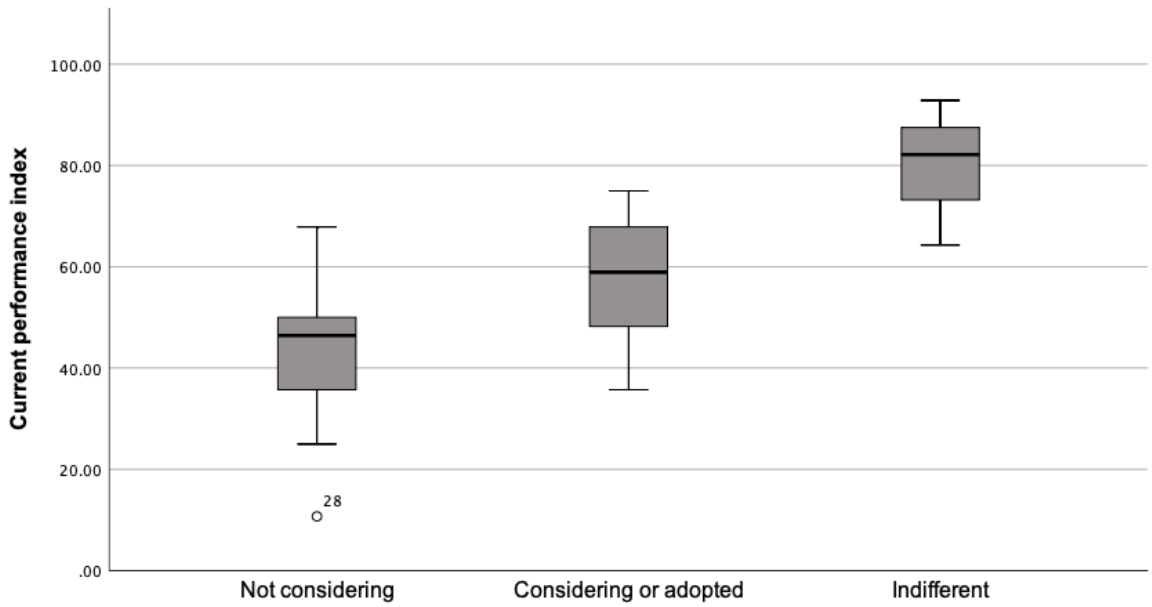


Figure 23: Gap between current performance and performance required for compliance with AWS measured by current performance index for China.

Risk

Three dimensions of water risk have been noted in the literature: physical threats to a facility's operations; the threat of regulatory action (for example, fines for pollution, water pricing or increased inspection and control), and: the threat to brand and reputation from not managing water in line with community expectations. The literature also points to risk being subjective (Bohm & Tanner, 2019). As a result, four perspectives are considered to understand how facilities are influenced by risk; (1) independent observations of risk, (2) facility's views on water challenges, (3) facility risk analysis and water plans and, (4) actions taken to address water risks.

Independently observed risk

Both study regions in China are in high or extremely high water-risk areas according to the World Resources Institute Aqueduct (WRI 2019) and WWF Water Risk Filter (WWF, 2018). Both tools consider physical, regulatory and reputational risk. Northern China faces risk relating to water scarcity, water cost and water pollution. In the Yangtze Delta, pollution is a national, regional and municipal focus that has resulted in industrial shutdowns, fines and arrests. Both areas have physical risks although regulatory risks appear greater in the Yangtze. Table 1 in Chapter 6 shows China (2.84) has a higher risk rating in the WWF Water Risk Filter than Australia (2.53) and the United States (2.68). It has a higher physical risk than both, although Australia has a higher reputational risk than China and the United States has a higher regulatory risk.

In Northern China, air pollution from heavy industry is an immediate health hazard to citizens whereas, for water, as noted earlier, major infrastructure projects to deal with scarcity (south-north water diversion) and pollution (major investments in water treatment) have reduced public attention on water scarcity and pollution. An Environmental regulator in Northern China indicated that poor air quality was the highest priority for the region (interview 3/001). On the other hand, in the Yangtze Delta, government agencies are focused on water pollution, cleaning-up polluted waterways and curtailing polluting industries. The same regulator pointed out that, unlike Tianjin, water pollution is a major national issue in the Yangtze Delta region (interview 3/001).

Reputational risk can be associated with regions, industrial sectors or individual brands. Microelectronics PCB manufacturers represent a large proportion of respondents to the survey. The industry has been criticised in the past for its impact on water(BSR, 2010; H. Yang et al., 2013). The criticism (an NGO campaign) did not target manufacturing sites in China, rather, the global brands for which these facilities produce electrical equipment. As a result, water represented a reputational risk to the brands and stimulated interest in supply chain water use.

Both regions face physical water risk. However, there is a much higher number of adopters in the Lower Yangtze (15), and a more successful water stewardship program in that region, compared to North China (6 adopters). This suggests that the presence of physical risk is a necessary but not sufficient condition for interest in AWS. Adoption is more likely where physical risk is combined with regulatory and reputational risk through stakeholder pressure. For the microelectronics facilities, this pressure was intensified by NGO campaigns in market countries.

Facility identified challenges

The survey suggests that physical water risk does not automatically translate into a facility water challenge. Despite scarcity being an independently observed risk for Northern China, only 25 per cent of respondents identified water scarcity as a challenge for their facility. Looking at this from the perspective of adopters and non-adopters, scarcity was only recognised by adopters as a challenge facing their facility. Higher water costs (a manifestation of scarcity) were also recognised differently between adopters and non-adopters. Adopters were more aware of costs as a challenge (67 per cent) compared to non-adopters (34 per cent). While all facilities were concerned about water efficiency and environmental impact challenges, only adopters saw scarcity as a challenge.

Water costs

Water cost has been identified as a potential proxy for physical water risk. The investigation is interested in whether water cost is a driver for adoption. Facilities were asked at what level of water price increase would they need to consider the ongoing viability of the facility at that location (would they have to consider closing or moving). Facilities in northern China, where water prices are high by Chinese standards, are more price sensitive (all saying they could not withstand an increase of more than 10 per cent) than firms in the Yangtze. However, this does not appear to translate into a facility considering or adopting AWS.

Figure 25 shows adopters are clustered in two groups; a price sensitive cluster and a cluster who are not sensitive to water price. Non-adopters are clustered in the middle (five to 50 per cent increase would threaten viability). This pattern suggests water cost may influence facilities where water price pressure has them on the edge of viability (cannot withstand a price increase of more than five percent). But there is also a group of adopters for whom water price is not a consideration as they could withstand price rises from 50 per cent to greater than 200 per cent.

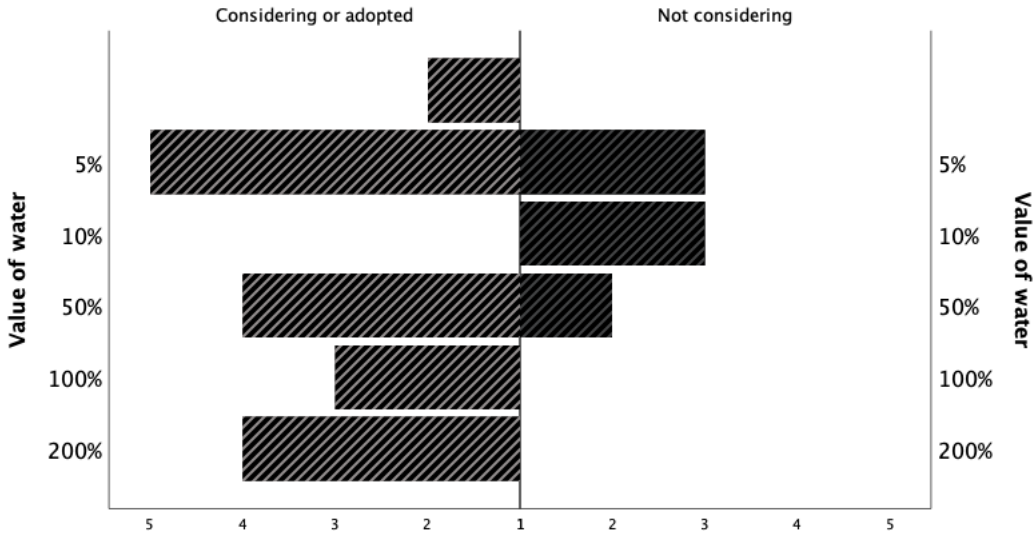


Figure 24: Level of water price increase that would force a facility to close or relocate split by adopters and non-adopters in China.

Risk assessments and water plans

Another approach was to understand how facilities were approaching risk by understanding how they analysed risk (risk analysis) and planned for risk (water plan). The objective was to see if there was a relationship between a facility's approach to risk and its interest in water stewardship. Almost all facilities had undertaken a water risk analysis and developed a water plan. Adopters were more likely to consider a broad range of risks (operational, catchment, supply chain and

stakeholders) than non-adopters. Adopters also had more comprehensive water plans (covering efficiency, environmental impacts, legal compliance and, to a slightly lesser extent, water quality) than non-adopters. The biggest difference was environmental impacts; 90 per cent of adopters considered environmental impacts, whereas only 50 per cent of non-adopters considered environmental impacts in their water plan. This seems to reinforce the earlier observation of cultural differences between adopters and non-adopters with adopters being more aware than non-adopters of the social and environmental context in which they operate.

Facility water initiatives

The final perspective on risk is the investment facilities had made or were planning to make in water improvements. Adopters are active across a wider range of water improvement initiatives than non-adopters (both completed projects and planned projects). This is illustrated in the Figure 26 where, to assist comparison, results appear as a percentage of the total number of adopter and non-adopters. The difference is strongest for measurement and monitoring initiatives, efficiency improvement and future plans to increase recycling and re-use of water. Adopters are engaged in activities such as groundwater management, education and training, where non-adopters are not. In short, adopters are facilities accustomed to investing in a broad range of water improvements whereas non-adopters invest in a narrower range of business water initiatives.

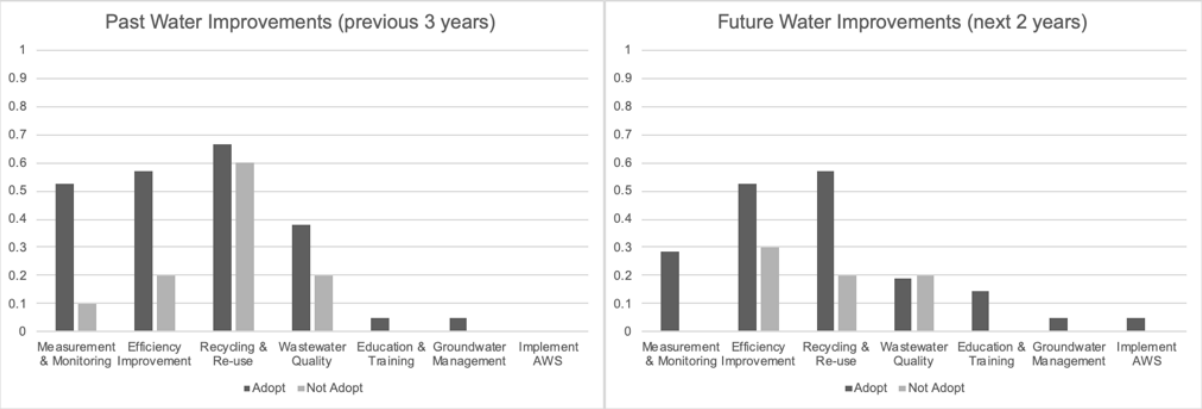


Figure 25: Past water improvement initiatives (three years) and planned future initiatives (two years), scaled, by type of improvement for adopters or non-adopters in China

Influence of risk

The research has validated that risk is a consideration in understanding decisions to adopt water stewardship. However, it is neither as neat nor as simple as suggested in the literature. Physical risk is a driver in conjunction with reputational and regulatory risk, moderated through government and customer priorities. While both Northern China and the Yangtze Delta present physical water risks, facilities in the Yangtze, where government is focused on water and customers are advocates for water stewardship, are more strongly represented among adopters. Costs, as a

metaphor for risk, is most relevant for facilities when they are at the edge of viability. Adopters are more engaged in water management, see risks more broadly, respond more comprehensively than non-adopters and have a track record of investing in a broad range of water initiatives.

Reputation

Potential to achieve reputational benefits from participation has been discussed in the literature review. To understand the relevance of reputation to a decision to adopt or not adopt AWS, a series of responses from participants were examined to tease out differences between adopters and non-adopters: (1) pre-AWS drivers for water improvements; (2) motivation for participation in water stewardship briefings and training; (3) stated reasons for adopting or not adopting water stewardship, and; (4) intangible benefits adopters expect from water stewardship.

Water improvement drivers

Facilities were asked why they undertook water improvements at their site. There is a pronounced difference in what drives adopters and non-adopters. Adopters are more focused on being a responsible business (91 per cent compared to 50 per cent), reputation (86 per cent compared to 30 per cent), business sustainability (86 per cent compared to 10 per cent), customer pressure (57 per cent compared to 20 per cent) and customer opportunities (57 per cent compared to 10 per cent). On the other hand, non-adopters are more focused on legal compliance (80 per cent compared to 67 per cent). The difference in priorities is apparent with adopters giving a higher priority to reputation, customer relationships and being a responsible and sustainable business. Non-adopters are more focused on meeting legal compliance obligations.

Reasons for participating in training session

All facilities had participated in some form of AWS training or information session. The survey asked why they had participated in order to understand any differences in motivation for engagement. The main difference between adopters and non-adopters was that adopters participated to improve their reputation with customers (43 per cent) and government (33 per cent). Non-adopters did not see reputation with government (0 per cent) or customers (10 per cent) as a reason for participation, although a third cited concerns about plants being shut down due to pollution. Only 10 per cent of adopters gave this concern as a reason for participation. Major differences included the higher priority adopters gave to their reputation with government and customers and, for non-adopters, greater concern about regulatory interventions. This theme recurs, adopters are conscious of the interest a wider range of stakeholders have in their facility.

Reasons for adopting or not adopting water stewardship

The survey asked adopters to indicate reasons for adopting or considering adopting AWS water stewardship and it asked non-adopters why they were not considering AWS. Responses followed a similar theme. Adopters wanted to meet customer expectations (57 per cent), improve, verify or benchmark their performance and exceed regulatory requirements (43 per cent). Non-adopters were unanimous (100 per cent) in saying they felt they did not know enough about AWS to reach a decision. Other concerns of non-adopters were complexity (30 per cent), time commitment (20 per cent) and compliance costs (10 per cent). Once again, there is a similar theme here. Adopters are interested in their reputation with customers and government and improving their business whereas non-adopters were concerned about uncertainty and lacked knowledge of AWS.

Water stewardship intangible outcomes valued by adopters.

Table 4 breaks down the category intangible benefits into preferences for different types of intangibles by adopters and non-adopters. Some are general statements (improve reputation and brand, environmental programs and enhance business sustainability) and some focus on specific stakeholder relationships (community, employees, government and customers). The topics are from the list of benefits provided in Appendix 1. Scores are from a maximum of five, meaning this issue would be vitally important for the site, to a minimum of zero meaning it is irrelevant. A standard deviation is provided to indicate the spread of responses. These are all relatively high, with the closest being the importance adopters place on reputation and environmental programs.

The types of benefits most valued by adopters are the potential of AWS to contribute to their reputation and environmental programs (particularly their corporate social responsibility or CSR strategy). There is a relatively low standard deviation here, suggesting relatively high coherence among adopters. The largest difference between adopters and non-adopters is the importance they attach to environmental programs and customer relationships. Non-adopters are less concerned about customer relationships although the relatively high standard deviation indicates less coherence among non-adopters on this issue.

Table 4: Preference for different types of intangible benefit from water stewardship for adopters and non-adopters

	Mean and SD of Importance for Facility (0-5 rating)						
	Total	SD	Adopt	SD	Not Adopt	SD	Diff.
Reputation	4.24	1.33	4.57	0.81	3.4	1.96	1.17
Sustainability	3.68	1.74	3.95	1.56	2.8	2.04	1.15
Environment	3.66	1.28	4.07	0.83	2.55	1.57	1.52
Customers	3.2	1.64	3.7	1.29	2.2	1.81	1.5
Community	3.16	1.32	3.42	1.08	2.55	1.59	0.87
Government	3	1.76	3.14	1.80	2.8	1.61	0.34
Employees	2.38	1.76	2.62	1.75	1.5	1.65	1.12

Diff. represents the score given by adopters minus the score given by non-adopters. SD = standard deviation. Rating based on 0-5 scale where 0 means the attribute is not a consideration for the facility and 5 means it is a key consideration (N=34)

Ownership

Ownership is considered for the Chinese case study as a result of observations made during the survey that foreign-owned or partially foreign-owned firms may be more interested in participation. However, closer examination found foreign ownership is not a strong influence on participation, with adopters having a higher proportion of domestic-foreign joint ventures but a lower proportion of wholly foreign-owned. There is a relatively even split of domestic facilities between adopters and non-adopters. The sample was not random and may be influenced by participants being generally better performers. Results may be different from the total population of manufacturing facilities in China. An explanation may be that foreign-owned entities have policies on matters such as adopting a conformity assessment program set by the global corporate office whereas domestic-foreign joint ventures have a greater need to demonstrate sustainability performance.

Influence of reputation

Reputation would appear to be a relevant consideration for facilities deciding to participate or not participate. However, it is a broad perspective on reputation. Adopters are facilities that have a stronger commitment to their reputation, want to do better on water, have strong corporate social

responsibility and environmental commitments and value customer relationships while non-adopters are more focused on regulatory compliance. These factors underline and complement differences in business values and culture noted earlier.

7.6.3 Rural attitudes to water stewardship

As an extension to this research, the investigator collaborated with a Masters of Development Studies student at the Graduate Institute of International and Development Studies in Geneva to test the survey instrument in rural communities; two villages near Nanjing and Shanghai. The resulting thesis (Whitebrook, 2019) used stakeholder analysis to understand the perspectives of farmers, local community leaders, NGOs, local and national government on water stewardship. In one village, Whitebrook found stark differences with community leaders seeing water stewardship as offering enhanced reputation for the village while farmers saw it as another compliance tool. He found farmers were the most apathetic toward water stewardship, having few resources and limited ability to implement water stewardship. The farmers he found, were at the bottom of a hierarchy of stakeholders with the least power and ability to influence outcomes.

Whitebrook's hypothesis - that engaging village-level farmers would be a key to implementing village water stewardship - was not supported by his investigation using a modified version of this survey instrument. He found the key determinant for a village water stewardship project would depend on the circumstances of each village. In one village, local government and local community leaders were the most influential while in the second village, local industry was a key influencer because of its contribution to pollution of local waterways. In this second village, national government (because of its concern about pollution in the Lower Yangtze) and local government were also important. In both villages, farmers were important but would need to be engaged through education and convinced about the alignment of water stewardship with government expectations. He argued synchronicity between national government policy and the ambitions of local stakeholders was promising for AWS in promoting collaborative water governance.

Separate analysis of Whitebrook's data found interesting perspectives when comparing these results with results from this investigation. Whitebrook's village sample showed the inverse of results illustrated earlier for the Net Benefits Index and the spread of responsibility for water and catchment health. For example, the village sample found that those who said they were not considering water stewardship were more positive about net benefits than those who were considering. At the same time, those who were considering saw government as being more important to water and catchment health than those that were not considering adopting water stewardship. Combining this with some of Whitebrook's observations, this reinforce the importance of government, particularly at a village level. Because Whitebrook's introduction to survey

participants was through a village leader, participants may have felt water stewardship was a government-sponsored program and they may have been wanting to tell the researcher what they thought the government wanted to hear. While in one sense, this is a limitation of the research, on the other hand it illustrates the importance of government to develop a village level project.

7.6.4 Summary of survey findings in China

As with Australia, rational choice is an inadequate explanation for why facilities choose or do not choose to adopt AWS. Both adopters and non-adopters produce similar net benefits index (NBI) scores, although adopter scores are more widely dispersed. Intangible benefits and compliance costs are the biggest differentiators, with adopters seeing these as more important than non-adopters. More generally, adopters see responsibility for water and catchment health spread more broadly among stakeholders than non-adopters, who place a stronger emphasis on government responsibility. Facility performance on water, relative to AWS requirements, shows a strong correlation to the literature with the very best performers disinterested in AWS, the medium to higher level performers likely adopters and poorer performers the non-adopters.

AWS adopters see water risk more broadly and plan for a wider range of mitigation measures in their water plans than non-adopters. This is reflected in actual investment in past and planned water performance improvement measures. Independently observed risk is a necessary but not sufficient condition for AWS and it needs to be reinforced by some form of stakeholder pressure. Reputation, broadly defined as a suite of actions, is more important for adopters, who see meeting government and customer expectations on water as more important that non-adopters, who are more likely to be motivated by regulatory compliance. Further investigation at a village level has underlined the importance of working with local officials in China to gain program legitimacy.

7.7 Case study summary

China has long-standing, deep-rooted cultural and institutional attitudes to water management. It is built around top-down hierarchical command-and-control based on major engineering works, national targets and regulations with local level implementation. The strength and resilience of the water and environment institutions may provide an opening for other forms of governance as frustration builds with the ability of these institutions to adapt to changing circumstances and priorities. China wishes to reset the balance between economy and ecology but, with existing institutions locked-in to ways of doing things, there is an interest in exploring other forms of governance such as markets and collaboration. At a local level, there has been some experimentation with collaborative governance, including AWS. Government has indicated it would like to further develop new approaches in the next five-year-plan thereby creating opportunities

(perhaps not mainstream opportunities) to grow collaborative governance. While saying that, it is noted that much of what can and cannot happen in China depends on government.

It was observed that China is the most successful jurisdiction for AWS. Two important drivers of this success are partnerships with local government agencies looking for new approaches to water after the national government crackdown on pollution and, partnerships with global brands concerned about water management in their supply chain. The Kunshan collaboration outlined in this case study was built on both government and supply chain support. This included both encouragement for facilities to participate, financial support for the program and financial incentives for participation. This combination was influential in bringing water-using facilities into the collaborative governance program (AWS). A further factor is the nature of the firms themselves. They are sophisticated businesses that value their reputation with government and customers, have commitments to environmental programs and CSR activities and, experience investing in a wide range of water improvements. The success of this collaboration provides some guidance for developing a provisional model for future water stewardship projects.

8 Analysis and discussion

The objective of this chapter is to bring together learnings from the case studies and the literature review to respond to the four main research questions posed in the introduction. The investigation set out to understand both the failings of environmental governance and opportunities for better stewardship through greater use of collaborative governance. In pursuit of that understanding, the investigation posed the following questions:

(1) how did different forms of governance emerge in these case studies and what factors facilitate the emergence of collaborative governance?
(2) do the examples of collaborative governance offer opportunities for stewardship that are better than those offered by other forms of governance?
(3) if yes, what are the impediments to greater participation by users of water and wood in collaborative forms of governance? and,
(4) how can these impediments be removed or overcome to achieve greater adoption of collaborative governance?

This chapter considers each of these questions, and in so doing aims to shed light on where environmental governance has failed stewardship and where collaborative governance may offer the prospect for better stewardship.

8.1 Evolution of governance and emergence of collaborative governance

This section is interested in factors that contribute to the emergence and maintenance of predominant forms of governance and, within that context, how forms of collaborative governance emerge. Furthermore, in considering examples discussed in the case studies, the investigation is interested in factors that may contribute to the durability of collaborative governance. Each of the case studies is different yet also exhibits similarities. Accordingly, this section will proceed in three parts: the first will consider factors that influenced governance in Australia based on case studies (1) and (2); the second will consider factors that influenced governance in China based on case study (3); and the final section will consider factors that contribute to the emergence and maintenance of collaborative governance based on the three case studies.

8.1.1 Environmental governance in Australia

The evolution of governance in both Australian case studies follows a similar trajectory: an abrupt end to Indigenous traditional governance, a transition period of frontier colonial governance followed by the establishment of local technocratic command-and-control. Towards the end of the 20th century, forms of market-based governance are introduced. Several forms of collaborative

governance appear at the end of the 20th century. The cases illustrate three themes: (1) how governance can change in the context of significant social transformation; (2) that policy change does not, of itself, alter the underlying approach to governance, and; (3) collaborative governance is more successful where it can equalise power differences between stakeholders.

From Indigenous to technocratic command-and-control (regulatory governance)

Environmental governance practiced by Indigenous Australians was extinguished by the arrival of the British, who did not understand how Indigenous Australians governed nor were they interested. They brought their own ontological assumptions about relations between humans and the environment. There followed a period of massive change during which colonial authorities were happy to adopt a light touch to environmental management as settlers essentially took what they needed or wanted from nature. The impact on forests was devastating while, for water in the relatively sparsely populated rural areas, the impact was less severe. With the development of local elites in the 19th century, a national economic development agenda developed, and colonial parliaments began to exert authority over resources with the aim of building national industries.

Ways of thinking imported from the British enlightenment, combined with the economic priorities of a place that saw itself as an emerging nation, influenced the technocratic institutions established at the start of the 20th century. These institutions were the foundation of regulatory governance built around technical expertise and knowledge (held by professionals such as engineers and foresters) and applied to economic goals. For forests, this was timber for self-sufficiency and export while, for water, this was urban services and irrigation communities on inland rivers. In both case studies, expert technical knowledge was applied to advancing social and economic goals of industrial development and nation building. There were voices of concern about nature's limits, but foresters and water engineers pursued their goals in a methodical almost mechanistic way applying science and technology to the task of economic development.

The authority of Australia's technocratic institutions began to be challenged in the 1970s by new institutions of the environmental movement that questioned the former's ability to manage natural resources in the public interest. This was particularly evident for forests and foresters, who at first ignored and then resisted this pressure and, over time, became active participants in the political process to protect what they saw as their entitlement to access forests. Water engineers did not become participants in the same way as foresters; rather, more passively, they retained a focus on technical solutions and identified with and protected industries they had helped create. Both exhibited an *institutional lock-in* to a way of working. While these institutions, and the professionals that inhabited them, were fit for purpose in their time, they were difficult to repurpose as circumstances changed and new pressures emerged.

Intervention of market-based governance

Three factors influenced the emergence of market-based governance in the 1980s: (1) from the 1970s there was growing public awareness of scarcity of forests and water and its impact on natural capital and ecosystem services; (2) Australia was opened to global banks and capital seeking new areas of investment including public sector activities, and; (3) the emergence of public choice and new public sector management (NPM) in government. NPM appeared to be a magic wand in the hands of a new generation of university-educated politicians and bureaucrats that could solve resource allocation problems. Markets could make allocative decisions more efficiently and effectively than regulation by the state. Public benefits or community service obligations could be managed through Pigouvian subsidies and taxes (Pigou, 1932). There was interchange of people and ideas between the public sector, investment banks and advisory firms. Many had been at university together. NPM promoted outsourcing of advice to many of the same organisations that were marketing investment in the public sector. Guttman and Willner (1976) refer to this as the *shadow government* of unaccountable advisors.

Market-based governance was intended to resolve scarcity through a science-based cap on resource extraction and trade to allocate available resources efficiently through price signals that direct resources to the highest value use. However, existing users of forests and water *rights* used political and institutional processes to resist change where they felt adversely affected. NPM did not account for *lock-in* of old institutions and the professions. What followed became a compromise that largely failed to address the resource constraints faced in forestry and irrigated agriculture. This failure is not adequately explained by concepts such as public choice theory that argue politicians, like consumers, make decisions based on self-interest. As will be discussed the failures involve a more complex set of factors than politicians acting on self-interest.

Samuelson (1976), in his seminal lecture on the forest problem, warned market-based governance had the potential to push forests to *tragedy of the commons* outcomes:

> *… applying what is sound commercial practice to government's own utilization of public forests, or what is the same thing, renting out public land to private lumbering interests at the maximum auction rent competition will establish – this is a sure prescription for future chopping down trees.* (Samuelson, 1976, p. 485)

He argued that unimpeded movement of price was the key to avoiding this outcome[48].

> *As wood becomes scarce, it will become more expensive. As it becomes expensive, people will economise on its use. But as long as there remain important needs for wood that people will want to satisfy, the price of wood will rise to the level necessary to keep a viable supply of it forthcoming.* (Samuelson, 1976)

For the social systems[49] of forestry and irrigated agriculture, nurtured by powerful state institutions over the course of the 20th century, with a dependence on the state for inputs of wood and water, their evolution imbued a culture of entitlement. While farmers and foresters will operate in highly competitive product markets the brutality of markets for primary inputs, that were once seen as limitless, was similar to the brutality facing a new child at Malthus' *feast of nature*:

> *A man who is born into a world already possessed, if he cannot get subsistence from his parents on whom he has just demand, and if the society do not want his labour, has no claim of right to the smallest portion of food, and, in fact, has not business to be where he is. At nature's mighty feast there is no vacant cover for him. She tells him to be gone, and will quickly execute her own orders, if he does not work upon the compassion of some of her guests.* Thomas Malthus, *An Essay on the Principle of Population* 2nd edition 1803 quoted in Hardin (Hardin, 1998, p. 181)

As Malthus had advised, forestry and irrigation sought protection of the institutions that had nurtured them, compassion of the community at large for their contribution to national identity, and to exert political power they had acquired as components of the national economic development agenda. Key elements of market governance were undermined or jettisoned. This perpetuated overconsumption and eventual loss of access to the resource in the case of forestry and an inability to achieve environmental goals in the case of water. The architects of NPM strategies for market governance, with their narrow perspective on financial levers, neglected social costs, institutional power and the institutional lock-in that would protect industries they had created.

Governance and belief systems

Public awareness of the limits to nature arose through the emergence of an environmental movement from the 1960s. This resulted in new institutions that clashed with institutions focused on national development. Underpinning this conflict were different priorities, values and belief systems. Regulatory governance was unable to moderate this clash. Environmentalists may be

---

[48] Samuelson acknowledged that he had not considered the externalities of chopping down trees or the impact on other forest benefits which, if properly considered was likely to put economists on the same side as environmentalists.

[49] The term *social system* is used here in the sense adopted by Rogers and described earlier.

motivated by values and emotional feelings toward nature (c.f. Berque, 2013; Nash, 2014) and/or rational understanding of the threats to nature and the planet from human activity. This leads to conflict with those who see nature from a utilitarian perspective as a thing at the service of humans. Environmentalists that argue a rational technocratic case become prisoners of the same instrumentalist assumptions that create the threat. This results in endless debate where science and values become interchangeable. Conroy and Peterson (2013) argue decisions about the environment are often about values rather than science and science is frequently a smokescreen for debate about values. Frustration leads to what Vekötter (2018) describes as apocalyptic environmentalism that confronts utilitarians with shock and horror. But this deepens division in societies unable to confront chronic challenges. Dumping traumatic data becomes overwhelming allowing some to rationalise doing nothing (T. Morton, 2018).

Murphy (2018) citing the work of Beck (1995) points to two possibilities from this confrontation:

> *Either the anthropogenic unleashing of nature's autonomous hazardous dynamics results in dangers perceived to be too big and costly to solve; hence the hazards are denied or discounted on the presumption future technology will enable humans to adapt to anything. Or they are perceived as too big and serious to ignore, hence the foreseen danger prompts humanity to free itself from the activities that threaten to unleash nature's harmful forces*. (Murphy, 2018, p. vi)

The case studies provide evidence of both responses; for forests, there were periodic shocks from overharvesting but more generally, a denial by forestry institutions that limits to harvesting were being reached or beyond their management. For water, the shock of the Millennium Drought prompted action that may not otherwise have occurred, but this was followed by a gradual erosion of that commitment and discounting of threats.

The belief system of forestry and water has its foundation in what Berque as the classic modern Western paradigm (CMWP), its commitment to private wealth accumulation and a largely utilitarian approach to nature (Berque, 2013). Institutions of forestry and water are responsive to the current holders of economic and political power. While at times this belief system was overcome by shock and outrage in the face of crisis, it reasserted itself and proved more powerful than political shifts and spikes. Regulatory governance, independently or in combination with markets, failed (for wood) or was compromised (water) resulting in an inability to provide stewardship.

8.1.2 Environmental governance in China

The Chinese case study identified a long history of water governance that retained many of the same features through changes in dynastic rule, political systems and leadership. Water governance in China drew from the origins of Chinese civilisation, rooted in Confucian, Taoist and

Buddhist traditions, and efforts to manage the waters of the Yellow River. It focused on hierarchies and top-down governance from a central ruling authority that delivered major engineering works (putting nature at the service of humans) and local governance of water management. Much of this continued into the post-revolutionary state where, as China industrialised, it imported and incorporated elements of the technocratic governance model of Western countries. As in Australia, technocratic bureaucracies were directed by political priorities for development. Water infrastructure was a key contribution to development. As in Australia, environmental stewardship was a second order priority compared to development and industrialisation.

An important difference between China and Australia was that in China, public agencies were able to act with even greater authority, backed by the unquestioned power of the state. Communities were forced out of the path of projects such as the South-to-North water diversion project and significant force accompanied the crackdown on pollution from 2016. However, as China attempted to change the balance between development and environment, it found a similar institutional lock-in that not even the powerful state could change at will. At first, China attempted to change through new laws and higher penalties accompanied by massive investment in infrastructure. However, this required follow-up with a major enforcement exercise designed to bring local institutions and officials into line with national policy. Further follow-up saw institutional change with the nine dragons of water[50] replaced by two super-ministries and vertical management introduced that by-passed provincial government. Further change is foreshadowed for the 14th 5-Year Plan, 2021-25 including greater use of markets.

Despite the difference between China and Australia in terms of history, culture and the systems of government, the underlying issue of technocratic command-and-control is similar. The institutions that managed water during the country's amazing growth phase (and devastating environmental management phase), and the professionals who managed them, were locked-in to ways of doing things that the state found difficult to change. As China moved from an industrialisation and development agenda to an *ecological civilisation* agenda, from a Confucian approach of humans commanding nature to a Taoist approach of living in harmony with nature, institutions failed to adapt. Ambiguity about priorities at a local level, and the historic attitude of *shang you zhengce, xia you duice* (*there are policies above, counter measures below*) contributed to these institutions retaining their focus on growth (*normative isomorphism*) and regarding environmental outcomes as secondary despite the national government's efforts to force change.

Until the shift to balanced growth over the past 10 years, China's water governance regime had been quite consistent over a long period of time. The change in emphasis has been accompanied

[50] The phrase *nine dragons of water* was used to describe the nine ministries and agencies in China's national government that shared, or squabbled over, responsibility for water (c.f Xu & Chan, 2018).

by growing interests in alternative forms of governance as a way to bypass institutional constraints of regulatory governance. However, adoption of market and collaborative governance appears to be constrained by fear of loss of control and both only exist in experimental form at this stage.

8.1.3 Emergence of collaborative governance

Forms of collaborative governance emerged both in Australia and China prior to industrialisation. In China, local rules were established at a village level to manage the distribution and consumption of water equitably. Agricultural collectivisation in China has been considered as a form of collaborative governance although, as noted in case study 3, this was short-lived. In Australia, self-managed irrigation schemes were advocated in the second half of the 19th century. Deakin argued that "the basis of successful irrigation must be … individual energy and … joint action on the part of the farmers themselves". Government could offer the means for development, but success would require collaborative management by farmers (Deakin, 1886, p. 428).

More recent developments of collaborative governance models have faced new barriers. In both China and Australia, collaborative governance needs to navigate technocratic institutions focused on expert-derived solutions that attribute greater authority to engineering and regulation than collaboration. In China, this is compounded by history and a controlling authoritarian state. In Australia, collaboration needs to contend with modernist paradigm, influenced by the libertarian ideology espoused by Hayek and others. Their views of government as a threat to liberty were based on rejection of collective action which they regarded as a stepping-stone to socialism. This conception atomises communities into competing individuals seeking to maximise utility (wealth, power). The idea that people can act collectively to solve social dilemmas was not regarded as rational. Markets were preferred for resolving competing priorities. Widlock (2017) argues this belief in markets led to a form of denialism that believed humans were incapable of sharing without expecting reciprocity. This reinforces an ideology of individualism. He does not deny reciprocity as a motivation but argues humans are capable of alternatives.

Despite this hostile environment, examples of collaborative governance appear in these case studies where there are gaps between community expectations of environmental stewardship and, the performance delivered by the state (regulation) or markets (private rights). In each case study, FSC and AWS develop where existing arrangements were not meeting environmental stewardship expectations for all or part of the community.

Prerequisites of collaborative governance[51]

In the case studies, addressing the gap between environmental stewardship expectations and existing practice required collaboration among stakeholders. Proposals to establish a collaborative governance arrangement[52] were advanced by civil society and addressed to industry leaders who were seeking to: (1) distinguish themselves from other businesses that were failing to provide stewardship or, (2) gain market or stakeholder acknowledgement for their stewardship initiative. Civil society played a dual role highlighting stewardship failings (forest campaigns by NGOs) and offering collaboration (FSC or AWS) as a solution. While NGOs may hold legitimacy within that sector of the community disaffected with industry stewardship, they will generally only have the ability to pressure industry to participate if they can build sufficient market or investor pressure. This pressure also needs to generate sufficient financial resources to establish and maintain the infrastructure for collaboration. Both FSC and AWS ask business to undertake sometimes costly activities that they would not otherwise undertake. Participation is not guaranteed.

The literature review identified a range of collaborative governance models (c.f. Kekez et al., 2019). The case studies indicate collaborative governance is more successful when it equalises power differences between stakeholders. In other words, where power difference is equalised, there can be collaboration toward an agreed outcome for forests or water because no party can force its will on the whole. Values differences must be mediated, and problems seen from multiple perspectives. Achieving this power balance between stakeholders requires commitment and *rules of the game* that equalise the financial strength of business, the political strength of government and the network strength of civil society. This balanced stakeholder form of collaboration, such as FSC and AWS, can be distinguished from those often advocated by government, that tend to be extensions of regulatory governance, where stakeholder engagement or advice is being sought. They can also be distinguished from collaborations controlled by industry that lack legitimacy in the eyes of stakeholders because they appear to primarily serve the interests of business (greenwash). Being a neutral, honest broker establishes legitimacy for collaborative governance.

If stakeholders (community, business, public sector) do not perceive the governance mechanism as providing equal standing to all participants this will undermines the standing of the collaboration. This was evident in both the forest and water case studies in Australia. The Regional Forest Agreement (RFA) process was seen as comprehensive, but (certainly in Victoria) lacked legitimacy because experts retained control (financial control, control of information and ultimately control of outcomes). Stakeholders felt they did not have equal ability to influence outcomes (Lindenmayer et

[51] This section draws on sources as indicated in the text as well as the personal experience of the investigator with FSC and AWS

[52] For FSC from the late 1980s and AWS from the second half of the 2000s.

al. 2004). The NSW catchment agreement process faced similar problems. Here, the decisive obstacle was the control retained by experts and politicians to decide the outcomes. Participants felt disempowered. It was claimed the experience would undermine the legitimacy of collaborative processes more generally (Bell and Park, 2006). Problems for the Wombat forest collaboration (case study 1) were more complex: it was overwhelmed by outside interests which neither people nor processes were equipped to manage. Hence, the issue is not just balancing power but having the rules to balance power effectively.

The importance of agreed *rules of the game* has been identified as central to the characteristics of governance (for example, Williamson, 1996) and specifically, the characteristics of collaborative governance (Ostrom, 1990). The case studies showed that where these rules were either absent or not clear, the collaboration failed to achieve its goals. In the Wombat forest example (case study 1), participants sought to develop rules on the run while dealing with pressure from government to make progress and an inundation of outside interests. In NSW catchments (case study 2), there may have been rules, but these were not clearly communicated to participants who had developed their own expectations. Similarly, with RFAs (case study 1), there was a misalignment in the expectations of participants and rules established by government. In contrast, FSC emerged in Australia with a pre-existing set of international governance rules intended to balance the power of stakeholders that were a condition for entry. AWS adopted the same approach. Rules need to be clearly established and communicated before moving to the subject of the collaboration.

Maintaining firm rules for balancing stakeholder interests is challenging in the development phase of a collaboration, where there is a need to balance legitimacy with building participation. This was evident in the AWS case studies (2 and 3) where AWS attempted to grow without the strong brand of FSC. The literature review discussed *club theory* (Buchanan, 1965) and its application to voluntary environmental programs (Prakash & Potoski, 2007). Participation or the *size of the club* (of respected members) builds the brand value that rewards participants. Prestige (brand recognition) and membership size feed off each other. In case study 1, the FSC brand, recognised in international markets, was seen as valuable to new plantation-based woodchip companies seeking to enter international pulp and paper markets. Hence their early engagement that, in turn, provided momentum for FSC. Similarly, Paperlinx saw value in promoting the FSC brand in a market where there was concern about the origin of paper supplies. This provided a start for FSC in Australia, although it did not guarantee success. For AWS, the lack of brand value meant it needed to generate momentum in a space that, while contested, was not contested to the same extent as forestry. There were no product boycotts due to water and once the Millennium Drought broke, momentum in Australia was lost. Participation creates a virtuous cycle of participation.

In contrast to the Australian experience of AWS (after the Millennium Drought), the Chinese case study (case study 3) showed that the participation of government and supply chain leaders (or dominant brands) in Kunshan compensated for the lack of brand value. The heavy-handed crackdown on water pollution and the impact that had had on factory operations created a receptive environment for AWS. Influential local officials were willing to experiment with a voluntary standard and certification scheme (AWS) managed through collaborative governance. They were interested in testing a way to engage industry in stewardship that was more flexible and adaptive than a direct instruction from government. AWS allowed industry to find its own route to improved performance. AWS and WWF could work with industry in a way that was independent of the strong hand of government although still within the *shadow of the state*[53]. Participating facilities attended workshops in search of better ways to manage water, even though they would have been able to achieve the same by engaging a consultant. It would appear they wanted to be seen to be trying. This initial success engaged Apple as the end customer with an interest in improved supply chain water management. This allowed AWS to generate momentum in China.

In each of the case studies, a prerequisite for success was the availability of resources to manage the collaborative governance arrangement independently while offsetting the cost of participation either through intangible benefits such as brand or reputation in case study 1 or financial compensation in case studies 2 and 3.

8.1.3 Emergence of forms of governance – summary and conclusion

This section set out to respond to the question: how do different forms of governance emerge in these case studies and what factors facilitate the emergence of collaborative governance? Forms of governance are influenced by a range of factors including culture and prevailing belief systems as well as the distribution of economic and political power. While Australia and China developed technocratic command-and-control from different backgrounds, they arrived at a very similar point at the conclusion of the study period. In both cases, the institutions created become locked-in to a way of being that restricts their ability to adapt to changing priorities. In Australia, this is dealt with through an attempt to transition to market-based governance. Yet, institutions persist and either constrain the market (water) or dismantle it (forests). In China, despite a decade of institutional change, environmental governance was not meeting the goals of national leaders and in 2020 they were considering an expanded role for markets and collaborative governance.

[53] A phrase borrowed from (Guttman et al., 2018) to describe non-state actors operating independently yet remaining with the overall framework of national government policy particularly in relation to environmental management and policies.

The case studies show evidence of collaborative governance in both pre-European and 19th century Australia and in pre-industrial China. In Australia, the modernist paradigm, that emphasises individuals, competition and utility while mistrusting collective action, is not conducive to collaborative governance. Nevertheless, it develops where there is a gap between stewardship expectations of all or part of the community and what is delivered through markets or regulation. This dissatisfaction is generally taken up by one or more civil society organisations who will lead the development of a collaborative governance arrangement by: (1) defining and articulating the problem, and; (2) creating a pathway to improvement. In China, collaborative governance emerges where there is also a gap between environmental outcomes and expectations. It has been successful where there is cooperation between both government (in this case municipal) and customers (in this case global brands).

A key to successful collaborative governance is equalisation of power imbalances between stakeholders; that is, create a neutral space in which collaboration can be developed. Equalising power imbalances must be based on clear and accepted *rules of the game* that align expectations and build consensus around goals and process. This neutral platform allows mediation of values differences. Gaining support from industry participants for this form of collaboration presents a barrier for start-ups such as AWS where there is no pre-existing brand value that can compensate business for participation. The China case study showed that this can be overcome by engaging government and supply chain leaders who are prepared to provide support, subsidise adopters and encourage participation without dominating or disturbing the neutral platform.

8.2 Opportunity of collaborative governance

This section sets out to answer the following: do the examples of collaborative governance outlined in the case studies offer opportunities for stewardship (as defined in the literature review) that are better than those offered by other forms of governance? The discussion will be in four parts: first, it will summarise the stewardship performance of current governance arrangements; second, it will review limitations on the ability of regulatory governance and market-based governance to foster stewardship; third, it will consider advantages collaborative governance has in dealing with these issues; and fourth, it will reflect on the limitations collaborative governance has in demonstrating superior performance.

Before proceeding, it is noted the case studies reveal that the Ostrom typology of governance may be deficient in so far as it neglects traditional Indigenous governance; a form of governance that delivered stewardship of the Australian continent for many thousands of years. While this form of governance was not specifically included in this investigation, passing observations have been

made and it is acknowledged that inclusion of governance practiced by traditional Indigenous Australians would be an important addition to future investigations of stewardship in Australia.

8.2.1 Performance of current governance arrangements

Almost 50 years since the world came together in Stockholm to "guide the peoples of the world in the preservation and enhancement of the human environment" (UN, 1972), the situation remains grim. Solutions to problems such as global warming, water crises, deforestation and biodiversity loss seem just as far away despite some successes. As planetary boundaries are exceeded, there is a threat of *step change* and unpredictable consequences that could fundamentally alter earth's systems (Steffen et al., 2015). Far from being able to come together to resolve social dilemmas, the world is divided into tribes who believe either the planet is headed for disaster or that the planet is fine and offers ongoing opportunity. This was reflected in each of the case studies.

Deforestation in Victoria

The most striking illustration of stewardship failure is Figure 4 in Chapter 4 that illustrates the decline of harvestable timber from State forests over time. The value of available harvestable timber in State forests declined, over a ten-year period, from $300 million to $10 million[54]. Yet individuals who participated at a senior level of forest administration of the state had never brought the data together in this form and, even though the data was drawn from annual reports lodged in Parliament, believed it must be wrong (interview 1/003). If, as Hardin (1968) argues, the Leviathan was supposed to address *tragedy of the commons*, it clearly failed in this case. When the full range of forest ecosystem services are considered - water, biodiversity, forest carbon, recreation – the failure of regulatory governance to provide stewardship is stark. Many of these ecosystem services co-exist in the same region, the Central Highlands (VEAC, 2017a). Rather than attempting to balance these services to maximise net community benefit and protect assets, under regulatory governance it became a political tussle between the human advocates for particular services – cute marsupials versus hard-hatted loggers – and economics generally won.

Market-based forms of governance also failed. The *Sustainable Forests (Timber) Act 2003 (Vic)* was designed to address over-harvesting of State forests. It set compliance requirements for State forest managers and presaged the introduction of a market-based governance. Regulatory and compliance functions remained with the Department, harvesting and marketing became a business (VicForests). The Department would allocate harvest areas and regulate compliance. VicForests,

[54] As mentioned in the case study, these figures are derived from Annual Reports and based on applicable accounting standards.

would harvest and market through a competitive sales system. This worked for about three years before it was eroded due to industry pressure and bushfires. Foresters from both the Department and VicForests collaborated on a long-term harvest plan to sustain the industry consistent with what Leslie (1987) describes as the profession's single-minded focus on wood production. Industry complaints about wood being subject to market prices and competitive bidding saw the demise of competitive bidding (auctions) thus depriving the market of price signals warning of scarcity. The available forest was logged-out and unsustainable within a decade.

Water crises in Australia

The evidence for water management in the Murray-Darling Basin is similar to forests. However, rather than a steady decline in environmental conditions, the failing health of the Basin is evident in periodic events influenced by drought and flood. Recent mass fish kills in the lower Darling brought national attention to the state of the Basin's ecological health. Regulatory governance resulted in overallocation of water from the Basin that, during the Millennium Drought was described as an *ecological catastrophe*. For the past two decades, governments have believed that market-based governance and the cap-and-trade system, can do a better job of managing for balanced outcomes. Environmental stakeholders point to ongoing failure to achieve, maintain and deliver the 'cap' in cap-and-trade to protect environmental health. Market-based governance is dependent on rules created and enforced by government. If the cap in is not set correctly or not enforced, the system fails. Current arrangements have left communities feeling alienated by experts and a market that allocates water to new players who are not part of their communities. Governance arrangements do not address these concerns ensuring ongoing debate and dissatisfaction.

Water crises in China

China has ongoing water crises. While most attention is focused on pollution of rivers, lakes and groundwater systems, it also suffers scarcity and a loss of ecosystem health. Regulatory governance has been used almost exclusively. Yet, even for the powerful Chinese state, turning the direction of institutions that influence these issues is difficult. With its rich history of water engineering, there has been massive expansion of water infrastructure regardless of the impact on local communities. Regulatory action has been more problematic where this depended on local enforcement and clashed with local economic interests. A crack-down on pollution has seen people, including senior government and party officials, fined and imprisoned for failing to meet river health and water quality requirements. Institutions have been reorganised and provincial government by-passed. There is evidence these measures are having an impact although water challenges continue with scarcity likely to increase as climate change impacts are felt. Reliance on

engineering solutions can have an opposite effect to what may be desired as it can perpetuate the invisibility of water to users and a myth of abundance such that little actually changes.

Government Ministers describe the situation as grim (Hou, 2020). Continuing reliance on engineering solutions is expensive (ADB, 2016), yet these solutions alone will not solve China's water deficit (2030 Water Resources Group, 2009) while melting glaciers present a threat to China's future (Hu & Tan, 2018). While some cannot conceive of China addressing water problems in any way other than top-down command-and-control, there is growing interest in other governance arrangements as it pursues creation of an *ecological civilisation* (Xu, 2020).

8.2.2 Limitations of current governance arrangements

Both the Australian case studies show a similar pattern of regulatory governance failing to provide stewardship and government reaching for market mechanisms to deal with resource scarcity (overextraction). In both cases, markets were able to allocate scarce resources to the highest value use however, this created political problems and invited political interference. Setting *caps* to manage scarce resources, and policing them, relies on the same institutions that allowed over extraction. Where these institutions were established to foster economic development, they will be locked-in to an industry support role that is likely to result in *tragedy of the commons* outcomes as indicated by failures of water management in NSW and forests in Victoria. While Eggleston (1932) argued, consistent with public choice theory, failure to manage natural resources was due to self-interested politicians, at the turn of the 21st century there was a much wider array of actors involved many of whom believed they were acting in the public good rather than for their own benefit.

Institutions and their professional experts adopt technology or regulatory solutions that result in perverse outcomes such as the Jevons Paradox[55], or create a focus on compliance rather than stewardship. Engineers make water invisible and regulators make pollution a legal compliance issue or an issue for the market, rather than a moral issue of how people behave towards others and future generations. This is convenient for business, as water or forestry problems become someone else's problems or simply matters of legal compliance, not moral problems to be confronted through relationships with stakeholders in their operation. These attitudes were evident in the responses of non-adopters to the questionnaire of water-using enterprises. Engineering and regulatory approaches increase separation between people and nature making it more difficult to build consensus outcomes that address multiple concerns and priorities for stewardship.

[55] Jevons observed for coal in England that increased technological efficiency of steam engines did not lead to an expected decrease in consumption. It led to coal becoming a more cost-efficient power source which led to increase use of steam engines which increased coal consumption. The concept has since been extended to water use and more broadly in environmental economics (see for example, York, 2006).

Professions both populate regulatory institutions and become institutions themselves. As experts, they enjoy “trust and respect” (Stehr & Grundmann, 2005, p. x) and hold knowledge which privileges them with an asymmetry of power. The opposite is also the case – and this is relevant to collaborative governance – the growth of professional experts disempowers non-experts. In many cases this is accepted through the agency afforded to experts by non-experts. In economic terms, this is simply Smith’ division of labour at work and unremarkable. But it undermines collaboration and building stakeholder engagement. Sharp (2017), for example argues that through their expertise, water professionals have effectively made water invisible in contemporary western societies. Reconnecting people with water will require re-democratising - sharing knowledge in a way that allows greater engagement or *hydrosocial water management* (Sharp, 2017, p. ix). Thus, collaboration will require working with professions to accept this democratisation of knowledge and accepting the legitimacy of stakeholder-managed processes.

Decision-making tools are either inappropriate or underutilised to devise stewardship outcomes that require holistic appreciation of ecological systems as well as inter and intra generational sharing. Competing priorities between economic, public sector and community stakeholders were evident in the case studies. As discussed in the literature review, tools are available that allow trade-offs between alternative uses to be evaluated, yet, in the case studies, these tools were not adopted to calculate net public benefit. Cost-benefit analysis is based on achieving welfare maximisation. This was originally defined by Pigou (1932) as maximising the sum of private benefits or economic welfare maximisation. There have been attempts to broaden this to social welfare maximisation by using tools such as shadow-pricing for non-market benefits (for example, Florio, 2014). However, conventional cost-benefit analysis, as practiced, will tend to prioritise measurable (private) economic benefits over non-market public benefits, as illustrated in the case studies, making stewardship of natural capital (market and non-market) almost impossible to achieve. Accounting approaches that allocate value to natural capital and allow trade-offs to be evaluated - SEEA, integrated accounting, natural capital accounting – are yet to be widely adopted.

How private economic interests become prioritised over public (non-market or non-traded) interests by regulatory and market governance was illustrated in case study 1 (forests). The Board of Inquiry (I. S. Ferguson, 1985) had proposed that the goal of managing State forests should be the maximisation of net public benefit from those forests. Yet Ferguson said this would be impossible to calculate because non-wood benefits were too difficult to calculate. The government’s subsequent forest statement only focused on wood harvesting, the wood products industry and protection of timber jobs. This fitted the institutional culture of forest management and was translated into action. Other elements of forest management, those involving public benefits, were allocated to national parks or reserved areas and separated from the business of forest

management. What followed was a reduction in the measurement of non-timber forest values in State forests. Tools for calculating trade-offs between ecosystem services were not applied and economic management of forests continued to be the main concern of foresters.

Intergenerational interests have no voice (other than through some civil society organisations) in regulatory or market-based governance. Markets discount the value of future interests such that, more than 10 years out, they are of little consequence. Government in Australia pays lip service to future generations, but they don't vote and won't vote in elections within the timeframe of most politicians. While the notion of intergenerational equity has been part of sustainability dialogue since Bruntland (1987), how it is included in the discussion has advanced little. Stern argues it is a moral issue, and that the interests of future generations in climate outcomes should not be discounted (N. Stern, 2007). In the forest case study, forests were valued based on discounted future cash flow. This only considered wood values from the current crop of trees. In the Australian water case study, it was intended that the Basin Plan would manage for future generations; however, the current generation demanded government maintain its viability at times of water stress. In China, the idea of an *ecological civilization* offers some prospect that future generations could be considered, although this is yet to be fully articulated. Consideration of future generations will either require a firm decree from government or consensus among stakeholders in a collaborative governance arrangement.

8.2.3 Advantages of collaborative governance

Collaborative governance offers an alternative pathway to stewardship by engaging all stakeholders, on a neutral platform, to review the social dilemma from multiple perspectives, define outcomes, develop rules, prepare and implement plans to achieve those outcomes. A neutral multi-stakeholder platform is essential to overcoming power discrepancies, and to creating dialogue and transparency. FSC and AWS were able to balance economic, ecological and social forces through rules and procedures for equalising power. Each case study provided anecdotal evidence of constructive work toward resource stewardship that would not otherwise have occurred although neither FSC nor AWS has a mature performance measurement system. This included evidence of improved practices by industry as a result of pressure created by FSC or AWS. Empirical evidence based on performance of AWS adopters and non-adopters, from Australia and China, illustrates that those who engage with AWS take a broader interest in stewardship beyond the factory gate. The evidence leaves open the question of whether this demonstrates the type of business attracted to AWS, is the result of engagement with AWS or ex-post rationalisation. The data was not manipulated to reveal the direction of the relationship. Either way, the evidence shows there is further scope for improvement by adopters to fulfill the requirements of the AWS Standard as discussed in each of the water case studies (see discussion at 6.6.2 and 7.6.3).

Evidence of differences between industry cohorts was not analysed because of the small case numbers. However, each industry has its own set of characteristics, and these can be tested against the model set out in the following sections (8.3 and 8.4). As the number of facilities participating in AWS grows, this would be a worthwhile extension to this investigation.

This case studies illustrate several approaches to collaborative governance. The Wombat forest example (case study 1) did not deliver on its promise and disintegrated after only two years. However it is argued that the project engaged more people and a more diverse cross-section of interests than other forest processes (N. Matthews & Missingham, 2009). Prior to the project becoming swept up by the state and joined by interests from outside of the community, it had built consensus within the community for an approach that could have achieved stewardship. Petheram et al. (2004) argue this case required a much greater understanding of principles and processes of collaboration and communication. Governance and the management of power relations are crucial. “Power held by various stakeholders is a crucial issue in the establishment and maintenance of collaborative initiatives because it has a strong impact on why people will or will not participate” (p. 139). Collaboration, they continue, cannot occur where there are disparities in power and influence. The Wombat project needed more time to develop *rules of the game* to manage power discrepancies and guide endeavours toward a shared vision.

The ability to resolve power relations was built into FSC. The FSC governance model equalises power differences and its Principles and Criteria for responsible forest management are intended to provide forest stewardship. When FSC brought economic, social and environmental stakeholders together, many acknowledged they had never previously sat at the same table. Its strongest area of activity was in planted forests. There, some were well-run but there were constant battles between stakeholders over issues such as chemical use and protection of endangered species. FSC influence on State forests was more limited although VicForests maintained throughout the decade 2010 to 2020, that it was seeking certification, despite two applications being rejected. Yet, in pursuit of certification, VicForests did prepare new plans and strategies for managing sensitive forest areas known as High Conservation Value (HCV) areas. VicForests representatives also participated in FSC meetings and working groups. Some civil society organisations found the engagement of VicForests or engagement with plantations troubling (c.f. Amis, 2007). Despite this, FSC did manage power imbalances, certify large plantation areas and develop an Australian standard for forest stewardship.

In contrast to the Wombat example, FSC arrived in Australia with a well-developed multi-stakeholder governance system. From the start, the Board included people with strong loyalties defined by past conflicts. Despite these differences, individuals came together as a Board of FSC

Australia with a legal obligation to the health and success of the organisation. Meetings and working processes were all based on tripartite collaboration between economic, social and environmental interests. (M. Spencer, 2006). This brought multiple perspectives to shared problems while building honesty and transparency in the search for solutions. Social events, such as the annual FSC Awards Night, involved previously warring parties coming together in an informal environment, often for the first time. All they had in common was forests and a shared interest in FSC. Staff saw their role as managing a respectful process and abstained from conflict. There were disagreements but also many opportunities for what Christensen and Butler (2019) refer to as *relational accountability*; the informal interpersonal dynamics that develop in a collaborative group. "By spending time together, working on challenging issues, and clarifying their commonalities, the participants in these collaborative groups not only developed strong relationships, but also fostered trust …" (Christensen & Butler, 2019, p. 69). The governance system survived challenges (such as a walkout by a major union because it could not control FSC processes) and built the engagement of diverse stakeholders with an interest in forests.

Water stewardship could point to a number of positive outcomes, although these would be in the league of small changes rather than Basin-wide stewardship. For example, the engagement of the Renmark Irrigation Trust (RIT) with the Commonwealth Environmental Water Holder (CEWH) to distribute water for wetland restoration through its irrigation infrastructure illustrates how stewardship can prompt change and different ways of thinking. RIT received income from the CEWH for this work and it stimulated a new small business in the town providing guided walks of the rehabilitated wetlands. Similarly, the first Ingham's site to achieve AWS certification engaged with its community in new ways by supporting the Western Port Water Stewardship project that involved working with environmental agencies, non-government organisations and other industries in the region. The project engaged more than 100 nearby water users. Site water manager, Hudson Cameron, pointed to a change in water culture at the site where management and employees became more aware of water and undertook collaborative projects not only with the community, but on site – for example, fencing off waterways that ran through a paddock at the back of the site (Cameron, 2015).

The China water stewardship example provided some evidence of participants becoming more involved in stewardship outside their fence line. One example cited was the activity of a major micro-electronics firm in Kunshan that engaged local schools in learning about water, its challenges and how the community could respond to those challenges. In another example, the investigator visited a Nestle water-bottling facility in Yunnan province after it achieved AWS certification. The facility had already spent considerable time and resources monitoring and stabilising the groundwater system from which it draws water. Following AWS certification, it committed to improving transparency in sharing water data and building community relations for

mutual understanding of water challenges (Nestle, 2018a). The investigator met and interacted with local water officials and schoolchildren engaged in water projects at the plant. In China, building a sense of shared ownership of natural capital seemed as important as in a country such as Australia, and a potential contributor to building an *ecological civilisation* insofar as that term is intended to suggest a new way of being between humans and nature (c.f. M. Spencer & Xu, 2021). Anecdotal examples point to improvement, but not conclusive evidence of stewardship.

Water performance data collected through the questionnaire of water-using sites shows two things relevant to this discussion: (1) that those adopting AWS are more engaged in a wider range of water initiatives, inside the facility and beyond the fence line, than those not adopting and, (2) the AWS system offers scope and reward for ongoing improvement as illustrated in the gap between the current performance and desired performance to fully comply with the AWS Standard. However, the data does not conclusively support the hypothesis that collaborative governance delivers improved stewardship because stewardship changes have not been measured in a convincing manner. That work remains to be done (c.f. IDEEA Group, 2018).

8.2.4 Demonstrating superior performance of collaborative governance

Measurement is central to the contemporary Western paradigm, where empiricist social science (Popper, 1959) is the dominant epistemology in many fields and an entry point for credibility. Discussion about the relationship between humans and the environment generally takes place within this paradigm. For example, Meadows et al.(1972) warned that nature's resources were being overconsumed through computer modelling of planetary scenarios. Pearce (1991) argued that if humans could value their environment they would not degrade it as much. Stern (2007) sought to quantify the impacts of climate change through economic modelling to argue the need for action. The TEEB project[56] (Kumar, 2010) sought to provide visibility to nature through economic valuation. For some, measurement can be in either financial or biophysical terms as long as there is an ability to evaluate trade-offs to inform decision-making (Polasky, 2008). Since the 1992 Rio Summit, a host of valuation and measurement techniques have been developed with a view to having natural capital incorporated in discussion on the same basis as physical capital. The view that without measurement there cannot be effective management[57] has become widely accepted. Yet, as the case studies illustrate, there is very little measurement to demonstrate the ability of collaborative governance to achieve stewardship.

[56] The Economics of Ecosystems and Biodiversity project know as TEEB

[57] The quote "If you can't measure it, you can't measure it" is widely attributed to management scholar Paul Drucker (Lavinsky, 2020). However, as Zak points out: "He never actually said it" (Zak, 2013). While Drucker undoubtably saw measurement as an essential part of management, his view was more nuanced emphasising the importance of managing by objectives and tracking performance (Drucker, 1955).

There is evidence of efforts to improve measurement of impacts by both FSC and AWS. As the investigator can testify based on experience with both, measurement has been a challenge from their early days of development. Auld et al. argue that FSC offers a mixed story on impacts because while it encouraged best practice and continuous improvement, patterns of adoption "raise questions about effectiveness" (G. Auld et al., 2008, p. 198). They argue those who engage with FSC are already better forest managers before certification and therefore face lower compliance costs. Bringing those who are already better managers into a certification system did not help to address deforestation and may have increased demand pressure on lower cost uncertified forests. In the absence of data, discussion too often rests on generalisations. The ISEAL Alliance, an umbrella organisation, has led work on goal-setting by affiliates through *theories of change* and collecting data through *monitoring and evaluation* systems in order to better report *impacts*. Milder et al. argue that "the once accurate refrain" that environmental effects of these programs "are largely unknown" is being addressed, but in ways that are still far from complete (Milder, Newsom, Lambin, & Rueda, 2016, p. 22).

The investigator attempted to address this deficiency through integrating AWS reporting requirements with the System of Environmental-Economic Accounts that was linked to the System of National Accounts. It was felt this would help to understand and quantify public benefits from AWS in order to engage public sector agencies (M. Spencer, 2018). Linking AWS with the SEEA could produce data to communicate performance, outcomes and impacts of collaborative governance in a language understood by the institutions of both regulatory and market governance. It could also provide a framework for implementing stewardship (management by objective (Drucker, 1955)), reporting on stewardship and engaging water managers in public sector agencies driven by performance metrics. The project concluded this approach could successfully engage with public sector managers but awaits further action to move to a broader trial.

Relationships over metrics

A counterpoint to this focus on measurement is the argument that valuing nature (in monetary terms) devalues nature and reduces it to an object that can be bought and sold (Foster, 1997; R. Spencer, 2013). As Stern (N. Stern, 2007) noted, valuation techniques effectively disenfranchise future generations by discounting future value. In Heideggerian terms, valuation amounts to an instrumentalist separation of subject and object, such that humans are alienated from their environment and see it is something separate rather than part of their being. This can become counterproductive to stewardship because instrumentalist discussion about relations between humans and the environment becomes a discussion about us and it rather than seeing it as part of us. Not only does this separate object from subject, it separates facts from values (Painter-Morland & ten Bos, 2016).

In the context of business, Painter-Morland and ten Bos argue: “The tendency to measure dominates corporate life in ways that make an alternative relationship between various types of beings impossible to envisage”. They argue Heidegger offers such an alternative where organisations will be: “… less concerned with quantifying environmental impact and more concerned with building the relationships or avoiding the destruction of relationships that cause the ‘impact’ in the first place.” In short: “What is required is to de-distance ourselves from nature” (Painter-Morland & ten Bos, 2016, p. 558).

In this view, a measure of success for collaborative governance would be the collaboration itself, in so far as this engaged business in working with nature instead of seeing nature as an object or business input. Building collaborative relationships requires letting go of the power imbalance that favour owners of capital. This creates the opportunity for multi-stakeholder perspectives on social dilemmas, openness, transparency and ultimately trust. It provides a pathway to include the interests of future generations in discussion where they would otherwise be excluded. In this regard, programs such as FSC and AWS offer a pathway to stewardship through collaboration based on relationships that require different measures of achievement if not success. Therefore, it could be argued that strong and well-functioning collaborations that include all stakeholders on an equal basis may provide a better indicator of stewardship success than measurement.

8.2.5 Opportunity of collaborative governance: Summary and conclusion

Collaborative governance creates new opportunities to address long-standing social dilemmas through equalising power relationships and bringing together otherwise warring stakeholders around clear rules in a way that encourages collective problem-solving. By creating a neutral platform, it creates the possibility for relationship-building (both formal and informal), where this would not otherwise exist, and openness, transparency and trust. Through adopting a multi-stakeholder perspective on social dilemmas, problems can be seen in multiple dimensions creating the possibility of solutions that might not previously have been considered. Participants see problems in a social, economic and environmental context. Risks include a broader range of issues than compliance and solutions are seen as extending, for example, beyond the fence line of a facility and into the community and environment. These solutions embrace moral and social dilemmas not merely regulatory compliance, thereby making possible the consideration of future generations.

Collaborative governance programs of FSC and AWS were created by civil society as a result of stakeholder pressure to address gaps left by regulation and market-based governance. FSC withstood considerable institutional pressure to prevent its establishment in Australia yet

succeeded by equalising power differences in a highly contested space. AWS adopted a similar governance model but lacked market pressure in Australia to overcome institutional resistance. In China, with support from customers and government, AWS was more successful. It is noted that collaboration involves more than just organised participation; “stakeholders must come to the table with a desire to develop shared goals and then work out strategies to achieve those goals” (Petheram et al., 2004, p. 140). Collaboration needs time for co-learning. Scale also needs careful consideration; start small and build (N. Matthews & Missingham, 2009; Nelson & Pettit, 2004; Petheram et al., 2004). Clear *rules of the game* are required. Collaborations draw on expert knowledge but are not necessarily directed by experts. Outcomes may not be as neat as the experts would like, nor will decisions be made quickly. However, decisions can be owned by all in a way that ensures long-term commitment and recognition of future generations.

The case studies reveal obstacles to collaborative governance will be self-interested institutions, particularly professional interests reluctant to let go of their power and position. In case study 1, foresters became part of the power struggle with environmentalists and saw those advocating for protection of environmental values as an enemy and a threat to their profession. Foresters saw collaborative governance as a threat to their professional expert status. The water case studies pointed to the dominance of an engineering culture based on providing technical and infrastructure solutions and demonstrating an impatience- or intolerance - of social solutions. Non-experts were disenfranchised by a disequilibrium of knowledge and power. In the NSW catchments example, there was intolerance from the engineers to drawn-out, non-expert, *messy* collaborative decision-making. Irrigation communities had been created and nurtured by the state leaving an expectation the state would resolve social dilemmas on their behalf. In China, top-down technical solutions were the way things were done and there was a lack of familiarity with collaborative governance.

Intergenerational equity remains a difficult concept for governance because it requires an inter-temporal perspective that is generally not present in modern societies. Traditional Indigenous governance, considered briefly earlier, was much more successful. Collaborative governance offers an opportunity through bringing together multiple perspectives on shared social dilemmas.

8.3 Impediments to collective action

This section begins a discussion of how participation in a new collaborative governance can grow by considering the impediments to participation in AWS by business as well as the attractions of participation. It responds to question 3 that asks: if there are opportunities to achieve better stewardship through collaborative governance, what are the impediments to greater participation by business? Business is the focus because of the impact business can have on nature, both directly and indirectly, through its influence on government. The basis for the discussion is the

empirical evidence collected through the questionnaire outlined in Chapter 5. This section will bring together results from both China and Australia/New Zealand to consider what is common, what is not common and what can be learnt for the purposes of generating greater engagement.

Discussion in this section will proceed in four parts, it will: (1) review the provisional research model developed in Chapter 5 and make any adjustments; (2) develop a provisional typology of adopters and non-adopters; (3) compare and contrast China and Australia, and; (4) review factors that may influence participation or non-participation in AWS water stewardship. This will then set up the final section of this analysis where a provisional implementation model is developed.

8.3.1 Review of research model

The research model was explained in Chapter 5. It drew on a series of hypotheses from the literature to understand factors that may influence decisions of water-using facilities to participate in AWS. This model, illustrated in Chapter 5 at Figure 7, was used to frame a questionnaire administered to 53 facilities in China and Australia. It proposed choice decisions would be framed by the facility culture, perceived risks, perceived rewards and the achievability of AWS for the business. Responses to the questionnaire suggested some changes in emphasis.

The revised model is illustrated in the Figure below. The model retains rational choice (perceived benefits exceeding perceived costs) at its core but modifies the internal and external factors that influence choice. Data from the survey suggests rational choice is influenced by: (1) the extent to which the facility is engaged with water issues and committed to improving its water performance; (2) the internal business culture indicated by (a) the extent to which it values brand, reputation and relationships, and (b) whether it is more inclined to see water and catchment health as a social responsibility than just a government responsibility; and (3) water risks and how broadly the facility perceives those risks. Elements of the model are described in more detail below.

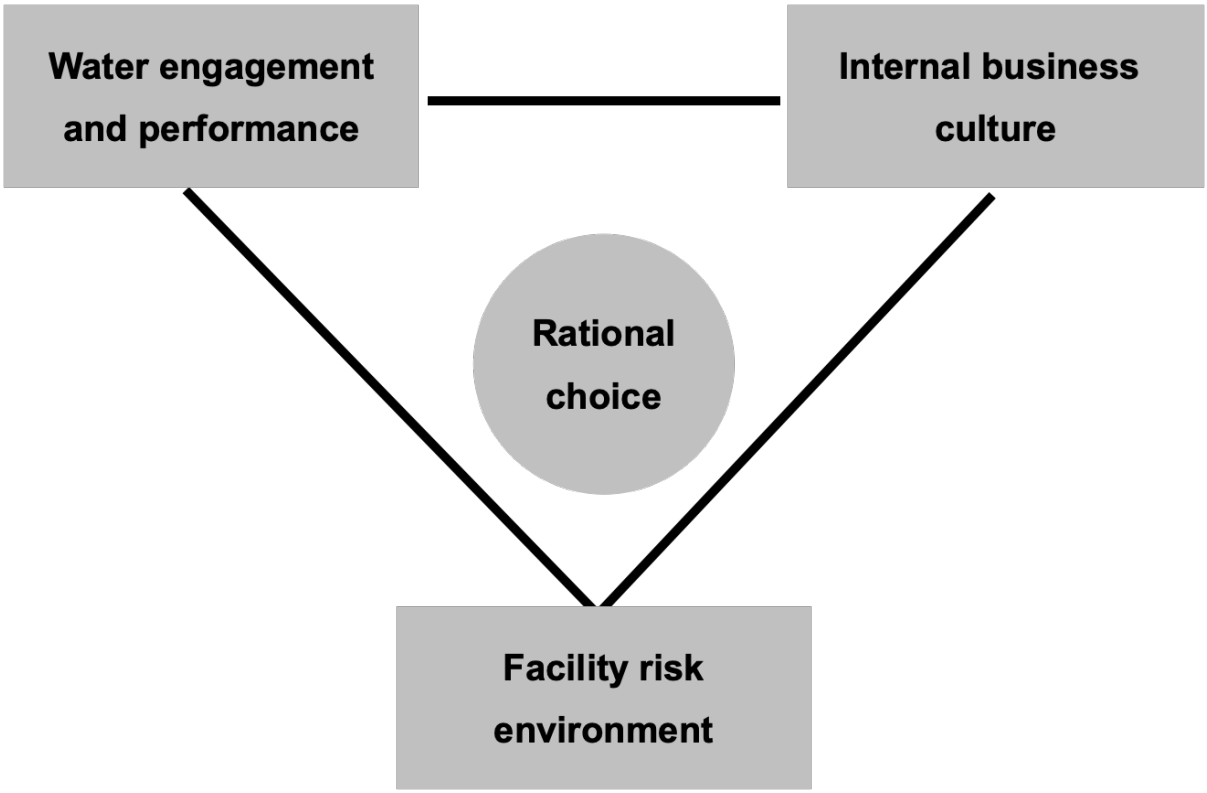


Figure 26: Key considerations that influence adoption of water stewardship

Rational choice. This has the same meaning as that provided in Chapter 5. That is, perceived benefits minus perceived costs as measured by the net benefits index (NBI).

Water engagement and performance. The number and, more importantly, the breadth of water-related investments by a facility, including both past investments and planned investment. Adopting facilities are more likely to have or plan to invest in a wider range of improvements, including waterways, groundwater and education. They are also likely to be more than halfway toward achieving AWS water stewardship. This does not necessarily mean they are the leading investors in water management; the China case study showed very best performers may be indifferent.

Internal business culture. Two elements of internal culture are relevant: (1) the value a facility places on its reputation, environmental programs (including corporate social responsibility) and stakeholder relationships (customers and government), and (2) whether a facility sees water and catchment health as primarily a government responsibility or a broader social responsibility. Non-adopters will be more compliance-focused emphasising the role of government in managing water and seeing their role as complying with regulatory requirements.

Facility risk environment. The differentiator here is not so much the actual risk; the case studies show that even where facilities face the same water risks, their responses may differ. Of interest is the facility's attitude to risk. Adopters see risks more broadly and strategically than non-adopters, who see risk in a more transactional way focusing on immediate impacts. For example, adopters

are more likely to consider issues such as climate change and its potential impact on water. Non-adopters see water more as a public service and respond as changes impact their business.

It is important to see these as inter-related factors influencing the choice. For example, perceptions of risk are influenced by internal culture (how we do things here) and are expressed in risk strategies and actions (performance). Equally, external factors such as risk should not be seen in isolation. Physical risk - scarcity and pollution – is important in the case studies however, it is considered more sharply when it is supplemented by regulatory and/or reputational risk through government and customer pressure. Regulatory risk does not necessarily lead to facilities adopting AWS in the absence of a culture that values reputation and encouragement from government and/or customers. These attitudes can become a self-perpetuating cycle (Shogren & Taylor, 2008) unless disrupted (positively or negatively) by government, customers, civil society or, more likely, a combination of these. They are long-term parts of the business culture and not confined to decisions on whether to participate or not participate in AWS. They both influence and are influenced by how a business thinks of itself in a social context.

To test the revised research model four indexes were produced from the empirical data: the net benefits index (benefits minus costs); the performance index (proportion of AWS requirements a facility has adopted); intangibles score (the sub-component of the net benefits index that deals with matters of reputation including corporate social responsibility), and; a risk attitude index (the range of risks perceived and acted upon by each facility). Scores on these four measures were adjusted to produce a standardised scale to illustrate variation on the four indexes[58] as illustrated in Figure 28.

[58] Modifications were intended to achieve comparability on a scale of 1 to 5. For the performance index and risk index, the percentage scores were divided by 20, intangibles were already on a scale of 1 to 5 and for the net benefits index (NBI), 2.5 was added to the NBI score (effectively zero was moved to 2.5 on the scale).

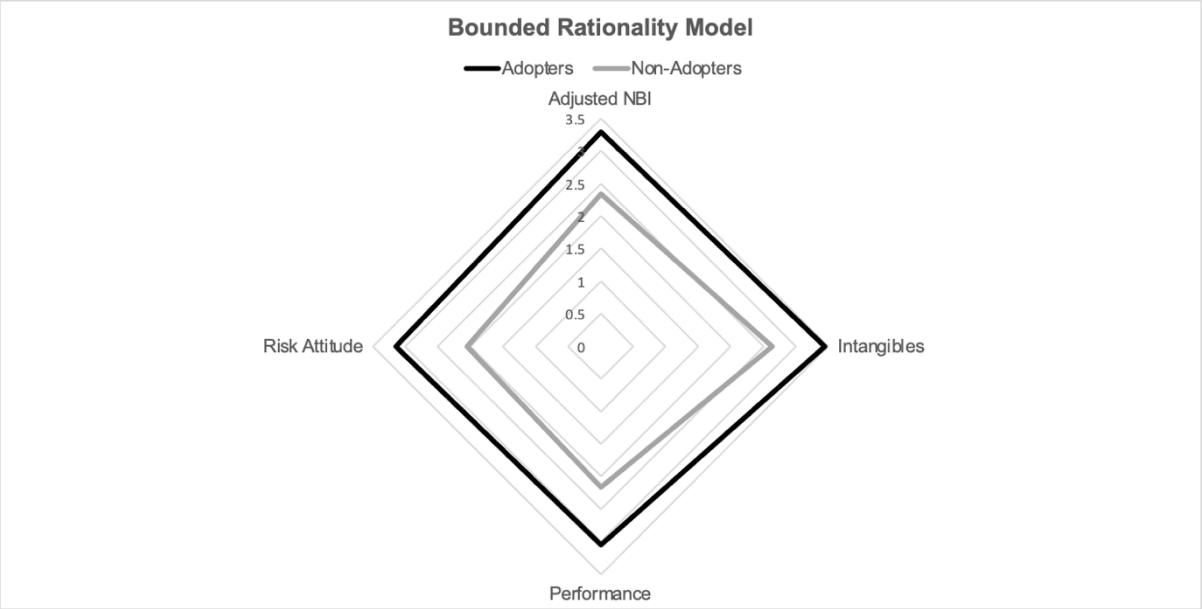


Figure 27: Quantification of revised research model based on data from questionnaire of 53 water-using facilities in China and Australia.

The model showed a clear gap across all indicators on the four *bounded rationality* parameters suggesting that, while they may not be the only indicators of attitude, they offer a guide to the likelihood of a facility adopting AWS and provide a basis for further research. While there is a risk these results could be influenced by ex-post rationalisation, and as indicated in Chapter 5 that risk is small because of the early stage of engagement by the facilities with AWS, the risk should continue to be reviewed in future studies as facilities gain more experience with AWS.

8.3.2 Typology of adopters and non-adopters

The research model can translate into a typology using a framework developed by Rogers (2003) in his work on diffusion of innovation. This can help to operationalise the model if AWS is seen as an innovation for addressing water challenges.

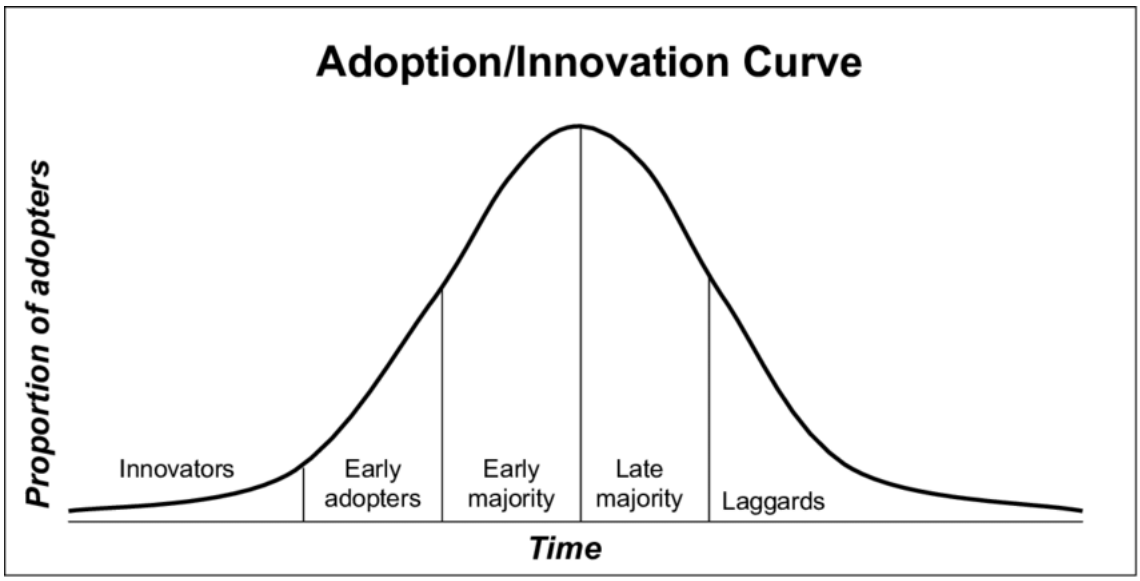


Figure 28: Adoption of innovation curve from Rogers (2003)

Rogers five adopter categories (ideal types) are summarised in the left-hand column of Table 5. The right-hand column offers a description, based on the findings of this empirical investigation, for each category (although the last category would not have participated in AWS activities or this investigation). The categorisation also draws on experience after the questionnaire was conducted. In the 12 months following the survey in China, five facilities achieved AWS certification and two registered as preparing for certification. Three of the five could be classified as *innovators* and two as *early adopters* based on this typology.

Table 5: Typology of AWS adopters and non-adopters based on Rogers (2003)

	Description
Innovators - *Venturesomeness is almost an obsession*	Already have a strong commitment to water innovation and environmental leadership (though not necessarily the best performers). Looking for leadership opportunities.
Early Adopters – *more integrated with local social system*	Solid committed performers on environment (not leaders) conscious of stakeholder relationships, reputation. Strong businesses that act on good rationale including likelihood of system growing.
Early majority – *adopt new ideas just before the average member of the system*	Currently indifferent because they are already leaders or borderline early adopters. Will act if they see system becoming established and/or incentives

	for adoption. Less invested in water than those with stakeholder and/or water price pressure.
Late majority – *sceptical and adopt ideas just after the average member*	Not considering adopting water stewardship but are better performers than laggards, facing some water risks, more conservative culture and see water as a government responsibility (their role is compliance) but will move if everyone else does.
Laggards – *last to adopt, not leaders, most parochial in their outlook*	Most conservative culture toward water & environmental innovation, see water purely in transactional terms as government responsibility, undertake minimum water improvement program.

Each type will have a different rate of adoption and ability to influence adoption by others in different ways. If, as Rogers argues, adoption occurs within a social system of relationships, each adopter type will be able to influence others and the rate of adoption by the social system differently. The most important group of influencers are not necessarily in the first group to adopt, the *innovators*, but likely to be in the second group, the *early adopters*. These are key influencers who have the respect of others in the social system. Rogers cautions that *innovators* can be perceived as "deviant from the social system" and accorded "low credibility" (p. 26) and are not as influential as *early adopters* who are more integrated with the social system.

Opinion leaders within a social system are able to influence attitudes and behaviour of others, informally in a desired way, with relative frequency. This is not a function of formal status but is earned by technical competence, social accessibility and conformity to the system's norms. When the social system is inclined to change, the opinion leaders are more innovative, but when it is not, the opinion leaders will reflect this norm. They "exemplify and express the system's structure" and "serve as a model for the innovation behaviour of their followers" (p. 27). The most important feature of these leaders is that they are at the centre of the system's communication (information flows, interpersonal networks). Compared to followers, they are more exposed to external communication, have somewhat higher socioeconomic status and are more innovative (if this is in keeping with the system's norms).

Change agents - professionals representing change agencies external to the social system - will often use opinion leaders; however, if these opinion leaders are over-used, they may lose credibility with followers and peers for appearing to become change agents themselves.

8.3.3 Comparison between Australia and China

Comparisons between China and Australia, and the implications of differences for collaborative governance, can be viewed from three perspectives: (1) the distribution of political power; (2) the nature of institutions, and; (3) pressures and incentives for business participation in collaborative governance. The following section will consider each in light of AWS experience and results of the questionnaire.

Distribution of power

If power relationships are simplified to be relationships among the state, the economy and the community – and it is accepted there will be qualifications to this simplification – then difference in the distribution of political power between Australia and China can be viewed as inverted triangles. In China, political power is monopolised by the Leviathan state; specifically, the national government and the CCP (the two are at times interchangeable). While economic activity is important to the state, business is subordinate whether as state-owned enterprises (SOEs) or private enterprises. Both private enterprise and community exists within the *shadow of the state* (Guttman et al., 2018). Providing they stay within this shadow, economic power and community power can be exercised with a level of local autonomy. Both will generally have internal CCP party organisations that manage alignment with the state[59].

Any question that business is subordinate to the state has been clarified by the current leadership and their willingness to bring even the most powerful companies into line if they challenge the state: ".. no company is too big, and no IPO too valuable, to be allowed to challenge the state." (*The Economist*, 2020) In Figure 29, the triangle represents both relationships of power, but is also a metaphor for the shadow of space within which non-state actors (both NGOs and private enterprise) can operate.

For water in China, this is how things have always been, with the imperial state exercising control over major pieces of water infrastructure, setting national rules and, providing they stay within the imperial bounds, communities setting their own rules for access and distribution of water. Indeed, this distributed power structure, and the tensions it creates, is part of Chinese mythology reflected in sayings such as "the mountains are high and the emperor is far away" (*Shan gao, Huangdi yuan*) or "above is policy, below is defiance" (*Shang you zheng ce, xia you dui ce*). This creates an opportunity for innovation, although it does not guarantee success for collaborative governance.

[59] For example, Reuters reported that 70 per cent of China's 1.86 million privately owned companies had internal CCP party organisations (Reuters, 2018).

In Australia and other *liberal democracies*, political power is shared between the state and economy. An alternative view might be that they compete for power; nevertheless, the disproportionate power held by the state (political) and the economy (financial) mean that the community has considerably less power[60]. It is accepted that this may be a contested and some democratic theorists would argue that in a liberal democracy the state is representative and therefore exercises power on behalf of community. Others (c.f. Rosanvallon, 2011) argue disproportionate power held by economic interests and executive government rob liberal democracies of their claim to *majority rule*. Be that as it may, the case studies reported support the view that power is disproportionately held by the state and economy which has implications for collaborative governance.

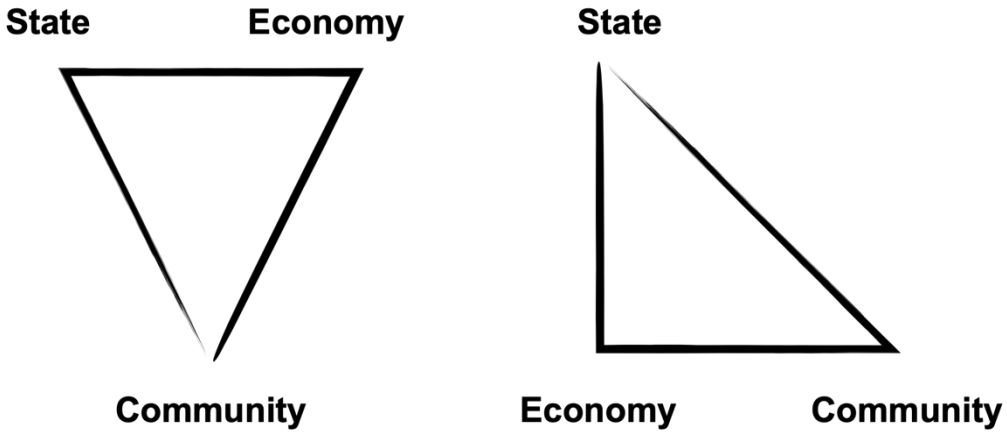


Figure 29: Stylised distribution of power in Australia (left) and China (right) where in Australia the state and economy share dominance and in China the state exercises a monopoly on political power.

In the two water case studies, power structures created a greater potential for collaborative governance in China than in Australia. In China, AWS linked with local water authorities, other civil society organisations and business, and operated within the innovation bubble available in the shadow of the state. The link with local water officials provided initial legitimacy to the program in Kunshan and encouraged industry participation. This both preceded and continued after customers became involved in supporting the program. As Béland (2009) notes, transnational reform processes need to be translated and framed within a national repertoire to engage key interest groups. Support of government and customers provided this 'translation' and this led to incentives for participation as well as income to support the project.

In Australia, support of the South Australian Government was a threshold requirement for Renmark Irrigation Trust (RIT) to become involved. However, that support was limited and directed to support RIT not AWS. In Australia, decisions on water policy and implementation have been made

[60] The meaning of power here, in the context of this investigation, is power in relation to decision over forests and water.

at state level with very little local control. Irrigation communities were created by the state and, in so doing, an expectation was created that conflict would be resolved through the exercise of power at a state level rather than through community collaboration. Commonwealth authorities provided initial support to AWS and considered broader support, but this was blocked by rural political interests. Distribution of power appears to be locked-in with limited scope for collaboration.

Role of institutions

There was less difference in the water case studies between water institutions. In Australia and China, they were technocratic expert institutions, largely managed and guided by professional engineers. Both had narrow ideas of how to address water challenges, drawing on a similar toolbox of approaches (engineering and regulatory). Their thinking was constrained by institutional lock-in around their role in working for economic development and both countries saw the impact of this lock-in when they attempted to change from a purely development focus to one that sought to balance commercial water use and environment. In Australia, adoption of market-based governance to allocate water between economy and environment was undermined by institutions that favoured economic outcomes. Similarly, China's ability to change focus from economic development to *ecological civilisation* met institutional resistance. China attempted to overcome this resistance through nationally initiated compliance checks on provincial authorities, adoption of vertical management that removed provincial authority and restructuring of national water institutions. Ongoing implementation difficulties (a *grim* situation) resulted in China considering alternative governance arrangements at the end of the period under review.

The institutions in both countries did not embrace collaborative governance as their thinking, their *way of being*, was grounded in hierarchies and technology. One Chinese official made the point that she could not see a role for collaborative governance in a country built around top-down hierarchical governance. In Australia, the CEO of the MDBA believed only experts could make decisions in the public interest (Simons, 2020). The very strong focus on regulation in China as the only form of governance may offset the advantage of power relationships that create scope for local collaboration. However, as was discussed in case study 3, this will be influenced by the nature and interests of local water professionals.

Differences among facilities reviewed

A large number of facilities surveyed in China were part of global supply chains with direct customer relationships, whereas the Australian sample included farms whose produce was sold into commodity markets (for example, wine grapes and almonds). While there were some industrial operations included in the Australian case, they were in relatively short supply chains that sold

direct to supermarkets or fast-food chains (Ingham's). While these customers welcomed AWS compliance, they were not prepared to offer incentives or additional rewards (although Ingham's was recognised by McDonalds as a global water leader). The contrast with China was that, once AWS became established in Kunshan, global microelectronics brand Apple encouraged suppliers to participate, paid for AWS training and supported the AWS program to maximise participation. These differences are relevant as was the fact that the challenge in China was pollution caused by industrial production and the role of the microelectronics industry had been highlighted by NGOs in customer countries. In Australia, where the issue is scarcity and the cause periodic drought, it was more difficult to attribute responsibility to a particular industry or group of large well-known brands.

Examining the research model developed in section 8.3.1, the greatest differences between the two jurisdictions is in attitudes to risk and the extent to which the Chinese facilities value intangibles such as reputation[61] (Figure 30). The Australian companies have a narrower, operational view of risk and value intangibles, such as reputation, less. The cumulative impact of these factors is reflected in the lower net benefits index (NBI) score attributed to AWS by Australian facilities. This is indicative of the Chinese firms being more conscious of supply chain concerns (broader range of risks) and expectations (intangible benefits such as reputation).

[61] Another perspective would be the extent to which China's Social Credit System, that gives economic value to reputation as reflected in a social credit score, influences attitude to corporate reputation. Examination of this observation is beyond the scope of this investigation.

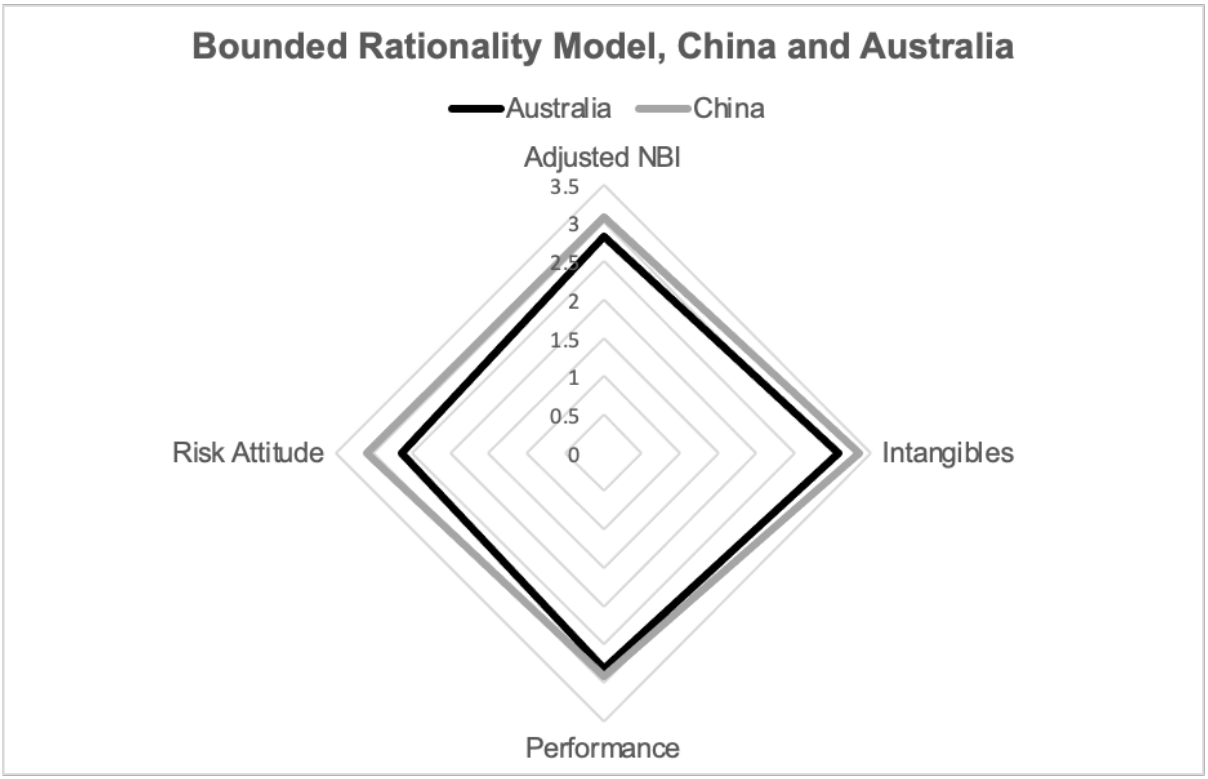


Figure 30: Research model developed in section 8.3.1 showing different attitudes of survey participants in Australia and China.

Breaking the model down (Figure 31) to show difference between adopters and non-adopters in the two jurisdictions reveals greater differences for non-adopters. Chinese non-adopters had a broader approach to risk and a more optimistic view of net benefits than their Australian counterparts but valued intangible benefits less. This would reinforce the view that non-adopters in China were less exposed to reputational pressure from customers and government and therefore valued intangible benefits of AWS, such as reputation, less than their Australian counterparts. While Australian respondents valued intangible benefits, they didn't see the value as sufficient to overcome costs.

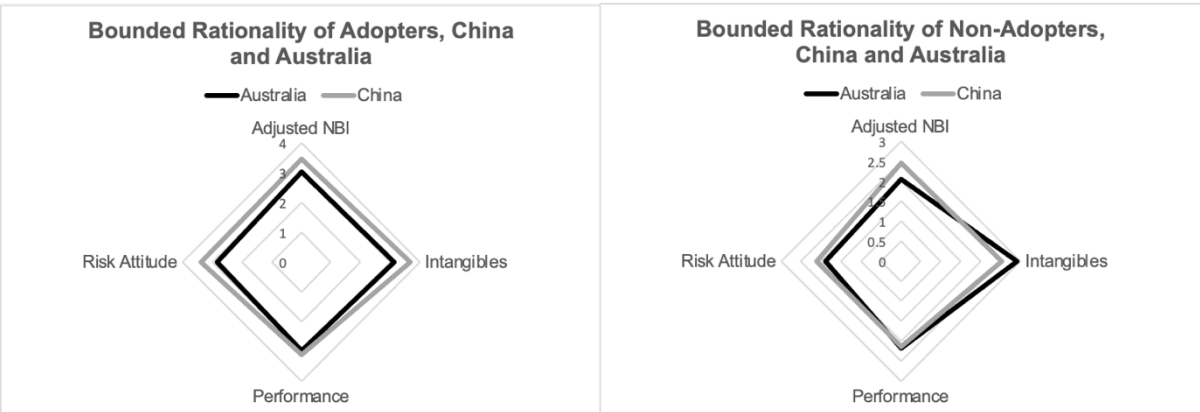


Figure 31: Research model developed in section 8.3.1 showing differences between Australia and China disaggregated between adopters and non-adopters.

Comparison between the jurisdictions suggests the extent to which implementation of national policies is undertaken locally in China may be a source of advantage for collaborative governance. This may be offset by a belief that regulatory governance is the only form of governance, although this will be influenced by the attitudes of individuals being engaged at a local level. Both countries faced similar resistance from water institutions and the professionals who manage and inhabit them who are, in general, locked-in to ways of working and thinking about their role. The greater supply chain sensitivity of the industries examined in China, and the importance of relationship to their business may have been a factor in the greater success of AWS in China.

8.3.4 Factors influencing participation and non-participation

While empirical data was not collected for case study 1, issues identified in case studies 2 and 3 were evident in decisions to participate or not participate in FSC. In case study 1, political and economic power was used to try to suffocate FSC in Australia before it was born. It survived because of pressure from outside the jurisdiction (demand for FSC in international markets). New plantation companies who participated in FSC were already either certified or seeking certification and therefore their performance was close to FSC requirements. Forestry was under pressure over ecological risks and stakeholders (civil society and customers) wanted verification of environmental performance and were prepared to offer market share to businesses that complied with FSC.

Table 6 attempts to summarise factors discussed and their implication for decisions to participate or not participate in FSC or AWS in the case studies.

Table 6: Internal and external factors that influence participation or non-participation

	Participation	Non-participation
External factors		
Risk	Presence of physical (e.g., water stress), regulatory or reputational risk	Absence of physical, regulatory, reputational risks
Stakeholder pressure	Pressure from customers, civil society, government either directly or indirectly	No pressure from customers, civil society, government directly or indirectly
Attitude of influencers	Key influencer within the social system adopts and advocates	Key influencers either not interested or hostile to participation
Value of 'club' benefits	Adds brand or networking benefits or, other benefits valued by participant	Either no benefits from participation or not sufficient to warrant participation
Institutions	Motivated individual or group willing to venture beyond institutional norms	Institutions not interested or hostile to collaboration – view as threat
Distribution of power	Power structure creates space for community innovation	Power structure creates no space or hostile to innovation
Internal factors		
Current performance	Already halfway toward achieving compliance	Either at or above full compliance or less than 50% of compliance
Costs of compliance	Compliance costs manageable financially & workload	Costs higher than benefits and/or already struggling with compliance workload and/or cost
Importance of reputation	Reputation (customers, civil society, govt.) important to brand/social license of the business	Reputation not large consideration. Just interested in avoiding being a bad operator
Attitude (social responsibility)	Culture takes social responsibility seriously reflected in commitments & practices going beyond compliance	Only interested in meeting compliance and business optimisation requirements not going beyond that

In this table, the following descriptions apply:

Risk - both the presence of actual risk for the resource and its relevance to the entity (e.g., over extraction, pollution, over harvesting)

Stakeholder pressure - this may be civil society campaigns, community agitation, etc. and could be applied at any point in the supply chain

Influencers - peers or agency officials who are respected within the social system where the entity exists

Club benefits -	in the case of certification programs such as AWS and FSC, the benefits available to an entity from participation (may be tangible or intangible)
Institutions -	agencies, professional associations, academic disciplines who manage or influence management of the resource
Power -	where and how power is arranged and exercised and whether it leaves space for collaborative governance
Current performance -	performance of the entity on specified measures in comparison with that required for club membership (e.g., FSC or AWS)
Cost of compliance -	both the financial investment required for compliance and the additional compliance burden in relation to the entity's capacity or capability to support compliance
Reputation -	the importance of reputation (particularly environmental management reputation) to the entity's business model and the culture of the entity
Attitude -	attitude to social responsibility; whether the entity accepts it has a social responsibility, and care for the resource concerned is a social responsibility as opposed to an attitude that the entity's only responsibility is compliance.

What is not listed, but became self-evident, is that all these factors exist within a social or cultural belief system that may encourage or discourage forms of social organisation. For instance, the rise of the modern paradigm has influenced the predisposition in Western nations to adopt market governance. It is not proposed that any one of the factors listed above is a *knock-out* for participation or non-participation; rather, that these will influence the likelihood of participation. It is likely be a combination of factors that will set pre-conditions and conditions for participation in a collaborative governance program such as FSC or AWS. This sets up the next section of this chapter, where a preliminary model is developed for building participation in these programs.

8.3.5 Summary and response to question 3

This section set out to consider impediments to participation in collaborative governance programs based on the survey of AWS participants in case studies (2) and (3). Building on this evidence, the research model developed in Chapter 5 was modified. The new model retained *rational choice* at the centre of a *bounded rationality* model but modified factors influencing choice to emphasise: (1) water engagement of the entity and its current performance in relation to that required by AWS; (2) the importance the entity places on its reputation with customers, government and civil society and the extent to which it sees water as a social responsibility, and; (3) the risk environment in which the entity is operating and the breadth of the entity's perception of risk.

Based on this, a typology of potential adopters (and non-adopters) was developed using a framework developed by Rogers (2003). Descriptions were provided for categories of firms in a social system[62] to help to identify influencers and facilities most likely to participate in collaborative governance. In comparing the Australia and China case studies, three factors were examined: (1) the way power is distributed and the space it leaves for collaborative governance; (2) the role of institutions, and; (3) differences between the types of facilities in the sample for each case study. China left space in its distribution of power for local innovation although this was mitigated by very strong commitment to command-and-control. The role of institutions was similar. A difference was the number of firms in China that were part of global supply chains subject to stakeholder pressure.

From this analysis, a table of factors likely to influence participation was developed that will provide input for development of a provisional implementation model in the following section.

8.4 Building a collective action model for forests and water

This final section considers how impediments detailed in the previous section can be navigated to achieve greater adoption of collaborative governance. It will address this question while accepting the status quo in relation to belief systems in China and Australia. How those beliefs might be influenced to create a more conducive environment for collaborative governance will be discussed in the Conclusion. This section will proceed in three parts: (1) it will consider the role of partnerships between civil society, government and markets as a foundation for collaborative governance; (2) it will then draw on the list of factors constraining (or encouraging) participation and innovation diffusion theory to propose how partnerships can build engagement within selected social systems, and; (3) it will apply this knowledge to build a provisional model for expanding AWS participation.

8.4.1 Building partnerships for collaboration

The case studies have shown that collaborative governance is more successful where civil society works in partnership with markets (FSC) or government (AWS) and most successful where it works with both (AWS China). For FSC, market demand provided value that attracted industry to participate. This participation engaged civil society and neutralised otherwise hostile government and institutions. For AWS, participation of government in Australia validated and financially

[62] Rogers argues diffusion of innovation takes place within a social system; "a set of interrelated units that are engaged in joint problem-solving to accomplish a common goal" (Rogers, 2003, pp. 23-24). He provides examples of different types of social systems from peasant families in a Peruvian village to all consumers in the United States. The sharing of a common objective binds the system together. The social structure of a system affects the diffusion of innovation.

supported interest from the RIT to participate. In China, government introduced businesses to AWS and encouraged selected businesses to participate which, in turn, encouraged Apple to support the program by promoting participation in its supply chain through supporting training and providing financial support. None of these partnerships could be regarded as natural alliances and, in the case of FSC, rested on consumer awareness of forest challenges and, in the case of AWS, on one or more stakeholders wanting to try a new approach to achieve better water outcomes.

Partnerships between government, business and civil society need to reconcile differences in ways of thinking and working, and different objectives. The state facilitates private business by providing the legal environment in which transactions occur and the infrastructure to support shared public services (such as transport or water). The two have an affinity with economic growth; for business, this increases revenue and profit, while for government, it creates tax revenue. Business and civil society have a shared interest in the social license and legitimacy of an economic activity (or not). Civil society and government share an interest in how externalities and public goods are managed. However, as discussed in the literature review, each has its own mode of governance and set of drivers. This discussion is summarised in the Table below.

Table 7: Sectors, modes and drivers

Sector	**Organisation**	**Mode of governance**	**Prime sector driver**	**Individual driver**	**Governance type**
State	Government	Hierarchies	Command and coercion	Mentally centred	Public governance
Market	Business	Markets	Trade and Exchange	Physically centred	Corporate governance
Society	Non-Government Organisations	Networks	Shared values, commitment	Emotionally centred	Civil Society

Source: (Bell & Park, 2006; Coghill, 2002; Waddell, 2007)

Building partnerships between government, business and civil society requires finding points of sufficient mutual interest to overcome different priorities, modes of thinking and ways of working. For FSC global outrage over the state of the world's forests impacted the market for wood products and this pressure created a shared interest between civil society and segments of business to address deforestation. For AWS, during the Millennium Drought, concern over industrial and agricultural water consumption created a shared interest in water stewardship between civil society and business. In Kunshan the threat of plant closures as a result of the national government crack-down on pollution created a shared interest in water stewardship between local government, business and civil society. In each case, the partnership was built around a problem not being

resolved by regulation or markets and growing stakeholder concern. Building partnerships requires recognising these differences and finding points of mutual interest.

Lin (2019) found that firms interested in eco-innovation turned to government for policy endorsement, financial subsidies, and technical support. Government, in her case, was interested in promoting cleaner production. However, to be successful, relationships needed to allow flexible strategies that promote innovation in products, processes and technologies. This required government to modify its top-down regulatory approach and adopt governance arrangements that were more flexible and non-contractual. It required an embrace learning that tolerated different interpretations of known information (explorative learning) and accept collaborative rule-making for projects to expedite transformation. This is consistent with the findings of the case studies in two respects: (1) successful collaboration involves letting go of hierarchical control and pure self-interest (collaboration in pursuit of public/private benefits), and; (2) collaboration between different organisational sectors (state, business and civil society) can be transformative in addressing wicked problems. "… work at the intersection of markets and regulation [can] bring about social and environmental change that none of the parties could achieve alone" (Lin, 2019, p. 565).

Dent (2015) makes a similar point in relation to water stewardship in his training sessions; that bringing together diverse perspectives (on a neutral platform) allows problems to be seen from multiple perspectives. This not only allows the problem to be seen in all its dimensions, but solutions to be considered that may not have been proposed by one interest or stakeholder group acting alone. This multi-stakeholder perspective moderates differences of values, interests and priorities (participants need to come prepared to find consensus solutions) and, mitigates the potential for perverse outcomes.

8.4.2 Innovation diffusion

Partnerships provide a foundation for a broader industry engagement process within a social system[63] that is required to develop momentum and critical mass (Rogers, 2003). If collaborative governance is an innovation (albeit a governance innovation rather than a technological innovation), there is a need to diffuse this through a set of enterprises that share a common problem or are interested in a common goal. In China, this was an industrial park affected by water pollution. In Australia it was an irrigation trust interested in achieving best practice. So, a relevant consideration is to first identify the social system within which the collaborative governance arrangement, such as AWS, is to be implemented. That may be a collection of firms within a particular industry, group or geographic setting or some other common feature.

[63] See earlier footnote for Rogers definition of a social system.

Within a social system, there is a need to define a pathway of engagement or what Rogers (2003) refers to as the *innovation-decision* process. Five main steps in the innovation-decision process were introduced in the literature review and are conceptualised as: (1) knowledge, (2) persuasion, (3) decision, (4) implementation, and (5) confirmation (Rogers, 2003, p. 20). This suggests a stepwise progression of engagement over time to which different strategies and communication can be directed. These stages were quite evident in the case study survey sample of 53 firms.

The typology based on Rogers' five adopters types developed in section 8.3.2. is useful in considering firms to target in the early stages of a project. Each type has a different rate of adoption and ability to influence adoption by others. The most influential group, early adopters, have respect from others in the social system but are not necessarily the first to adopt. Innovators, who may be the first to adopt, do not necessarily have credibility with other firms in the social system. Building a collaborative governance initiative requires careful analysis of the adopter types in the social system and not relying on the first to embrace, but engaging credible, influential firms. This appeared to occur in Kunshan but less so with the Renmark and Westernport AWS projects.

The importance of engaging the *opinion leaders* within a social system is their ability to influence the attitudes and behaviour of others informally in a desired way with relative frequency (Rogers, 2003). For example, the government official who supported the AWS project in Kunshan or the Chair of *Waterfind* (a former Renmark real estate agent), who introduced AWS to South Australian Murray Irrigators. This is not merely a function of their status but is earned by competence, social accessibility and conformity to the system's norms. When the social system is inclined to change, opinion leaders are more innovative but when it is not, opinion leaders will reflect this norm. They "exemplify and express the system's structure" and "serve as a model for the innovation behaviour of their followers" (p. 27). They are at the centre of the system's communication (information flows, interpersonal networks), are more exposed to external communication, have somewhat higher socioeconomic status and, are more innovative (if this is in keeping with the system's norms). Opinion leaders have been important to success in each of the case studies.

Opinion leaders need to be distinguished from change agents. A *change agent* is generally a professional who represents change agencies external to the social system (such as AWS staff). Change agents will work with opinion leaders; however, opinion leaders can be overused by change agents and may lose credibility with their followers and peers for appearing to become change agents (Rogers, 2003). In each of the case studies, collaborative governance was introduced and managed by a change agent but, success was only possible through opinion leaders within a relevant social system: for example, environmental groups, plantation forestry companies and the paper and printing segment for FSC. A project will need to build a communication network and engage opinion leaders as influencers. In the AWS case studies,

government and customers were important influencers who added legitimacy and financial support to the program.

8.4.3 Building a virtuous cycle

A further consideration is the ability of the collaborative governance arrangement to sustain itself; its ability to self-perpetuate. Building brand value can create momentum; a virtuous cycle where new members joining attracts additional members. As value grows, the business case for participation improves. Stakeholders such as civil society, government and customers have an important role in maximising benefits and minimising costs of participation to build momentum. Figure 32 builds on Figure 6 in Chapter 5. Brand value grows with participation, but where it starts will depend on the value attached to reputation within the social system. Government, customers, lenders and philanthropists can increase participation by reducing costs (subsidising participation) or increasing rewards. Their motivation is that they have an interest in the positive externalities that result from more firms participating. For example, in Kunshan the municipal government subsidised AWS certification because it helped address water pollution while maintaining key industries.

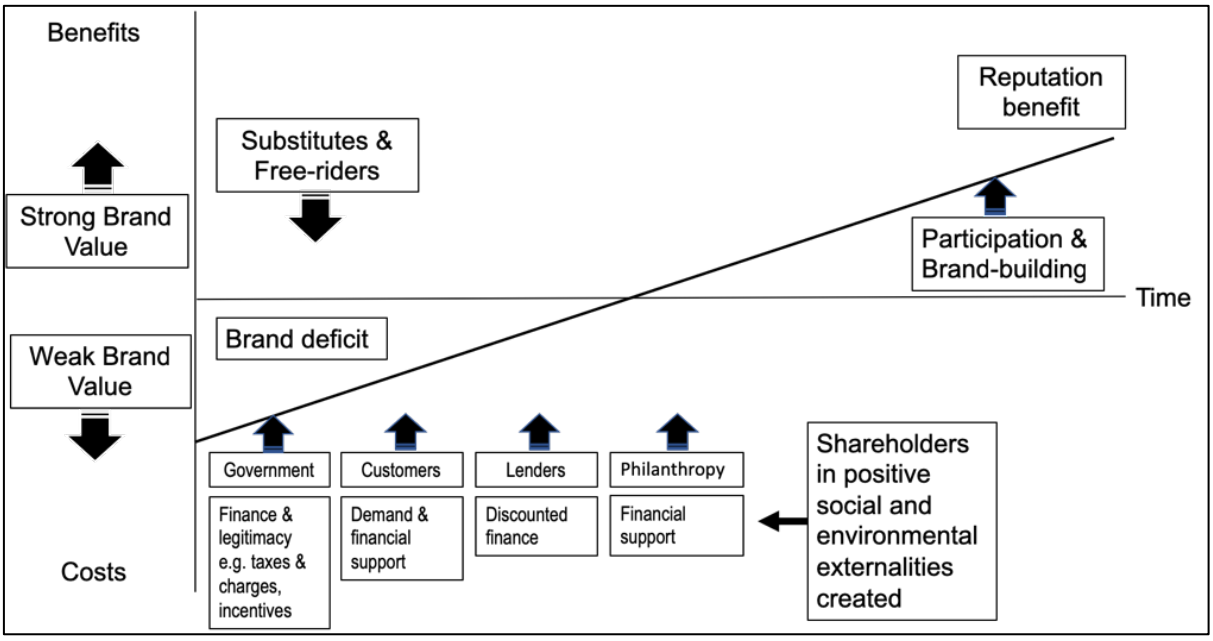


Figure 32: The role of stakeholders in improving the business case for collaboration (influenced by (Prakash & Potoski, 2007))

The AWS questionnaire asked facilities what sort of incentive would encourage adoption. For most, any support was welcome. In China, non-adopters said some form of tax or water levy rebate for participation would influence their decision. Adopters were more interested in a reduced compliance burden as relief from an already heavy and costly water compliance requirements in Kunshan. In Renmark, there was an interest in water levy reduction as a reward for compliance. This creates potential for government, customers, philanthropists or financiers to *nudge* (Thaler &

Sunstein, 2008) facilities into participation and contribute to a virtuous cycle of growth. In Figure 33, stakeholders who support participation can be referred to as shareholders in the positive externalities of a collaborative governance program. This is of course an *ideal* approach insofar as it would still need to overcome political, cultural and institutional hurdles identified earlier.

8.4.4 Preliminary model for future programs

From the discussion in this chapter and Table 5, it is possible to start to construct a model for an AWS collaborative governance program. It targets a given social system where there is a shared risk or concern that neither regulation nor markets have been able to resolve to the satisfaction of influential stakeholders. The social system may be an industrial park in China or an irrigation community in Australia. It requires a shared interest in resolving that concern, either to achieve a policy objective (government), address negative externality (civil society, philanthropy), access new markets, enhance reputation or address threats such as consumer boycotts (industry). Early adopters and opinion leaders are identified within the social system and encouraged to participate, demonstrate and provide leadership. A governance arrangement (institution, rules of the game) is developed and agreed between stakeholders in the program to provide a neutral platform and establish a multi-stakeholder leadership group.

The leadership group, which includes early adopters and opinion leaders, builds participation by engaging potential participants through shared interests in the social system. For example, in Kunshan, this involved building knowledge about catchment challenges, potential water solutions and operational improvement ideas. While innovators will be attracted, the focus should be on engaging early adopters in pilot projects. In the AWS case study, there was an interest in sharing technical expertise and best practice (exploration and cognitive learning (Lin, 2019)). Building out from a small group of pilot or demonstration projects, the program starts to generate momentum (with support from government, customers, etc.) that grows benefits (generally reputation or brand value) within the social system. This growth in value from club membership (Potoski & Prakash, 2013) draws in the *early majority* and, if the program accelerates, the *late majority* to share club benefits. Learning and innovation become part of the social system that is able to demonstrate enhanced business opportunities, strong business performance and gradually create new norms.

This model is illustrated in Figure 33.

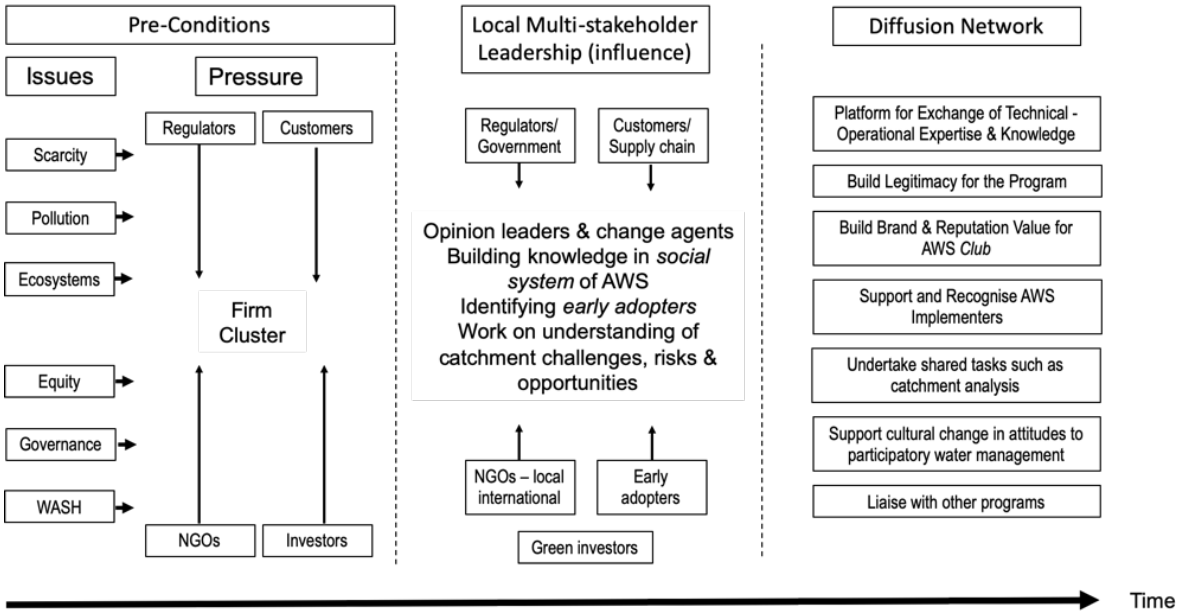


Figure 33: Provisional model for social system water stewardship projects based on discussion in this chapter.

As noted earlier, there will still be barriers from belief systems, institutions and professions and strategies will need to find opinion leaders willing to cross these barriers in search of alternative solutions. It is important there is an incentive for these professionals to participate and support the project as their professional performance and status is likely to be judged by criteria that most probably do not align with the goals of a collaborative governance project.

8.4.5 Summary and response to question 5

Discussion in this section built on previous observations to create a provisional model for implementing collaborative governance relevant to the case studies. It did so in the knowledge there were other factors such as belief systems and institutional constraints that would require longer-term strategies. However, the main focus was on what could be achieved within the current settings. For this it drew on discussion in section 8.3 and this section as well as the literature review. It drew on Rogers (2003) to frame a model for diffusing an innovation such as AWS through a given social system. This emphasised the importance of a time-based strategy as well as targeting early adopters rather than innovators within a social system. In doing so, it reflected on observations from the three case studies for validation and confirmation.

8.5 Summary of analysis and discussion

This chapter has sought to respond to the five questions posed at the outset of this investigation.

In response to (1), it found that regulatory governance, with its powerful technocratic institutions, emerged as governments embraced the goal of economic development. Expert professionals brought science, technology and management to exercise mastery over nature in search of continuous growth. In China, this resulted in massive pollution whereas, in Australia, it resulted in resource overallocation. As scarcity became an issue in Australia, new public sector management sought to replace regulatory governance with markets. This created a political clash between those who had prospered under the old system and markets re-allocating resources to the highest bidder. In China, regulatory control decreed a shift from development-first to balanced development. This slowed the rate of environmental degradation but did not reverse it as similar institutional constraints were present.

Collaborative governance emerged where regulation and market governance failed to meet the expectations of all, or part, of a society and stakeholders sought out alternative approaches. For FSC, this was forest degradation and for AWS water stress. Success was based on creating a neutral platform that was not dominated by government or business and civil society was able to bring its networks without fear of being overwhelmed. FSC and AWS were able to achieve a neutral platform through clear rules of the game. This allowed all perspectives to be heard and values differences moderated.

Responding to (2), the investigation reaffirmed the inability of regulation or markets to manage relations between humans and the environment. This is a result of a range of factors including power relationships, belief systems and values, institutional constraints and the commitment to economic development. It found that, while FSC and AWS had few measurable outcomes, there were areas where they had achieved success. There is an argument that the prioritising of relationships in collaborative governance, on a neutral platform, may be more likely to lead to stewardship than regulation or markets. It creates opportunities for new solutions built from multiple perspectives, transparency and trust. Intergenerational equity remains difficult for all forms of governance, although it may have a greater chance through collaboration as short-term economic and political interests are neutralised and communities seek security.

In response to (3), the research model developed in Chapter 5 was modified to show that rational choice was influenced by the culture of a firm and its current performance (in this case water management), its attitude to relationships and the value it places on its reputation and, how it sees and addresses risks. This work provided the basis for a typology, based on Rogers (2003), of adopters and non-adopters. Differences between China and Australia were reviewed to consider differences in terms of power relationships, institutions and the types of firms that participated in the questionnaire. A list of factors likely to influence participation was developed.

Responses to (3) were used to respond to (4) and build a provisional model for water stewardship projects that could be developed within the confines of existing belief systems. It emphasised the importance of: partnerships between civil society, markets and government in bringing about transformational change; multi-stakeholders institutional arrangements that equalise power through clear rules of the game; identifying opinion leaders and early adopters within a social system, and; building brand value through growing participation. It emphasised building a virtuous cycle of growth based on Buchanan's *club theory* (Buchanan, 1965) as developed by Potoski and Prakash in the concept of *green clubs* (Potoski & Prakash, 2005, 2013). The model developed is preliminary and based on these case studies. Hence it is suggested for future water stewardship project where similar conditions prevail rather than for all forms of collaborative governance.

9 Conclusion

9.1 Approach to the investigation

The investigation started with two related problems. These were the inability of humans to manage their relationship with the natural environment in a way that didn't diminish the natural assets of the planet, and; the difficulty of gaining support for solutions that involve stakeholders collaborating to achieve mutually beneficial solutions (collaborative governance). In simple terms, why can't humans resolve social dilemma's by working together? The investigation explores this as a problem of governance; the rules and institutions for resolving contested priorities, values and power. Why are current governance arrangements failing, what is the potential of collaborative governance as an alternative and, if it has potential, how can this be advanced?

Four questions were formulated to guide the investigation through three case studies in two jurisdictions:

(1) how do different forms of governance emerge in these case studies and what factors facilitate the emergence of collaborative governance?
(2) do these examples of collaborative governance offer opportunities for environmental stewardship that are better than those offered by other forms of governance?
(3) if yes, what are the impediments to greater participation by business in collaborative forms of governance? and,
(4) how can these impediments be removed to achieve greater adoption of collaborative governance?

The case studies were selected based on the investigator's personal experience and the insights gained as CEO of both the Forest Stewardship Council in Australia and the Alliance for Water Stewardship in the Asia Pacific region. The three case studies are the management of:

(1) State forests in Victoria,
(2) water in the Murray-Darling Basin and,
(3) water in two regions of China.

The investigation is framed by a typology of three forms of environmental governance adopted from Ostrom (1990). These are:

(1) regulatory governance or command-and-control by the state (Leviathan),

(2) markets as a mediator of private rights and,
(3) collaborative governance by stakeholders.

To analyse the case studies and respond to the questions, a multidisciplinary analytical framework was developed. This had three elements or lenses:

(1) a genealogical lens to understand the evolution of governance,
(2) an institutional lens to understand the role of institutions and,
(3) a bounded rationality lens to understand choice decisions by firms in relation to participation in collaborative governance.

The primary ontological approach was constructivist insofar as the investigator was prepared to allow observations to emerge from the case studies. The research was exploratory using mixed methods. These methods included experimental observation insofar as the investigator played a role in introducing a form of collaborative governance to each of the case study situations. It applied historical analysis and institutional theory to each of the case studies to see what this revealed. It tested theories, derived from the literature and personal observation, of why firms may or not participate, in the context of bounded rationality theory, through a survey of 53 water-using facilities. These methods were complemented by qualitative research and personal observation.

9.2 Limitations of the investigation

It is hoped the investigation will provide new insights into managing relations between humans and the environment by adopting a multi-disciplinary perspective and approaching this as a question of environmental governance. However, as an experimental exercise in case study research, the methodology has limitations and, as a result, any findings should not be overstated. Case study research does not seek to provide scientific, generalisable findings rather; it offers intuitive generalisations (Starke, 2009) and working hypotheses (Lincoln & Guba, 2009) for future investigation. At best, findings from this investigation, can be applied to cases with a similar *fit of circumstances*, similar situations, or provide a basis for further investigation.

9.3 Review of the investigation

The investigation begins by noting two goals of modern societies that appear irreconcilable: the goal to constantly expand production and wealth to deliver economic growth (distribution remains another issue), and; the desire to protect and preserve the planet and the benefits humans derive from nature. These have been matters of debate and attention since, at least, the Stockholm conference on humans and the environment in 1972. The intervening period has seen the prospect

of reconciling these goals diminish while the issues that prompted global concern in 1972 remain unresolved. Discussion has become more polarised into competing camps; as one campaigns for changes to protect the planet, the other resists any encroachment on economic freedom to exploit the planet's natural resources.

Scholarly consideration of this dilemma is hampered by what Costanza et al. (2015) refer to as a *reductionist paradigm of contemporary scholarship*. Biophysical science may argue the planet is on an apocalyptic trajectory, requiring immediate and significant change. Economists may retort that the crisis will secure the allocation of capital to develop technology that will address the critical issues. Those with the power to affect change may choose the answer that suits them or just do nothing because the questions are too difficult. Costanza et al. (2015) call for reunification of economics and ecology. This investigation takes a broader view. It draws on history, sociology, economics and philosophy to governance of biophysical problems. Investigating *big questions* requires breaking out of the fragmented disciplinary approaches (Marglin, 2008).

The investigation defines governance as the means through which humans seek order and mutual gains. That is, political and institutional relationships that resolve competing interests and priorities and direct decisions and resources (Leach et al., 2007; Williamson, 1996). In this conception, governance has two elements; the *rules of the game* (rules, regulations, behavioural, ethical and moral norms) and, the mechanisms of governance (institutions that may be hierarchies, markets, organisations or collaborations). The three forms of environmental governance being considered – regulatory, markets and collaboration – represent different ways of working (modes) with different drivers and dynamics (Bell & Park, 2006; Coghill, 2002; Waddell & Khagram, 2007) and different sources of power – the state, capital and community.

The implicit assumption of the research is that sustainable use of natural resources is a desirable objective. However, it found the term *sustainability* is poorly defined, of little analytical value and often used in a manner designed to protect the status quo (APEEL, 2017; Farley & Smith, 2020). Various attempts have been made to redefine sustainability based on a view that the planet is a system of interactions with limits and boundaries (APEEL, 2017; Farley & Smith, 2020; Ison & Straw, 2020). Drawing on this work, this study adopts the term *stewardship* in a way that regards the current generation as a trustee of the planet for future generations (intergenerational equity). It regards the planet as an interconnected system and recognises all people as being trustees entitled to share in its benefits. These three elements represent planetary stewardship: managing the planet as a closed integrated system, equity for the current generation and intergenerational equity for future generations.

The analytic framework comprising three lenses was developed on the basis of a literature review. The first lens is the *social context* in which governance develops and is maintained. The evolution, or genealogy, of belief systems, power and the interaction between power and institutions. It seeks to identify historical points that shape governance. The second lens adopts *institutional theory* to understand how institutions impact on and are impacted by governance. Concepts from historical and sociological institutionalism are relevant to understand *lock-in* and the role of professions. The third lens is *bounded rationality* which acknowledges people, in most situations, are not capable of knowing and computing all possible information and therefore make decisions based on heuristics, rules of thumb and other short-cuts. It is interested in how external and internal factors influence decisions on taking part in collaborative governance. These lenses provide a range of perspectives, albeit perhaps not a complete list of perspectives, on environmental governance.

9.3.1 The case studies

The three case studies show similar patterns of evolution insofar as industrialisation and *modernity* have been accompanied by the establishment of technocratic command-and-control institutions managed by professionals to drive development. The timing was different with China due to its later industrial development. All cases encountered institutional constraints that revealed that institutions lacked adaptability. Responding to resource scarcity and pollution revealed *institutional lock-in* and the dominance of technical professionals whose status and reputations were tied to old ways of working. Engineers or foresters who ran these institutions were trained, recognised and rewarded for efficiently building infrastructure or managing production forests. These professions contributed to the separation of people from nature: water engineers made water invisible; regulators made pollution a compliance issue rather than a moral issue, and; foresters saw forests as their domain rather than community assets. In Australia, government adopted market-based governance as an alternative to regulatory governance however the same institutions retained control and markets failed to realise the outcomes envisaged. In China, government, committed to command-and-control, attempted institutional reform but the situation remains grim and greater use of markets and collaboration has foreshadowed.

In both Australia and China, markets were seen as a viable option when regulatory governance failed, although, in both jurisdictions, this meant a constrained version of market governance where government retains a level of control. Government notions of collaboration were also restricted to a form of out-sourcing to civil society or consultation where government retained power. Multi-stakeholder collaboration tended to emerge where there were gaps between community expectations and what the state or markets were able to provide. In the case studies, these gaps lay in the overharvesting of forests and the overuse or pollution of water. Successful collaboration equalised power differences among business, government and civil society and created

relationships not envisaged under regulatory or market governance. But equalising power created obstacles to success. Business and government were required to surrender power advantages, professionals were subject to greater scrutiny and control by non-professionals while the outcomes were seen as uncertain, potentially messier and more costly.

Where collaboration was successful, this was achieved by increasing leverage through markets, the state or both. That is, collaboration was able to link with the political power, resources and authority of the state and/or financial power of markets. In the case of forestry, for example, the development of FSC Australia benefited from the international FSC brand. Plantation owners wanted to sell into markets seeking FSC certification, while consumer-facing printers and publishers wanted to maintain the reputation of their paper products. The power of these alliances overcame institutional and political resistance. For AWS, the lack of brand strength meant the organisation had less leverage in Australia after the Millennium Drought ended in 2009. Where it did succeed, for example in Renmark, it had financial support from government and local influencers. In China, an alliance with local government and a large international brand concerned about the implications of water use in its supply chain for its reputation, produced success of AWS. These factors point to alliances as necessary ingredients for collaborative governance success.

The investigation saw the engagement of business as a key driver of success. One of the first activities undertaken for the investigation was a stakeholder workshop at the NAB in Melbourne. Asked why government did not use its authority to enforce stewardship of natural capital, a politician answered government would look to business to exercise resource stewardship. When a businessperson at the same meeting was asked why business didn't lead, the answer was that business looked to government to set requirements for business to follow. *Catch 22*. To explore these issues, 53 water-using facilities that had shown some interest in AWS were surveyed to understand what factors influenced business participation. From this, a typology of adopters was developed (Table 6) and a set of factors listed (Table 6) that would influence participation (in the absence of any change in the underlying belief system). These tools were used to prepare a preliminary model for building participation within a defined social system (Figure 33).

9.3.2 Findings

The case studies point to a number of observations relevant to the potential expansion of collaborative governance for water in particular.

The first, and most general, is that the modern paradigm[64] is not conducive to collaborative governance. *Modernity*, with its emphasis on economic expansion, technical competence, efficiency and instrumentalism is part of the problem. It values private goods (which have market value) more highly than public goods (which are generally not traded). It values the current generation over future generations. The modern paradigm assumes a society of self-interested individuals seeking to maximise their utility. There is an assumption that these self-interested individuals cannot be trusted to make decisions about a public good (for example, comments by the MDBA CEO in case study 2). Experts are trusted agents providing technically competent solutions that are measurable and costed. This modern paradigm has its origins in a Cold War view that collective decision-making infringes individual liberty. Hence the prevalence of market-based governance solutions from the 1970s to the present. These solutions maximise individual liberty. In this view, markets are preferable to government and collaboration is a fringe option.

The technocratic preferences of the modern era diminish relationships and promote an instrumentalism that alienates subject and object. That is not to say technology is bad or unworthy but rather, through its scientific method, it assumes there is an objective reality. Thus, people and relationships are less important in achieving solutions than finding the right objective reality. Relationships are considered *after the fact*. Hence, command-and-control institutions will regard collaboration as consultation on outcomes determined by *experts* (see for example, Kekez et al., 2019). This instrumentalism has an insidious impact on those who advocate for nature. In seeking the authority of science, they too separate subject and object in a way that ignores relationships in favour of objective reality. This results in a form of tribalism; *apocalyptic environmentalism* (Vekötter, 2018) is countered by *technological salvationism*. It creates boundaries and alienates those overwhelmed by the threat of apocalypse (T. Morton, 2018). Collaborative governance puts relationships at the centre of humans and the environment and potentially, restores humans to their environment, instead of separating them from their environment by seeing it as an object.

Collaborative governance creates new opportunities to address long-standing social dilemmas through equalising power imbalances and bringing together otherwise warring stakeholders around clear rules in a way that encourages collective problem-solving. By creating a neutral platform, it creates the possibility for relationship-building (both formal and informal), where this would not otherwise exist as well as openness, transparency and trust. Through adopting a multi-stakeholder perspective on social dilemmas, problems can be seen in multiple dimensions thus creating the

[64] Here the term *contemporary modern Western paradigm* (CWMP) used earlier has been replaced by *modern paradigm* to reflect that many of the issues raised are not confined to the West but also evident in modern China. Village life with its collaboration around the water pumps (Fei, 1939) has been replaced by urban existence similar to Western countries for most Chinese. One anecdote that describes how collaboration has fallen away relates to an apartment block with an overloaded sewerage system. Instead of attempting to agree to upgrade the system, each resident added their own pipe such that the outside wall of the apartment block became a multitude of pipes from each residence to the sewer below.

possibility of solutions that might not previously have been considered. Participants see problems in a social and environmental context. Hence risk is seen to include a broader range of issues than compliance and solutions are seen as extending, for example, beyond the fence line of a facility and into the community and environment. These solutions embrace moral and social dilemmas, not merely regulatory compliance making possible the consideration of future generations.

Barriers facing collaborative governance are considerable. Beyond problems with the underlying belief system and a distribution of power that favours economic interests, there also exist quite practical issues such as engaging a firm with groups, that don't necessarily share their values, to achieve an uncertain outcome. Pressure on business is growing as a result of water crises and climate change however, the proliferation of compliance programs adds cost, management and resource burden for a firm that may otherwise want to contribute to solving social dilemmas. Equally, there is a burden on civil society to establish and manage collaborative governance programs without the financial resources of the state or business. Collaborative solutions need to be valued sufficiently by the state and business that they are willing to contribute meaningful resources without the ability to exercise control. At the same time, it is important to distinguish collaborative governance from voluntary CSR[65] activities where the company retains control. The growing cadre of sustainability professionals includes some who assist their organisations remain at the forefront of sustainability dialogue without changing any underlying business issues. Collaborative governance requires a deeper and ongoing commitment by businesses.

This investigation has identified two areas where a start could be made to lower these barriers for collaborative governance. The first involves working with professions to insert collaborative governance in their toolbox of solutions and working with them - through all stages of their professional development; university education, professional development, professional associations and employers – to understand how they can use this tool. The goal is not to jettison their existing toolkit, but to broaden their approach and encourage them to see collaboration as legitimate and valuable. This requires teaching a broader range of skills at university, valuing collaborative solutions and shifting the culture of water management[66]. Academic disciplines are institutions subject to lock-in that may need to be identified and challenged.

Similarly, the notion that communities are merely collections of self-interested individuals needs to be challenged; communities are more than the sum of the individuals. Scholars such as Marglin (2008), educated in the Western paradigm of atomised communities of self-interested individuals, found subsequently that some people live their lives "in deep connection with others – in short, in

[65] Corporate Social Responsibility programs generally involve a range of social, environmental and governance activities intended to respond to stakeholder concerns and issues.
[66] This argument is elaborated in *The Culture of Water Needs to Change* (M. Spencer, 2021).

community" (p. xii). He argues that thinking like an economist undermines community. Others (Jennings et al., 2020) argue the very notion of individual liberty needs to be redefined at a time of ecological crisis. None of this is radical when conservative politicians advocate for communities to be at the centre of natural resource management (Pitt, 2020b).

The investigation found that economic *rational choice* provides only a partial explanation for decisions to participate or not participate in collaborative governance. This moves beyond the work of Potoski and Prakash (2005, 2013; Prakash & Potoski, 2007) who argue, based on Buchanan's *club theory*, that choice to participate is rational and based on securing club benefits (mainly reputational) for their firm. It also advances on the work of scholars who identified collaborative programs, such as FSC, as non-state or private market-driven governance (G Auld, 2014; Cashore et al., 2004; Cashore et al., 2007; Green & Auld, 2017). In these case studies, the driver may be provided by government officials prepared to work within a multi-stakeholder, power-neutral platform. The water case studies developed a *bounded rationality* model of firms making decisions on participation based, in part on rational choice but supplemented by consideration of; (1) a firm's current performance and priority to water, the value it places on reputation with both customers and government; (2) its culture and whether it sees itself as having merely a compliance responsibility or a broader social responsibility, and; (3) whether it perceives risk narrowly (operational) or broadly (social). This understanding is important for the early development of collaborative governance.

The investigation has proposed a preliminary model (Figure 33) that, in certain situations, can overcome the weakness of collaborative governance in the face of political and financial power of the state and markets. The model can be summarised as a series of steps: (1) identify a social dilemma[67] where there is concern existing governance is failing to provide a stewardship solution; (2) build alliances with an appropriate level of state authority and/or market influence (often a willingness to align will be driven by community or NGO agitation); (3) gain consensus for a set of rules (such as AWS or FSC) and multi-stakeholder platform; (4) identify the relevant social system and attract participation from key influencers; (5) offer incentives for start-up participation that will build brand value for participants, and; (6) build the reward base in a way that creates an attractive proposition for *followers* whose interest in participation is more transactional than early adopters and innovators. Over time, collaborative governance needs to demonstrate that by bringing together the full range of perspectives from different stakeholders, it can more efficiently resolve social dilemmas, provide new perspectives and win-win outcomes. While a precondition is the failure of regulatory or market governance, that does not diminish the requirement for collaborations to prove their value to all stakeholders.

[67] Unfortunately, as these case studies illustrate, this task is normally left to civil society.

9.4 Further investigation

General findings from this investigation warrant further investigation to establish the degree to which they may be transferable or provide a basis for deeper engagement in social dilemmas. It is not proposed that *one size fits all* or that collaborative governance is superior in dealing with all social dilemmas. It is simply proposed that collaborative governance has a role and based on the evidence of these case studies, it can contribute to improved stewardship.

There is merit in continuing to grow the database of facilities that participated in the survey on participation in AWS water stewardship. That involves expanding the database in both Australia and China, as well as in new jurisdictions. There is interest, for example from Indonesia. It would also be useful to resurvey facilities that participated in the first survey to understand what has changed and how they may have progressed their intentions stated at the time of the original survey. The findings elaborated should also be tested in new domains beyond forests and water.

There are a number of ways this research can be applied to the social system of the case studies, through future projects. For example:

- For State forests in Victoria, there is a need to develop a *what next* strategy following the decision to cease native forest logging. Clearly given the power structures and institutional influence discussed in case study 1, there will be ongoing efforts to reopen forests (interview 1/005). Collaborative governance offers an opportunity to change the power structures and institutional influence before public pressure is exerted to resume logging (either by over-harvesting or opening protected areas). Adopting some of the principles of US collaborative forest management (c.f. Butler & Schultz, 2019), new decentralised institutions can be created that engage multiple stakeholders on a neutral platform, similar to FSC, to develop new forest plans that consider the full range of ecosystem services and to protect the value of natural capital. This will need financial support to build momentum.
- For water in the Murray-Darling Basin, the Federal Water Minister has said he wants to put communities back at the centre of the Murray-Darling Plan (Pitt, 2020b) but he is still dependent on the same institutions who see this as a technical and engineering issue. As a result, putting communities at the centre of the plan seems to involve government funding for community projects. Collaborative governance through a vehicle such as AWS offers a way to actually engage communities that feel left out in decision-making about water in much the same way as communities which thought they were making decisions about catchments after the introduction of the NSW Water Act. That experiment showed multi-stakeholder groups could make decisions that balanced all stakeholder interests while the

RIT trial has shown that good works such as restoring wetlands can be achieved through collaboration.

- In China, work on expanding the AWS program continues. There would also appear to be an opportunity to integrate collaborative governance into thinking on *ecological civilisation*. At the moment, discussion on ecological civilisation tends to focus on technical and regulatory measures that simply dress the old institutions in new clothes. A discussion on collaborative governance would start to address the issue of relationships and connection between people and nature. This would sit within the boundaries of national policy (the shadow of the state) and further elaborate or test the concept of ecological civilisation.

9.5 Final thoughts

A number of matters raised in this investigation involve longer-term cultural change that can begin the creation of a new paradigm; one that overcomes the weaknesses of the modern paradigm, with its origin in the middle of the 20th century and is adaptive to a resource-scarce planet. Two areas where this can begin would be: (1) working with professionals to expand their toolbox and equip them with knowledge and understanding of how to use collaborative governance, and; (2) restoration of community to a more central position in the lives of humans through collaborative governance. Modernity has resulted in abstraction of expertise, institutionalisation of knowledge and the centralisation of power. Reinstating community offers an opportunity to re-engage people in democracy and return them to *being in* their environment rather than separated from their environment. In doing so, this offers a pathway to stewardship. Of course, individuals will all have their self-interest, and some will attempt to game the system; that is why rules are needed to neutralise power imbalances. This is a major project beyond the scope of this investigation, and it has only been possible here to point to the possibilities for the future.

These possibilities offer an opportunity to escape the binary of alternatives that are often thrown-up; socialism versus capitalism, free markets versus state control, left versus right. Collaboration offers a dimension that is neither capitalist nor socialist and can co-exist with free markets and state control. For the rationalist left, it offers and escape from the prison of neo-liberalism with its promise of efficient outcomes but collateral of inequitable outcomes. Decentralisation of democracy has been an interest of a number of scholars in this area (c.f. Rosanvallon, 2011, 2018) and creates the potential to restore the ideal of *Liberté, Egalité, Fraternité*. Collaborative governance puts people at the centre of decision-making, equalises power imbalances, builds trust and maximises social outcomes. But none of this should be read as suggesting that collaborative governance is a replacement for regulation or market governance. The suggestion is merely that there is a greater role for collaborative governance in achieving stewardship.

Finally, there is the question of intergenerational equity. This rests on a different power balance; the balance between current and future generations. FSC addresses this through the *precautionary principal*. However, this still relies on the current generation willingly considering the interests of people as yet unborn. Traditional Indigenous governance, not part of this investigation but referred to in the case studies, achieved this though the concept of *country*, to which humans belong and would continue to belong, after death, for eternity. Rules set by ancestors, still present in country, created a whole-of-life accountability. Whereas in Indigenous culture, people remain in country after death, in Christian societies, people pass to another life in another place leaving the earth behind. In life, they are told nature is there for the benefit of humankind. The message is perverse for the goal of intergenerational equity. So while it is possible to acknowledge its relevance, as in works such as Stern (2007) and Brundtland (1987), there is no accountability. Addressing this gap, requires further work and a strong voice for future generations. That voice, in many respects, would also speak for nature itself.

Appendix 1 Cost and benefits used to calculate Net Benefits Index

Potential costs and benefits associated with participation in stewardship systems			
Intangible Benefits	**Operational (Private) Benefits**	**Operational Costs**	**Compliance Costs**
Improve reputation/brand	Improve site water efficiency	Upgrade water infrastructure	Monitoring and staff time on compliance
Improve employee morale	Reduce wastewater discharge	Enhance wastewater treatment	Develop new management systems
Improve community/NGO relations	Receive incentive payments	Impact on business model	Need for new skills and capabilities
Better manage natural capital	Reduce fines for breaches		Compliance reporting
Implement CSR strategy			Audit costs (time & money)
Improve social license			Perceived added complexity
Access new markets			Senior management commitment
Retain existing customers			Community/stakeholder liaison
Avoid tougher regulation			
Business sustainability			

Appendix 2 Australia/New Zealand questionnaire

MONASH University

WATER STEWARDSHIP CLUSTERS

CASE STUDY

Thank you for agreeing to participate in this interview. We are undertaking research into factors that affect decisions by water-using sites (plants, farms etc.) to adopt the AWS water stewardship system.

We have already interviewed 29 industrial sites in China and 20 sites in Australia and New Zealand. We are hoping to compare the experience of sites in China with sites in Australia and New Zealand. We also hope to extend this research to other countries and industries over time.

Water Stewardship is a five-step process for industry to progressively move toward best-practice water management and achieve five outcomes; sustainable water balance, good water quality, healthy important water-related areas, good water governance and safe water, sanitation and hygiene.

Our interest is in understanding factors that make water stewardship attractive to businesses or farms and factors that may discourage adoption of water stewardship. This will help to improve the AWS system, how water stewardship is communicated, and water-users engaged.

Lead researcher for this project is Michael Spencer who is a candidate for Doctor of Philosophy at Monash University in Melbourne (Australia). Michael is a former Board Chair of the Alliance for Water Stewardship.

Our research in China has received support from the Australian Water Partnership, AWS Asia-Pacific and TEDA EcoCentre in Tianjin.

You will be asked to provide some details about yourself and the company you work for and its approach to water management. You will then be asked some specific questions about AWS Water Stewardship and responsibility for water management.

If you have any questions please discuss these with your interviewer or contact Michael Spencer (mfspe1@student.monash.edu.au), or the supervisors of this research; Alice de Jonge (alice.dejonge@monash.edu) and Janet Stanley (janet.stanley@unimelb.edu.au).

Please sign the Consent Form provided by the interviewer.

Thank you

Interview number: ……

Q 1 Details of person being interviewed (tracking not use or disclosure)

Name : …….

Position : ……..……...

Reports to : …….

Contact email : ……...

Contact telephone : .....

Company name : ……..

Site: ……..

Q 2 Details of the site, plant or farm we are talking about today

Q 2.1 Industry sector:

a) Food and Beverage
b) Textile and Apparel
c) Microelectronics
d) Vehicles and automotive
e) Chemicals
f) Agriculture
    a. (specify)……..
g) Other (specify) ……

Q 2.2 Type of operation

a) Manufacturing
b) Wholesale, warehousing or distribution
c) Services
d) Irrigated farming
e) Dry land farming
f) Other (specify) ……

Q 2.3 Number of employees at this site? ……

Q 2.4 How many production sites does your company have? ……

Q 3 We would now like to ask you about your current approach to water management

Q 3.1 Which of the following do you see as the major water challenges facing your site/farm? (more than one answer is acceptable)

a) Water scarcity
b) Water pollution
c) Cost of water
d) Water efficiency
e) Attitudes of people to water (managers, employees, community, government officials)
f) Impact of industry on the environment
g) Other

Q3.1.1 If you listed (e) "Attitudes of people to water" which people do you have in mind?

a) Internal management of your site
b) Workers at your site
c) General community attitudes
d) Government officials
e) Other (specify) …….

Q3.1.2 If you listed (f) "Impact on the environment" which impacts did you have in mind?

a) Impacts identified in your site Environmental Impact Assessment
b) General impacts on the local environment of industry
c) Environmental conditions generally in our region
d) Other (specify) …….

Q 3.2 Do you undertake an analysis of water risks facing your site/farm? (Yes/No)

3.2.1 If yes, what sorts of risks do you consider? (more than one is acceptable)

a) Operational risks from water use at the site/farm
b) Water risks facing the region or catchment
c) Water risks facing your supply chain
d) Water risks facing our stakeholders (employees, customers, communities etc.)

Q 3.3 Do you have a water plan for your site/farm? (Yes/No)

3.3.1 If yes, does your plan consider:

a) Site water efficiency
b) Site water quality
c) Site environmental impacts
d) Legal compliance with water regulations
e) Shared water infrastructure
f) Impact on the environmental outside the site/farm gate
g) Climate change impacts
h) Regional water issues (e.g. quantity and quality)

i) Best practices for water management

Q 3.4 Do you monitor and evaluate your site's water performance? (Yes/No)

3.4.1 If you have a water plan, do you evaluate performance against your plan? (Yes/No)

3.4.2 Do you consult stakeholders (employees, customers, communities, government) in your evaluation of water performance and water issues? (Yes/No)

Q 3.5 Do you communicate about your water management and performance to:

a) The owners of your business
b) Employees
c) State or National Water agencies
d) Local water agencies e.g. water providers, CMA etc.
e) Industrial park management (if appropriate)
f) Local community
g) Your customers

Q 3.6 Is your site already independently certified against any international standards? (Yes/No)

3.6.1 If yes, could you specify? (e.g. ISO 14001?)

…….

3.6.2 Do your customers expect you to adopt these standards? (Yes/No)

3.6.3 Have any customers suggested you adopt the Alliance for Water Stewardship (AWS) International Water Stewardship Standard? (Yes/No)

3.6.4 Have your customers suggested any other water standards? For Example?

Q 3.7 Could you list three water management improvement initiatives you have made at this site over the past two years? Please list in order of importance based on impact and/or cost.

(1) …….

(2) ……..

(3) ……..

3.7.1 Could you list three water management improvement initiatives you are planning to make at this site over the next two years? Please list in order of importance based on impact.

(1) …….

(2) ……..

(3) ……..

3.7.2 If you have made or plan to make water management improvements at your site, what is the main driver or drivers for these improvements?

a) Improve efficiency and lower costs
b) Our customers want us to improve
c) We think we can win new customers
d) Protect or improve our reputation
e) Comply with the law
f) Our business will be more sustainable
g) We want to be a responsible business
h) Protect the environment
i) Other (specify)

Q 4 **We would now like to ask you about the value of water to your business**

Q 4.1 We would like to understand the value of water to your business. To do this we are asking about the impact of different water prices on your business. We are not interested in the actual price but the impact of change in price. So, if we assume that your current price is 100 units per litre, how much could you pay for input water before you would consider relocating or closing your business?

a) 105 (+5%)
b) 110 (+10%)
c) 150 (+50%)
d) 200 (+100%)
e) 300 (+200%)
f) 100 (0%) price is already too high for us

Q 4.2 What was the main issue you considered in deciding on your answer to the last question?

a) the cost of water as a proportion of all input costs
b) current profit margins
c) the importance of your current location

d) Other (please specify)

…….

Q 4.3 Thinking now about wastewater disposal, is the cost of wastewater disposal:

a) A more important cost for your business than input water
b) A less important cost for your business than input water
c) The cost importance of wastewater disposal is about the same as input water costs

Q 4.4 Thinking about regulations regarding wastewater, do you see fines for breach of water pollution controls as:

a) A cost of doing business
b) A financial cost your business cannot afford
c) Something your business would prefer to avoid because of the impact on your reputation
d) Other (specify)

……..

Q 5 I would now like to ask you about AWS International Water Stewardship Standard

The Alliance for Water Stewardship or AWS operates a system for recognising good, long-term, best practice water management by industrial and agricultural water-using operations. The system includes the AWS International Water Stewardship Standard (the AWS Standard), a certification system for operations that would like to be certified against the AWS Standard, a brand or label to recognise operations that have been certified and an international network of members and people interested in water as well as a multi-stakeholder governance system. The AWS Standard asks operations to consider conditions in the catchment where they operate as well as site risks and opportunities and develop a site water stewardship plan. It requires the plan to be implemented and updated every year and that important stakeholders be kept informed. The system aims to achieve sustainable water use (quantity), good water quality, healthy ecosystems and cultural sites, good water governance at a site and catchment level and safe water, sanitation and hygiene.

Q 5.1 How familiar are you with the AWS International Water Stewardship Standard?

a) Not at all
b) A little
c) A lot (colleague has participated in training)
d) Completely (I participated in training or are responsible for our participation)

5.1.1 If you or someone from your site participated in the water stewardship training, what was the main consideration that caused your firm to participate?

a) We just wanted to find out about the program
b) We were told to participate
    i. By who?
c) Help our reputation with government
d) Help our reputation with customers
e) Wanted ideas to improve water management
f) Worried about being shut down because of pollution
g) We think there are business opportunities
    i. Example?
h) Other (specify)

5.1.2 Did your company have concerns about participating in water stewardship program?

a) No, no concerns
b) Water is a small issue for our business
c) We don't have water expertise
d) It may increase our costs
e) We may attract attention
f) We could not see a business benefit
g) Other (specify)

Q 5.2 Are you considering, or have you adopted the Alliance for Water Stewardship (AWS) International Water Stewardship Standard? (Yes/No)

5.2.1 <u>If yes</u>, what is the main reason for considering/adopting the AWS Standard?

a) Benchmark our performance against peers
b) Verify our performance
c) Improve our performance
d) Meet customer expectations
e) Exceed regulatory requirements
f) Enhance our reputation
g) Other (specify)

5.2.2 <u>If no</u>, what is the main reason you are not considering adopting the AWS Standard?

a) Don't know enough about the AWS Standard and System
b) Potential cost of compliance
c) Looks complicated
d) Don't want others looking at our performance
e) No time for new programs
f) Other (specify)

Q 5.3 We would now like to understand a bit more about how you calculate the costs and benefits of participating in the AWS Water Stewardship System.

[Hand interview subject the sheet headed 'Benefits of Water Stewardship Attachment 1]

5.3.1 You have just been handed a list of potential benefits from participation in AWS Water Stewardship. Could you review this list and rank each item from 0 to 5 where 0 means it is not relevant for your company and 5 means it is a key benefit your company would be seeking to gain from participation in AWS Water Stewardship. If there is a benefit you feel is important, but it is not on the list, please add it in the blank space.

[Take back the list of benefits when completed, ensure it has been completed with items ranged from 0 to 5, and hand the sheet headed 'Potential Costs of Water Stewardship'. Attachment 2]

5.3.2 You have just been handed a list of potential costs from participation in AWS Water Stewardship. Could you review this list and rank each item from 0 to 5 where 0 means it is not relevant for your company and 5 means it is a key cost consideration. If there is a cost you feel is important but it is not on the list please add it in the blank space.

[Take back the Sheet 'Potential Costs of Water Stewardship' when completed, check that it has been completed correctly and mark with the interview number from Page 1]

Q 5.4 Would your decision to participate in AWS Water Stewardship be influenced by any of the following:

a) Government incentives (e.g. Kunshan RMB100,000 or USD 15,000)
b) Rebates on taxes, levies or charges
c) Discounted finance costs (lower interest)
d) Reduced government compliance costs (e.g. planning approvals)
e) Other (specify)

Q 6 Finally, we would like your views on the importance of different actors (government, farmers, industry, households, NGOS/civil society) to the health of water catchments (including the quality and quantity of freshwater available). When we talk about water catchments, we mean the area from which your water is sourced and the area impacted by your wastewater.

[Present a sheet of paper with different actors and hand the interview subject 10 pieces of sticky note for prioritising the different actors, Attachment 3]

We have just set out for you a paper with different categories of "actors" that could influence the management of water. You have been handed 10 small pieces of paper. We want you to use your pieces of paper to prioritise the different actors on the sheets of paper. Give the most pieces of paper to the actor you think is most influential, the second most to the next most influential, then the third and so on. When you have finished, the number of pieces of paper

should reflect how important each actor is in influencing catchment and water health. You have a blank piece of paper in case there is a group you feel we have not considered

There is no right or wrong answer in this exercise. We are interested in comparing and seeing if there is a difference in the perceived importance of different actors in different catchments.

[Please count the number of pieces of paper allocated to each of the actors and enter in the box below.

Actor	Score (x/10)	Actor	Score (x/10)
Industry/Business		Households/Domestic	
Government and its agencies		NGOs/Civil Society	
Farmers/Agriculture			

Q 6.1 Any comment on how you arrived at your answer?

Q 7 Any final comments on water stewardship and its potential application to your company?

Thank you for your time.

Attachment 1

BENEFITS OF WATER STEWARDSHIP

BENEFIT	**SCORE (0 – 5)**
Improve reputation/brand	
Improve employee morale	
Improve community relations	
Better manage natural capital	
Implement CSR Strategy	
Enhance social license	
Improve site water efficiency	
Reduce wastewater discharge	
Access new markets/customers	
Retain existing customers	
Receive incentive payments	
Reduce fines for breaches	
Avoid tougher regulation	
Enhance business sustainability	

0 = not relevant and 5 = key consideration

Attachment 2

POTENTIAL COSTS OF WATER STEWARDSHIP

POTENTIAL COST	SCORE (0 – 5)
Investment in water facilities	
Monitoring and staff time	
Wastewater treatment costs	
Develop management systems	
New skills and capabilities	
Compliance reporting time/costs	
Audit costs	
Added complexity	
Impact on business model	
Management time/commitment	
Community/stakeholder liaison	

0 = not relevant and 5 = key consideration

Attachment 3

BUSINESS AND INDUSTRY	GOVERNMENT & AGENCIES
FARMERS & AGRICULTURE	DOMESTIC AND HOUSEHOLD
	NON-GOVERNMENT ORGANISATIONS
OTHER	

Appendix 3 China questionnaire

WATER STEWARDSHIP IN INDUSTRIAL PARKS
CASE STUDY

Thank you for agreeing to participate in this interview. We are undertaking research into factors that affect decisions by companies to adopt the AWS water stewardship system for managing water risks and challenges.

We will be interviewing 20 companies in Kunshan and 20 companies in Tianjin. We have chosen companies in these industrial parks because the idea of water stewardship has already been introduced to these locations.

We will also be researching factors affecting decisions to adopt AWS water stewardship in other countries and different industrial sectors.

Water Stewardship is a six-step process for industry to progressively move toward best-practice water management and achieve four outcomes; sustainable water balance, good water quality, healthy important water-related areas and good water governance.

Our interest is in understanding factors that make water stewardship attractive to your business and factors that may discourage adoption of good water stewardship. This will help to improve both the AWS system and how water stewardship is communicated.

Lead researcher for this project is Michael Spencer who is a candidate for Doctor of Philosophy at Monash University in Melbourne (Australia). Michael is also the Board Chair of the Alliance for Water Stewardship.

The research is being supported by Prof. Kathinka Furst and students from Duke University Kunshan, Mr. An Chen from TEDA EcoCentre in Tianjin and Zhenzhen Xu from AWS Asia-Pacific based in Shanghai.

You will be asked to provide some details about yourself and the company you work for and its approach to water management. You will then be asked some specific questions about AWS Water Stewardship and responsibility for water management.

If you have any questions please discuss these with your interviewer or contact Michael Spencer (mfspe1@student.monash.edu.au), or the supervisors of this research; Alice de Jong (alice.dejonge@monash.edu) and Janet Stanley (janet.stanley@unimelb.edu.au).

Please sign the Consent Form provided by the interviewer.

Thank you

工业园区中的可持续水管理

案例分析

感谢您同意参加本次访谈。我们正在研究决定公司是否采用 AWS 可持续水管理系统来应对水风险和水挑战的影响因素。

我们将调研位于昆山和天津的各 20 家公司。选择这些位于工业园区的公司是因为可持续管理的概念在这些地区已经得到了推广。

我们还将研究影响不同国家、不同行业决定是否采用 AWS 可持续水管理的因素。

可持续水管理是一个分为六个步骤的过程，旨在帮助行业逐步实现可持续水管理的最佳实践方案，并取得四项成果：可持续的水平衡，良好的水质，健康的重要水相关地区和完善的水治理。

我们致力于了解使您对可持续水管理产生兴趣的因素，以及可能阻碍可持续水管理被采用的因素。这将有助于我们改善 AWS 系统以及完善可持续水管理交流。

本项目的首席研究员是澳大利亚墨尔本莫纳什大学 PhD 的候选人 Michael Spencer，同时他也是可持续水管理联盟的董事会主席。

这项研究得到了来自杜克大学昆山分校的 Kathinka Furst 教授与学生、天津泰达低碳中心的陈安先生和 AWS 亚太地区的徐臻臻的支持。

您将被要求提供一些关于您自己、您工作的公司，以及它的水管理方法的细节。随后您将被问到关于 AWS 可持续水管理和水管理责任的一些具体问题。

如果您有任何问题，请与调查员讨论；或联系 Michael Spencer (mfspe1@student.monash.edu.au)，本研究的主管 Alice de Jong（alice.dejonge@monash.ed）和 Janet Stanley（janet.stanley@unimelb.edu.au）。

请签署面试官提供的知情同意书。

谢谢

Interview number …… (T for Tianjin and K for Kunshan followed by consecutive number)

调查编号.....（T 代表天津，K 代表昆山，后用连续数字编号）

Q 1 Details of person being interviewed

受访者的详细信息

Name – 姓名：…….

Position – 职位：……..……...

Reports to -汇报对象：…….

Contact email – 邮箱地址： ……...

Contact telephone - 联系电话：.....

Company name - 公司名称： ……..

Q 2 Details of the site or plant we are talking about today 工厂详细信息

Q 2.1 Industry sector – 行业:

h) Food and Beverage – 餐饮
i) Textile and Apparel - 纺织和服装
j) Microelectronics - 微电子
k) Vehicles and automotive – 交通工具
l) Chemicals - 化学工业
m) Other (specify) - 其他（请注明）……

Q 2.2 Type of operation 经营类型

g) Manufacturing - 制造业
h) Wholesale, warehousing or distribution - 批发， 仓储或配送
i) Services - 服务
j) Other (specify) - 其他（请注明）……

Q 2.3 Number of employees at this site? 工厂的员工数量？……

Q 2.4 How many production sites does your company have? 贵公司有多少个生产工厂？
……

Q 3 We would now like to ask you about your current water management practices
现在我们希望了解您目前的水管理措施

Q 3.1 Which of the following do you see as the major water challenges facing your site/facility?

您认为以下哪项是您的场地/设施面临的主要水资源挑战？ (more than one answer is acceptable – 可以提供多个回答)

h) Water scarcity - 水资源短缺
i) Water pollution - 水污染
j) Water cost – 用水成本
k) Water efficiency – 用水效率
l) Attitudes of people to water - 人们对水的态度
m) Impact on the environment - 对环境的影响
n) Other - 其他

Q3.1.1 If you listed (e) "Attitudes of people to water" which people do you have in mind?

f) Internal management of your site
g) Workers at your site
h) General community attitudes
i) Local government officials
j) Other (specify)

Q3.1.2 If you listed (f) "Impact on the environment" which impacts did you have in mind?

e) Impacts identified in your site EIS
f) General impacts on the local environment of our industrial park
g) Environmental conditions in our region/province
h) Other (specify)
i)

Q 3.2 Do you undertake an analysis of water risks facing your site? (Yes/No)

您是否对工厂面临的水风险进行分析？ (是/否)

3.2.1 If yes, what sorts of risks do you consider? (more than one is acceptable)

如果是的话，您会考虑什么样的风险？ （可以提供多个回答)

e) Operational risks from water use at the site
工厂用水收到影响而带来的运营风险
f) Water risks facing the region or catchment
地区或流域面临的水风险
g) Water risks facing our supply chain
供应链面临的水风险
h) Water risks facing our stakeholders (employees, customers, communities etc.)
您的利益相关方（员工，客户，社区等）可能面临的水风险

Q 3.3 Do you have a water plan for your site? 您的场地是否有水管理计划？ (Yes 是/No 否)

3.3.1 If yes, does your plan consider: 如果回答是，该计划是否考虑到：

j) Site water efficiency – 工厂用水效率
k) Site water quality – 工厂水质
l) Site environmental impacts – 工厂环境影响
m) Legal compliance with water regulations - 遵守水法规
n) Shared water infrastructure - 共享的水利基础设施
o) Regional environmental impacts - 区域环境影响
p) Climate change impacts - 气候变化影响
q) Regional water issues (quantity and quality) - 区域水问题（水量和质量）
r) Best practices for water management - 水管理最佳实践

Q 3.4 Do you monitor and evaluate your site's water performance? (Yes/No)

您是否监测并评估您工厂的水管理绩效？ (是/否)

3.4.1 If you have a water plan, do you evaluate performance against your plan? (Yes/No)

如果您有水管理计划，您是否按照计划评估水资源管理绩效？ (是/否)

3.4.2 Do you consult stakeholders (employees, customers, communities, government, industrial park) on your water performance and water issues? (Yes/No)

您是否咨询了利益相关方（员工，客户，社区，政府，工业园区）对您的水资源管理绩效和水问题的看法？（是/否）

Q 3.5 Do you communicate about your water management and performance to:

您是否将您的水资源管理和绩效传达给：

h) The owners of your business – 股东
i) Employees - 雇员
j) National level EPB and/or Water Agency - 国家环保及水资源主管部门
k) Local Environment Protection and/or Water Bureau – 地方环保及水务部门
l) Industrial park management - 工业园区管理部门
m) Local community - 当地社区
n) Your customers - 客户

Q 3.6 Is your site already independently certified against any international standards? (Yes/No)

您的工厂是否已经独立通过任何国际标准认证？（是/否）

3.6.1 If yes, could you specify? 如果回答是肯定的，您能具体说明吗？ (例如 ISO 14001?)
……

3.6.2 Do your customers expect you to adopt these standards? (Yes/No)

您的客户希望您采用这些标准吗？（是/否）

3.6.3 Have any customers suggested you adopt the Alliance for Water Stewardship (AWS) International Water Stewardship Standard? (Yes/No)

是否有客户建议您采用水管理联盟（AWS)国际可持续水管理标准？（是/否）

3.6.4 Have your customers suggested any other water standards? For Example?

你的客户是否建议你采纳其它水相关标准？例如？

Q 3.7 Could you list three water management improvement initiatives you have made at this site over the past two years? Please list in order of importance based on impact and/or cost.

您能列出三项过去两年里您在该地做过的水管理改进项目吗？ 请按照重要程度排序（重要程度指：项目的影响和/或成本）

(1) ……

(2) ……..

(3) ……..

3.7.1 Could you list three water management improvement initiatives you are planning to make at this site over the next two years? Please list in order of importance based on impact.

您能否列出三项您计划在未来两年内计划开展的水管理改进项目？ 请根据项目的影响进行排序

(1) ……

(2) ……..

(3) ……..

3.7.2 If you have made or plan to make water management improvements at your site, what is the main driver or drivers for these improvements?

如果您已经或计划在您的工厂进行水管理改进，那么这些改进的主要驱动因素是什么？

j) Improve efficiency and lower costs - 提高效率并降低成本
k) Our customers want us to improve - 我们的客户希望我们改进
l) We think we can win new customers - 我们认为我们可以赢得新客户
m) Protect or improve our reputation - 保护或提高我们的声誉
n) Comply with the law - 遵守法律
o) Our business will be more sustainable - 我们的业务将更具可持续性
p) We want to be a responsible business - 我们希望成为一个负责任的企业
q) Protect the environment – 保护环境
r) Other (specify)

Q 4 **We would now like to ask you about the value of water to your business**

现在我们希望询问有关水对您企业的价值的问题

Q 4.1 We would like to understand the value of water to your business. To do this we are asking about the impact of different water prices on your business. We are not interested in the actual price but the impact of change in price. So, if we assume that your current price is 100 units per litre, how much could you pay for input water before you would consider relocating or closing your business?
我们希望了解水对您企业的价值。为此，我们询问不同水价对您企业的影响。 我们感兴趣的是价格变化的影响而非实际价格。所以，如果我们假设您目前的用水成本（包括原水和处理费用）是每升 100 个单位，那么在您考虑搬迁或关闭企业之前，您能够承受的用水支出？

g) 105 (+5%)
h) 110 (+10%)
i) 150 (+50%)
j) 200 (+100%)
k) 300 (+200%)
l) other/其他

Q 4.2 What was the main issue you considered in deciding on your answer to the last question?
在决定上一个问题的答案时，您考虑的主要问题是什么？

e) the cost of water as a proportion of all input costs -水成本占所有投入成本的比例
f) current profit margins -目前的利润率
g) the importance of your current location -当前工厂地理位置的重要性
h) Other (please specify) -其他（请注明）

……

Q 4.3 Thinking now about wastewater disposal, is the cost of wastewater disposal:
现在，考虑废水处理的成本：

d) A more important cost for your business than input water
它对于企业来说比用水成本更重要
e) A less important cost for your business than input water
它对于企业来水比没有用水成本重要
f) The cost importance of wastewater disposal is about the same as input water costs
废水处理成本与用水成本的重要性大致相同

Q 4.4 Thinking about regulations regarding wastewater, do you see fines for breach of water pollution controls as:
关于废水的法规，您将违规排放的罚款看作：

e) A cost of doing business -做生意的成本
f) A financial cost your business cannot afford -您的企业无法负担的财务成本
g) Something your business would prefer to avoid because of the impact on your reputation -由于会对您的声誉产生影响，您的企业更愿意避免这种情况
h) Other (specify) -其他（请注明）

……..

Q 6 I would now like to ask you about AWS International Water Stewardship Standard
现在我想问您一些有关 AWS 国际可持续水管理标准的问题。

The Alliance for Water Stewardship or AWS operates a system for recognising good, long-term, best practice water management by industrial and agricultural water-using operations. The system includes the AWS International Water Stewardship Standard (the AWS Standard), a certification system for operations that would like to be certified against the AWS Standard, a brand or label to recognise operations that have been certified and an international network of members and people interested in water as well as a multi-stakeholder governance system. The AWS Standard asks operations to consider conditions in the catchment where they operate as well as site risks and opportunities and develop a site water stewardship plan. It requires the plan to be implemented and updated every year and that important stakeholders be kept informed. The system aims to achieve sustainable water use (quantity), good water quality, healthy ecosystems and cultural sites and good water governance at a site and catchment level.

Q 6.1 How familiar are you with the AWS International Water Stewardship Standard?
您对 AWS 国际可持续水管理标准的熟悉程度如何？

e) Not at all -完全不熟悉
f) A little -有些了解
g) A lot (colleague has participated in training) -比较熟悉（同事参加了培训）
h) Completely (I participated in training) -完全熟悉（我参加过培训）

6.1.1 If you or someone from your site participated in the water stewardship training, what was the main consideration that caused your firm to participate?

如果您或您工厂的人员参与了可持续水管理培训，那么促使您的公司参与的主要因素是什么？

i) We just wanted to find out about the program -我们只是想了解该计划
j) We were told to participate -我们被告知参加
    i. By who? -由谁？
k) Help our reputation with government -帮助提升我们在政府的声誉
l) Help our reputation with customers -帮助提升我们在客户的声誉
m) Wanted ideas to improve water management -对改进水管理有需求
n) Worried about being shut down because of pollution -担心因污染而被关停
o) We think there are business opportunities -我们认为有商机
    i. Example? -例如？
p) Other (specify) -其他（请注明）

6.1.2 Did your company have concerns about participating in water stewardship program?

贵公司对参与此类试点项目是否有顾虑？

h) No, no concerns -不，没有
i) Water is a small issue for our business -水对我们的业务来说是一个小问题
j) We don't have water expertise -我们没有水的专业知识
k) It may increase our costs -这可能会增加我们的成本
l) We may attract attention -我们可能会引起他人的关注
m) We could not see a business benefit -我们看不到商业利益
n) Other (specify) -其他（请注明）

Q 6.2 Are you considering adopting the Alliance for Water Stewardship (AWS) International Water Stewardship Standard? (Yes/No)

您是否考虑采用水管理联盟（AWS）国际可持续水管理标准？（是/否）

6.2.1 <u>If yes</u>, what is the main reason you are considering adopting the AWS Standard?

如果是，那么您考虑采用 AWS 标准的主要原因是什么？

h) Benchmark our performance -评估我们的表现
i) Verify our performance -认证我们的表现
j) Improve our performance -提高我们的表现
k) Meet customer expectations -满足客户期望
l) Exceed regulatory requirements -超过监管要求
m) Other (specify) -其他（请注明）

6.2.2 If no, what is the main reason you are not considering adopting the AWS Standard?

如果不是，您不考虑采用 AWS 标准的主要原因是什么？

a) Don't know enough about the Standard -对标准不够了解
b) Potential cost of compliance -潜在的实施成本
c) Looks complicated -看起来很复杂
d) Don't want others looking at our performance -不希望别人了解我们的绩效水平
e) No time for new programs -没有时间开展新项目
f) Other (specify) -其他（请注明）

Q 6.3 We would now like to understand a bit more about how you calculate the costs and benefits of participating in the AWS Water Stewardship System.
我们现在想更多地了解您是如何计算参与 AWS 可持续水管理系统的成本和收益的。

[Hand interview subject the sheet headed 'Benefits of Water Stewardship Attachment 1]

[将"可持续水管理的收益"（附件 1）的表格递给被访者]

6.3.1 You have just been handed a list of potential benefits from participation in AWS Water Stewardship. Could you review this list and rank each item from 0 to 5 where 0 means it is not relevant for your company and 5 means it is a key benefit your company would be seeking to gain from participation in AWS Water Stewardship. If there is a benefit you feel is important but it is not on the list please add it in the blank space.

您现在看到的是参与 AWS 可持续水管理的潜在收益清单。请您浏览此清单并为每个项目从 0 到 5 打分，其中 0 表示它与贵公司无关，5 表示它是贵公司希望通过参与 AWS 可持续水管理寻求的关键利益。 如果您觉得有很重要但未列出的收益，请将其添加到空白处。

[Take back the list of benefits when completed, ensure it has been completed with items ranged from 0 to 5, and hand the sheet headed 'Potential Costs of Water Stewardship'. Attachment 2]

[完成后收回收益清单，确保已完成所有项目从 0 到 5 的打分，并将"可持续水管理的潜在成本"（附件 2）递给被访者]

6.3.2 You have just been handed a list of potential costs from participation in AWS Water Stewardship. Could you review this list and rank each item from 0 to 5 where 0 means it is not relevant for your company and 5 means it is a key cost consideration. If there is a cost you feel is important but it is not on the list please add it in the blank space.

您现在看到的是参与 AWS 可持续水管理的潜在成本清单。请您浏览此清单并对每个项目从 0 到 5 打分，其中 0 表示它与贵公司无关，5 表示它是关键成本考虑因素。如果有您认为重要但未列出的成本，请将其添加到空白处。

[Take back the Sheet 'Potential Costs of Water Stewardship' when completed, check that it has been completed correctly and mark with the interview number from Page 1] [完成后收回表格'潜在的可持续水管理成本'，检查是否已经正确填写并用第 1 页的调查编号标注]

Q 6.4 Would your decision to participate in AWS Water Stewardship be influenced by any of the following:
以下任何因素，是否会影响您对参加 AWS 可持续水管理的决定：

a) Government incentives (Kunshan RMB100,000) 政府奖励（昆山 人民币 100,000 元）
b) Rebates on taxes, levies or charges -税收或费用减免
c) Discounted finance costs (lower interest) -优惠的财务费用（更低的利息）
d) Reduced government compliance costs (e.g. planning approvals) – 降低合规成本（例如，新项目审批）
e) Other (specify) -其他（请注明）

Q 7 Finally, we would like your views on the importance of different actors (government, farmers, industry, households, NGOS/civil society) to the health of water catchments (including the quality and quantity of freshwater available). When we talk about water catchments, we mean the area from which your water is sourced and the area impacted by your wastewater.
最后，我们希望您对不同角色（政府，农民，工商业，社区家庭，非政府组织/民间组织）对流域健康（包括可利用淡水资源的水量和质量）的重要性提出看法。

[Set out a sheet of paper with different actors and hand the interview subject 10 pieces of sticky note for prioritising the different actors, Attachment 3]

[发放印有不同橘色的纸张和 10 张便利贴，要求被访者对不同角色的重要性进行排序, 附件 3]

We have just set out for you a paper with different categories of actors that could influence the management of water. You have been handed 10 small pieces of paper. We want you to use your pieces of paper to prioritise the different actors on the sheets of paper. Give the most pieces of paper to the actor you think is most influential, the second most to the next most influential, then the third and so on. When you have finished, the number of pieces of paper should reflect how important each actor is in influencing catchment and water health. You have a blank piece of paper in case there is a group you feel we have not considered.

我们为您累出了可能影响水管理的不同类别角色。您拥有 10 张小纸片。我们希望您使用这些纸片来为不同角色的重要性排序。请给您认为最有影响力的角色最多纸片，其次多的给第二有影响力的角色，以此类推。完成后，纸片的数量应反映每个行为者对影响流域和水体健康的重要性。您可在空白处填入新的角色，以防有我们没有考虑到的群体。

There is no right or wrong answer in this exercise. We are interested in comparing and seeing if there is a difference in the perceived importance of different actors in different catchments.

在这个练习中没有正确或错误的答案。我们感兴趣的是比较和观察流域中不同角色被赋予的重要性是否存在差异

[Please count the number of pieces of paper allocated to each of the actors and enter in the box below. [请计算分配给每个演员的纸张数量并输入下列表格。]

Actor 角色	Score (x/10)分数	Actor 角色	Score (x/10)分数
Industry/Business 工业/商业		Households/Domestic 社区家庭	
Government 政府		NGOs/Civil Society 非政府组织/社会组织	
Farmers/Agriculture 农民/农业			

Q 7.1 Any comment on how you arrived at your answer? 简要描述您是如何得出以上答案的？

Q 8 Any final comments on water stewardship and its potential application to your company?
关于可持续水管理在贵公司的应用，是否还有其他意见和建议？

Thank you for your time. 非常感谢您的配合！

Attachment 1 附件 1

BENEFITS OF WATER STEWARDSHIP
可持续水管理的收益

BENEFIT	收益	SCORE -分数 (0 – 5)
Improve reputation/brand	提高声誉/品牌	
Improve employee morale	提高员工士气	
Improve community relations	改善社区关系	
Better manage natural capital	更好地管理自然资本	
Implement CSR Strategy	实施企业社会责任（CSR）战略	
Enhance social license	加强社会认可	
Improve site water efficiency	提高工厂用水效率	
Reduce wastewater discharge	减少废水排放	
Access new markets/customers	开发新的市场/客户	
Retain existing customers	保持现有客户	
Receive incentive payments	获得（政府）奖励	
Reduce fines for breaches	减少违规罚款	
Avoid tougher regulation	避免更严格的法规	
Enhance business sustainability	增强业务可持续性	

Attachment 2 附件 2

POTENTIAL COSTS OF WATER STEWARDSHIP
可持续水管理的潜在成本

POTENTIAL COST	潜在成本	SCORE -分数 (0 – 5)
Investment in water facilities	投资水相关设施设备	
Monitoring and staff time	监控和员工时间	
Wastewater treatment costs	废水处理费用	
Develop management systems	开发管理系统	
New skills and capabilities	新的技能和能力	
Compliance reporting time/costs	合规报告时间/花费	
Audit costs	认证花费	
Added complexity	感觉会增加复杂性	
Impact on business model	对商业模式的影响	
Management time/commitment	管理时间/承诺	
Community/stakeholder liaison	社区/利益相关者联络	

0 = not relevant and 5 = key consideration - 0 =不相关， 5 =重点考虑

Attachment 3 附件 3

BUSINESS AND INDUSTRY 工商业	CENTRAL GOVERNMENT 中央政府
FARMERS AND AGRICULTURE 农民和农业	LOCAL GOVERNMENT 地方政府
DOMESTIC AND HOUSEHOLD 社区居民家庭	NGO AND CIVIL SOCIETY 非政府组织和社会组织
OTHER 其他	

Appendix 4 Ethics approval

MONASH University

Monash University Human Research Ethics Committee (MUHREC)
Research Office

Human Ethics Certificate of Approval

This is to certify that the project below was considered by the Monash University Human Research Ethics Committee. The Committee was satisfied that the proposal meets the requirements of the *National Statement on Ethical Conduct in Human Research* and has granted approval.

Project Number: CF14/2738 - 2014001524

Project Title: Non-Regulatory Responses to Environmental Externalities

Chief Investigator: Dr Alice De Jonge

Approved: **From:** 7 October 2014 **To:** 7 October 2019

Terms of approval - ***Failure to comply with the terms below is in breach of your approval and the Australian Code for the Responsible Conduct of Research.***

1. The Chief investigator is responsible for ensuring that permission letters are obtained, if relevant, before any data collection can occur at the specified organisation.
2. Approval is only valid whilst you hold a position at Monash University.
3. It is the responsibility of the Chief Investigator to ensure that all investigators are aware of the terms of approval and to ensure the project is conducted as approved by MUHREC.
4. You should notify MUHREC immediately of any serious or unexpected adverse effects on participants or unforeseen events affecting the ethical acceptability of the project.
5. The Explanatory Statement must be on Monash University letterhead and the Monash University complaints clause must include your project number.
6. **Amendments to the approved project (including changes in personnel):** Require the submission of a Request for Amendment form to MUHREC and must not begin without written approval from MUHREC. Substantial variations may require a new application.
7. **Future correspondence:** Please quote the project number and project title above in any further correspondence.
8. **Annual reports:** Continued approval of this project is dependent on the submission of an Annual Report. This is determined by the date of your letter of approval.
9. **Final report:** A Final Report should be provided at the conclusion of the project. MUHREC should be notified if the project is discontinued before the expected date of completion.
10. **Monitoring:** Projects may be subject to an audit or any other form of monitoring by MUHREC at any time.
11. **Retention and storage of data:** The Chief Investigator is responsible for the storage and retention of original data pertaining to a project for a minimum period of five years.

Professor Nip Thomson
Chair, MUHREC

cc: Mr Michael Spencer, Dr Janet Stanley

Postal – Monash University, Vic 3800, Australia
Building 3E, Room 111, Clayton Campus, Wellington Road, Clayton
Telephone +61 3 9905 5490 Facsimile +61 3 9905 3831
Email muhrec@monash.edu http://www.monash.edu.au/researchoffice/human/
ABN 12 377 614 012 CRICOS Provider #00008C

Appendix 5 Editor's Statement

RK Editing Academic & General

MOB: 0427 979 231 TEL: 03 57 908606 ABN: 99 470 929 145

Statement of Editorial Practice

This thesis has had the benefit of professional editorial advice according to:

- the guidelines set down by the Institute of Professional Editors (*Australian standards for editing practice*). Editorial advice was restricted to matters of substance and structure (exemplars only); language (including matters of clarity, voice and tone, grammar, spelling and punctuation, specialised and foreign material); and use of illustrations and tables.
- the Publication Manual of the American Psychological Association (6th Edition)
- The Australian Concise Oxford Dictionary (4th Edition)

All suggested changes are made in good faith based on this editor's professional opinion as to the readability of the text. Any decision to adopt or reject such changes is entirely at the discretion of the author.

Ruth Fluhr
Academic Editor
January, 2021

References

2030 Water Resources Group. (2009). *Charting Our Water Future; Economic frameworks to improve decision-making*. Retrieved from https://www.2030wrg.org/charting-our-water-future-economic-frameworks-inform-decision-making/:

Abbott, K. W., & Snidal, D. (2009). The Governance Triangle: Regulatory Standards Institutions and the Shadow of the State. In W. Mattli, Woods, N. (Ed.), *The Politics of Global Regulation*. Princeton: Princeton University Press.

ACCC. (2012). *Water Reform - Creating Water Markets: the role of the Water Market Rules and the Water Charge Rules*. Retrieved from https://www.accc.gov.au/publications/creating-water-markets-the-role-of-the-water-market-rules-the-water-charge-rules:

ACCC. (2020). *Murray-Darling Basin water markets inquiry Interim Report*. Retrieved from https://www.accc.gov.au/system/files/Murray-Darling%20Basin%20inquiry%20-%20interim%20report.pdf

ACF. (2009). *Woodchipping Our Water, Victoria's Goulburn Broken Catchment: A case for reassessing the use of the catchment's wet montane forests*. Retrieved from http://forestsandclimate.org.au/cms/wp-content/uploads/woodchipping-our-water-acf-report.pdf:

ADB. (2016). *Asian Water Development Outlook 2016: Strengthening water security in Asia and the Pacific*. Retrieved from https://www.adb.org/publications/series/asian-water-development-outlook:

AFSL. (2020). *Our History*. Retrieved from https://www.responsiblewood.org.au/about-us/history/:

AingeRoy, E. (2020, 27 February 2020). 'We're running out of water': NZ army sent in to help with Northland drought relief. *The Guardian*. Retrieved from https://www.theguardian.com/world/2020/feb/27/were-running-out-of-water-nz-army-sent-in-to-help-with-northland-drought-relief

Ajani, J. (2007). *The Forest Wars*. Melbourne: Melbourne University Press.

Altman, M. (Ed.) (2015). *Real-world decision making: An encyclopedia of behavioral economics*. ebookcentral.proquest.com.

Amis, A. (2007, 2013). Book Review (and an alterative view of the History of Campaigns to Save Victoria's Native Forests), Dr Rod Anderson's 'Cheap as Chips - A History of Campaigns to Save Victoria's Native Forests' Published by Dr R W Anderson 2006.

Anderson, S. (2017, 14 June). Gippsland sawmill to begin closure, rejecting offer from the Victorian Government to buy the share. *ABC News*.

Anderson, T. (2017). *Submission to the VEAC Central West Investigation*. Retrieved from http://www.veac.vic.gov.au/submissions/published/12832-CW_Subs_NOI_624_Tim_Anderson_Redacted.pdf:

Andrew, M., Jarvis, T., Howard, B., McLeod, G., Robinson, S., Standen, R., . . . Williams, A. (2007). The Environmental Stewardship System (ESS): a generic system for assuring rural environmental performance. *Australian Journal of Experimental Agriculture, 47*, 254-259.

Andrews, D. (2019). Securing the future for forest industry workers [Press release]

Ansell, C. (2019). Collaboration: key concepts. In A. Kekez, M. Howlett, & M. Ramesh (Eds.), *Collaboration in Public Service Delivery: promise and pitfalls* (Paperback edition (2020) ed.): Edward Elgar.

APEEL. (2017). *The Foundations of Environmental Law: Goals, Objectives, Principles and Norms*. Retrieved from https://static1.squarespace.com/static/56401dfde4b090fd5510d622/t/58e5f852d1758eb801c117d8/1491466330447/APEEL_Foundations_for_environmental_law.pdf

Arrow, K. J. (1986). Exposition of the theory of choice under uncertainty. In C. B. McGuire & R. Radner (Eds.), *Decision and Organisation; A volume in honor of Jacob Marschak* (2 ed.). Minneapolis: University of Minnesota Press.

Arrow, K. J., Keohane, R. D., & Lewin, S. A. (2012). Elinor Ostrom: An uncommon woman for the commons. *Procedings of the National Acadamy of Sciences of the United State of America, 103*(33).

Auld, G. (2014). *Constructing Private Governance: The Rise and Evolution of Forest, Coffee and Fisheries Certification*: Yale University Press.

Auld, G., Gulbrandsen, L. H., & MCDermott, C. L. (2008). Certification Schemes and the Impacts on Forests and Forestry. *Annual Review of Environment and Resources, 33*, 187-211.

Australian Academy of Science. (2019). *Investigation of the causes of mass fish kills in the Menindee Region NSW over the summer of 2018-2019*. Retrieved from https://www.science.org.au/supporting-science/science-policy-and-sector-analysis/reports-and-publications/fish-kills-report:

Australian Government. (2004). *Intergovernmental Agreement on a National Water Initiative*. Retrieved from https://www.pc.gov.au/inquiries/completed/water-reform/national-water-initiative-agreement-2004.pdf:

AWS. (2014). The AWS International Water Stewardship Standard (Version 1). In: Alliance for Water Stewardship.

AWS. (2015). *Glossary of Terms V.1*. Retrieved from https://a4ws.org/download/glossary-of-terms/:

AWS. (2018). AWS Certification. Retrieved from http://a4ws.org/certification/

Ball, P. (2017). *The Water Kingdom: a secret history of China*. London: Vintage.

Barber, W. J. (1967). *A History of Economic Thought*. London: Penguin.

Barkley, P. W., & Seckler, D. W. (1972). *Economic Growth and Environmental Decay, the solution becomes the problem*. New York: Harcourt Brace Jovanovich, Inc.

Barnosky, A. D., Hadly, E. A., Bascompte, J., Berlow, E. L., Brown, J. H., Fortelius. M., . . . Smith, A. B. (2012). Approaching a state shift in Earth's biosphere. *Nature, 486(7401)*.

Baumgärtner, S., Dyckhoff, H., Faber, M., Proops, J., & Schiller, J. (2001). The concept of joint production in ecological economics. *Ecological Economics, 36*(3), 365 - 372.

Béland, D. (2009). Ideas, institutions and policy change. *Journal of European Public Policy, 16*(5), 701-718. doi:10.1080/13501760902983382

Bell, S., & Park, A. (2006). The Problematic Metagovernance of Networks: Water Reform in New South Wales. *Journal of Public Policy, 26*(1), 63-93.

Bennett, N. J., Whitty, T. S., Finkbeiner, E., Pittman, J., Bassett, H., Gelcich, S., & Allison, E. H. (2018). Environmental Stewardship: A cenceptual review and analytical framework. *Environmental Management, 61*, 597-614.

Berque, A. (2013). *Thinking through landscape* (A. Feenberg-Dibon, Trans.). Oxford: Routledge.

Berry, R. J. (2018). *Environmental attitudes through time*. Cambridge, UK: Cambridge University Press.

Besley, A. C. (2011). Finding Foucault - fragments from a biography: A post-structuralist stance on cultures of the self. *Review of Contemporary Philosophy, 10*, 25-43.

Biblica. (1979). *The Holy Bible, New International Version (Anglicised edition)*: Hodder & Stoughton.

Birmingham, S. (2014). Forward. In *Water Recovery Strategy for the Murray-Darling Basin*: Commonwealth of Australia, Canberra.

Bishop, J. (Ed.) (2011). *The Economics of Ecosystems and Biodiversity in Business*. London: Earthscan.

Bloomberg. (2017). Xi's speech had 89 mentions of the 'environment', just 70 mentions of the 'economy'. Retrieved from https://www.bloomberg.com/news/articles/2017-10-18/in-xi-s-vision-for-china-environment-edges-out-economy

Bohm, G., & Tanner, C. (2019). Environmental Risk Perception. In L. Steg & J. I. M. de Groot (Eds.), *Environmental Psychology, An Introduction* (2 ed.). Chichester: Wiley.

BOM. (2020). Water Markets; Murray-Darling Basin. Retrieved from http://www.bom.gov.au/water/dashboards/#/water-markets/mdb/at

Bostrom, M., & Davidson, D. J. (2018). *Environment and Society: Concepts and Challenges*: Palgrave Macmillan.

Bourke, R. (1835). *Proclamation of Governor Bourke, 10 October 1835*. Colonial Office.

Bourke, T. (2009, 12 February 2009). [Letter].

Bracks, S. (2005). Victoria Attracts New Investments Worth $600M [Press release]

Bracks, S. (2020, 20 April 2020) *Forest Policy in Victoria/Interviewer: M. Spencer*. Unpublished.

Bracks, S., & Garbutt, S. (2002). *Our Forests Our Future*: Victorian Government, Melbourne.

Bren, L., Jeyasingham, J., & Davey, S. M. (2013). Impacts of native forest harvesting on flows into the Murray-Darling Basin system. *Australian Forestry, 76*(2), 91-100.

Brundtland, G. H. (1987). *Report of the World Commission on Environment and Development: Our Common Future*. Retrieved from New York: http://www.un-documents.net/ocf-cf.htm

Bryman, A. (2012). *Social Research Methods* (4th ed.): Oxford University Press, UK.

BSR. (2010). *Electronics Supply Networks and Water Pollution in China, understanding and mitigating potential impacts*. Retrieved from https://www.bsr.org/en/our-insights/report-view/electronics-supply-networks-and-water-pollution-in-china:

Buchanan, J. M. (1965). An Economic Theory of Clubs. *Economica, 32*(125), 1-14.

Buchanan, J. M., & Musgrave, R. A. (1999). *Public finance and public choice: two contrasting visions of the State*: MIT Press.

Bull, G. (2018). *One hundred and twenty five years of the Renmark Irrigation Trust No. 1 1893-2018*: Renmark Irrigation Trust.

Burdon, P., Drew, G., Stubbs, M., Webster, A., & Barber, M. (2015). Decolonising Indigenous water 'rights' in Australia, flow, difference, and the limits of law. *Settler Colonial Studies, 5*(4), 334-349.

Burke, E. (1775). Speech on Conciliation with the Colonies. In J. Plamenatz (Ed.), *Readings from Liberal Writers English and French*. London: George Allen & Unwin Ltd.

Butler, W. H., & Schultz, C. A. (2019). *A new era for collaborative forest management; policy and practice insights from the collaborative forest landscape restoration program*. Oxford, UK: Routledge.

Cahill, D., & Toner, P. (2018). *Wrong Way; How privatisation & economic reform backfired*: LaTrobe University Press, Melbourne.

Caldwell, B. (1997). Hayek and socialism. *Journal of Economic Literature, 35*(4), 1856-1890.

Camerer, C. F., & Loewenstein, G. (2004). Behavioral Economics: Past, Present, Future. In C. F. Camerer, G. Loewenstein, & M. Rabin (Eds.), *Advances in Behavioural Economics*. Princeton: Princeton University Press.

Cameron, H. (2015). *Water Stewardship Journey at Inghams Somerville Primary Processing Plant.* Paper presented at the 18th International Rivers Symposium, Brisbane.

Carr-Saunders, A. M., & Wilson, P. A. (1933). *The Professions* (1964 Reprint of 1st edition ed.): Cass., London.

Carron, L. T. (1979). Forestry in the Australian Environment - The Background. *Australian Forestry, 42*(2), 63-73.

Carron, L. T. (1985). *A History of Forestry in Australia*. Canberra: Australian National University Press.

Cashore, B., Auld, G., & Newsom, D. (2004). *Governing Through Markets: Forest Certification and the Emergence of Non-State Authority*. New Haven: Yale University Press.

Cashore, B., Egan, E., Auld, G., & Newsome, D. (2007). Revising Theories of Nonstate Market-Driven (NSMD) Governance: Lessons from the Finnish Forest Certification Experience. *Global Environmental Politics, 7*(1).

Caswell, P. (2006). [Preclusion of Timber from the New Melbourne Convention Centre Project].

CBD. (1998). Fourth Ordinary Meeting of the Conference of the Parties to the Convention on Biological Diversity, 4 - 15 May 1998, Decision IV/10 Measures for implementing. the Convention on Biological Diversity. Retrieved from https://www.cbd.int/decision/cop/?id=7133

Chislock, M. F., Doster, E., Zitomer, R. A., & Wilson, A. E. (2013). Eutrophication: Causes, Consequences, and Controls in Aquatic Ecosystems. *Nature Education Knowledge, 4*(4).

Christensen, R. A., & Butler, W. H. (2019). Navigating accountability tensions in collaborative ecological restoration of public lands. In W. H. Butler & C. A. Schultz (Eds.), *A new era for collaborative forest management: policy and practice insights from the collaborative forest landscape restoration program*. Oxford, UK: Routledge.

Clarke, C. M. H. (1962). *A History of Australia* (Vol. From Earliest Times to the Age of Macquarie, Vol. 1): Melbourne University Press.

Clode, D. (2006). *As if for a thousand years: a history of Victoria's Land Conservation and Environment Conservation Councils*: Victorian Environment Assessment Council.

COAG. (1994). The Council of Australian Government's Water Reform Framework [Press release]

Coase, R. H. (1960). The Problem of Social Cost. *Journal of Law and Economics, 3*, 1-44.

Coghill, K. (2002). *Governance for Uncertain Times*. Judge Institute of Management Studies, Cambridge University.

Conroy, M. J., & Peterson, J. T. (2013). *Decision Making in Natural Resource Management; A structured, adaptive approach*. Oxford, UK: Wiley-Blackwell.

Cornes, R., & Sandler, T. (1996). *The theory of externalities, public goods and club goods* (Second ed.): Cambridge University Press.

Costanza, R., Cumberland, J. H., Daly, H., Goodland, R., Norgaard, R. B., Kubiszewski, I., & Franco, C. (2015). *An Introduction to Ecological Economics* (Second Edition ed.): CRC Press, Taylor & Francis Group.

Craig, R., Taonui, R., & Wild, S. (2012). The concept of taonga in Māori culture: insights for accounting. *Accounting, Auditing & Accountability Journal, 25*(6), 1025-1047. doi:10.1108/09513571211250233

Crane, A., Matten, D., & Moon, J. (2008). Ecological Citizenship and the Corporation: Politicizing the New Corporate Environmentalism. *Organization & Environment, 21*(4), 371-389.

Creedy, J., & Wurzbacher, A. P. (2001). The economic value of a forested catchment with timber, water and carbon sequestration benefits. *Ecological Economics, 38*(1), 71-83.

Cromen, D. A. N. (1960). Australian forest resources and their assessment. *Australian Forestry, 24*(1), 22-24.

Crotty, M. (1998). *The Foundations of Social Research: Meaning and Perspective in the Research Process*. Sydney: Allen and Unwin.

Crutzen, P., & Schwägerl, C. (2011). Living in the Anthropocene: Towards a New Global Ethos. *Yale Environment 360*.

Crutzen, P., & Stoermer, E. F. (2000). The 'Anthropocene'. *International Geosphere - Biosphere Program Newsletter, 41*.

Water Act 2007, Parliament of Australia, Pub. L. No. 137, 2007 (2007).

D'Ambrosio, L. (2019). Protecting Victoria's Forests and Threatened Species [Press release]

Dahl, R. E., & Lindblom, C. E. (1953). *Politics, Economics, and Welfare: Planning and Politico-Economic Systems Resolved into Social Processes*: Harper and Brothers.

Dargavel, J. (1980). The political detection of an Australian forestry perspective. *Australian Forestry, 43*(1), 5-15.

Dargavel, J. (1987). Prospects present and preferred. In J. Dargavel & G. Sheldon (Eds.), *Prospects for Australian Hardwood Forests*. Canberra: Centre for Resource and Environmental Studies.

Darnall, N., Potoski, M., & Prakash, A. (2009). Sponsorship Matters: Assessing Business participation in Government- and Industry-Sponsored Voluntary Environmental Programs. *Journal of Public Administration Research and Theory, 20*, 283-307.

Davey, S. M. (2018). Regional Forest Agreements; origins, development and contributions. *Australian Forestry, 81*(2), 64-88.

Davies, A. (2019, 18 February 2019). 'The Darling will die': Scientists say a mass fish kill due to over-extraction and drought. *The Guardian*. Retrieved from https://www.theguardian.com/australia-news/2019/feb/18/the-darling-will-die-scientists-say-mass-fish-kill-due-to-over-extraction-and-drought

Davies, M. (2015). The Consciousness of Trees. *Law & Literature, 27*(2), 217-235.

Davies, P. K. (2007, 6 June 2007). [FSC].

DCNR. (1994). *Annual Report 1994*: Department of Conservation and Natural Resources, Melbourne.

DCNR. (1995). *Annual Report 1995*: Department of Conservation and Natural Resources, Melbourne.

Deakin, A. (1885). *Royal Commission on Water Supply First Progress Report; irrigation in Western America, so far as it has relation to the circumstances of Victoria: a memorandum for members of the Royal Commission on Water Supply*. Retrieved from https://nla.gov.au/nla.obj-226128292/view:

Deakin, A. (1886). Water Supply and Irrigation Bill. *Hansard, Victorian Legislative Assembly, 51*(24 June), 415-447.

Deegan, C. M. (2014). *Financial Accounting Theory* (4th ed.). Sydney: McGraw-Hill Education.

Dent, M. (2015). [Presentation slides for level 1 water stewardship training].

DEPI. (2014). *Victoria's State of the Forests Report 2013*. Retrieved from https://www.forestsandreserves.vic.gov.au/__data/assets/pdf_file/0019/52705/VIC_SFR2013_lowres.pdf:

DiMaggio, P. J., & Powell, W. W. (1983). The Iron Cage Revisted: Institutional Ismophism and Collective Rationality in Organizational Fields. *American Sociological Review, 48*(2), 147-160.

DNRE. (1996). *Annual Report 1996*: Department of Natural Resources and Environment , Melbourne.

DNRE. (1999). *Annual Report 1999*: Department of Natural Resources and Environment , Melbourne.

DNRE. (2000). *Annual Report 2000*: Department of Natural Resources and Environment, Melbourne.

DOA. (2015). *Regional Forest Agreements - an overview*. Retrieved from https://www.agriculture.gov.au/sites/default/files/sitecollectiondocuments/forestry/australias-forest-policies/rfa/rfa-overview-history.pdf:

DOE. (2014). *Water Recovery Strategy for the Murray-Darling Basin*. Retrieved from https://webarchive.nla.gov.au/awa/20160107191400/http://www.environment.gov.au/water/publications/water-recovery-strategy-murray-darling-basin:

DOEE. (2017). *Australia State of the Environment 2016*. Retrieved from https://soe.environment.gov.au/download/reports:

Doyle, K. (2019). Murray-Darling Basin in 'most severe' two-to-three year drought conditions in 120 years of records, BOM says. *ABC Weather*. Retrieved from https://www.abc.net.au/news/2019-07-19/most-severe-recorded-drought-across-the-murray-darling/11325216

DPI. (2009). *Victorian Government's Timber Industry Strategy*: Department of Primary Industries, Victoria.

DPI. (2011). *Timber Industry Action Plan* (M. Department of Primary Industries Ed.). https://vgls.sdp.sirsidynix.net.au/client/search/asset/1017467: Department of Primary Industries, Melbourne.

Drielsma, H. (1993). Keynote Address, 15th Biennial Conference, Alexandra Headland, September 1993. *Australian Forestry, 56*(4).

Drucker, P. F. (1955). *The Practice of Management* (Routledge 2011 ed.): Butterworth-Heinemann.

Druzin, B. H. (2017). Why does soft law have any power anyway? *Asian Journal of International Law, 7*, 361-278.

DSE. (2008). *Joint Sustainable Harvest Level Statement*: Department of Sustainability and Environment, Melbourrne.

DSE. (2009). *Victoria's State of the Forests Report 2008*. https://vgls.sdp.sirsidynix.net.au/client/search/asset/1013032: Department of Sustainability and Environment, Melbourrne.

DSE. (2011). *Monitoring Annual Harvest Performance in Victoria's State Forests 2008-09*: Department of Sustainability and Environment, Melbourne.

Duan, H., Ma, R., Xu, X., Kong, F., Zhang, S., Kong, W., . . . Shang, L. (2009). Two-Decade Reconstruction of Algal Blooms in China's Lake Taihu. *Environmental Science and Technology, 43*(10).

Duclos, L. (2006). Response to 'Collaborative forest management in Victoria's Wombat State Forest - will it serve the interests of the wider community? *Australian Forestry, 69*(1), 72-71.

Duncan, H., Langford, K., & O'Shaughnessy, P. (1978). *A comparative study of canopy interception*. Paper presented at the Proceedings of the Institute of Engineers Australia, Hydrology and Water Resources Symposium, Canberra.

Dupuy, P.-M. (1991). Soft Law and the International Law of the Environment. *Michigan Journal of International Law, 12*.

Eggleston, F. W. (1932). *State Socialism in Victoria*: P.S. King & Son, London.

Ellis, C., Adams, T. E., & Bochner, A. P. (2011). Autoethnography: An Overview. *Forum: Qualitative Social Research, 12*(1), Art. 10.

Engelman, R. (2013). Beyond Sustainababble. In W. Institute (Ed.), *State of the World 2013 Is Sustainability Still Possible* (pp. 3-16). Washington DC: Island Press.

Engineers Australia. (2020). Engineers Australia, Australia's preeminent engineering body. Retrieved from https://www.engineersaustralia.org.au/About-Us

Enqvist, J. P., West, S., Masterson, V. A., Haider, L. J., Svedin, U., & Tengo, M. (2018). Stewardship as a boundary object for sustainability research: Linking care, knowledge and agency. *Landscape and Urban Planning, 179*, 17-37.

ENRC. (2009). *Inquiry into Melbourne's Future Water Supply*. Retrieved from www.parliament.vic.gov.au:

FAO. (2016). *Global Forest Resources Assessment 2015: How are the world's forests changing?* Retrieved from https://www.unenvironment.org/resources/global-environment-outlook-6:

FAO. (2018). *The State of the World's Forests: Forest pathways to sustainable development*. Retrieved from http://www.fao.org/3/I9535EN/i9535en.pdf:

Farley, H. M., & Smith, Z. A. (2020). *Sustainability; If its everything, is it nothing?* (Second ed.): Routledge.

Farooq, M. B., & Maroun, W. (2018). Why organisations voluntarily report - institutional theory and institutional work. In C. M. DeVilliers, W. (Ed.), *Sustainability Accounting and Integrated Reporting*. Oxford: Routledge.

Farrier, S., Lewis, S., & Kelsall, M. (2020). *First Review of the Water for the Environment Special Account*. Retrieved from https://www.agriculture.gov.au/sites/default/files/documents/first-review-water-for-the-environment-special-account.pdf:

Fei, H. T. (1939). *Peasant Life in China: a field study of country life in the Yangtze Valley*. London: Kegan Paul, Trench, Trubner & Co., Ltd.

Ferguson, I. S. (1985). *Report of the Board of Inquiry into the Timber Industry* (Vol. 1): Victorian Government, Melbourne.

Ferguson, I. S., & Greig, P. J. (1973). What price recreation? *Australian Forestry, 36*(2).

Ferguson, M. (2006, 17 July 2006). [Letter].

Fiske, S. T., & Taylor, S. E. (2021). *Social Cognition; from brains to culture* (4th ed.): Sage.

Fitzpatrick, B. (1971). *British Imperialism and Australia 1783 - 1833; an economic history of Australasia* (2nd ed.): Sydney University Press.

Flanagan, R. (2007). [FSC Publishers, Printers and Paper Network].

Florance, R. G. (1973). Resource use and biological and environmental planning for eucalypt forest management. *Australian Foresty, 36*(3).

Florio, M. (2014). *Applied Welfare Economics: Cost-Benefit Analysis of Projects and Policies*. Oxford: Routledge.

Forbes, M. (2018). *The Evolution of Water Stewardship: An Australian Perspective*. Retrieved from Canberra:

Ford, R. M. (2013). Contested social values in decision-making for Australian native forests. *Australian Forestry, 76*(1), 37-49.

Foster, J. (Ed.) (1997). *Valuing Nature: Economics, Ethics and Environment*. London: Routledge.

Frame, C. (2004). Gunns, first to take up Australian Forestry Standard certification. *Australian Forest Grower*(Autumn).

Friedman, M. (1990, 14 August 1990). *Say 'No' to Intolerance.* Paper presented at the Future of Freedom Conference, International Society for Individual Liberty, San Francisco.

Friedman, M. (1992). Role and Incentive of Government in Private Behaviour. *San Diego Law Review, 29*(1), 1-12.

Frost, A. (1987). Towards Australia: the coming of the Europeans 1400 to 1788. In D. J. Mulvaney & P. J. White (Eds.), *Australians to 1788*: Fairfax, Syme & Weldon Associates.

Frydenberg, J. (2019). Competition and Consumer (Price Inquiry - Water Markets in the Murray-Darling Basin) Direction 2019. Retrieved from https://www.legislation.gov.au/Details/F2019L01038

FSC. (2019). FSC® Australia Forest Stewardship Standard In (pp. 99). https://au.fsc.org/preview.fsc-australia-national-forest-stewardship-standard.a-1413.pdf: Responsible Forest Management Australia Limited trading as FSC Australia.

Gagliardi, P. (1986). The Creation and Change of Organizational Cultures: A Conceptual Framework. *Organization Studies, 7*(2), 117-134.

Gale, F. (2018). *The Political Economy of Sustainability*: Edward Elgar Publishing.

Gale, F., & Haward, M. G. (2011). *Global Commodity Governance: State Responses to Sustainable Forest and Fisheries Certification*: Basingstoke: Palgrave Macmillan.

Gammage, B. (2011). *The Biggest Estate on Earth; how Aboriginals made Australia*. Sydney: Allen and Unwin.

Gao, X., & Chen, T. (2012). Heavy metal pollution status in surface sediments of the coastal Bohai Bay. *Water Research, 46*(6), 1901-1911.

Godden, I., Peel, J., & McDonald, J. (2019). *Environmental Law* (Second ed.): Oxford.

Grafton, R. Q., Libecap, G., McGlennon, S., Landry, C., & O'Brien, B. (2011). An integrated assessment of water markets; A cross-country comparison. *Review of Environmental Economics and Policy, 5*(2), 219-239.

Grafton, R. Q., & White, C. (2013). Economics for Water. In R. Q. Grafton, J. Pittock, M. Tait, & C. White (Eds.), *Water: Security, Economics and Governance*: Tilde Publishing and Distribution, Melbourne.

Green, J. F., & Auld, G. (2017). Unbundling the Regime Complex: The Effects of Private Authority. *Transnational Journal of Environmental Law, 6*(2), 259-284.

Greenwood, R., Hinings, C. R., & Whetten, D. (2014). Rethinking Institutions and Organisations. *Journal of Management Studies, 51*(7), 1206-1220.

Greig, P. J. (1986). Forest policy developments in Victoria. *Australian Forestry, 49*(4), 197-202.

Greig, P. J. (2004). Hardwood industry trends in Victoria since 1986. *Australian Forestry, 67*(3), 156-163.

Grocott, C. (2015). Compromising liberty: Friedrich Hayek's *The road to serfdom* in practice. *Economy and Society, 44*(1), 140-164.

Grose, R. J. (1973). Environmental considerations in harvesting and regenerating of forests. *Australian Forestry, 36*(2).

Guan, D., & Hubacek, K. (2008). A new and integrated hydro-economic accounting and analytical framework for water resources: a case study for North China. *Journal of Environmental Management, 88*(4), 1300-1313.

Gunnerson, T. H. (1981). *Economic Considerations of Australian Forestry - the wood from the trees.* Paper presented at the Australian Forests: Their role in our future, Canberra.

Guttman, D., & Willner, B. (1976). *The Shadow Government: The Government's multi-billion-dollar giveaway of its decision-making powers to private management consultants, experts and think tanks*: Pantheon Books.

Guttman, D., Young, O., Jing, Y., Bramble, B., Bu, M., Chen, C., . . . Zeidan, R. (2018). Environmental governance in China: Interactions between state and "nonstate actors". *Journal of Environmental Management, 220*, 126-135.

Guzman, A. T., & Myer, T. L. (2010). International Soft Law. *Journal of Legal Analysis, 2*(1).

Hall, P. A., & Taylor, R. C. R. (1996). Political Science and the Three New Institutionalisms. *Political Studies, 44*(5), 936 -957.

Hammersley, M., & Gomm, R. (2009). Case Study Method Introduction. In R. Gomm, M. Hammersley, & P. Foster (Eds.), *Case Study Method*. London: Sage Publications.

Hardin, G. (1968). The Tragedy of the Commons. *Science, 162*(13 December 1968).

Hardin, G. (1998). The Feast of Malthus, living within limits. *The Social Contract*(Spring 1998).

Hayek, F. A. (2005). *The Road to Serfdom with Intellectuals and Socialism (Condensed version as it appeared in the April 1945 edition of Reader's Digest)*: The Institute of Economic Affairs.

Hayes, B. (2010). [ENGO High Conservation Value (HCV) Forest coupe list].

Hechter, M. (2018). The emergence of cooperative social institutions. In M. Hechter, K.-D. Opp, & R. Wippler (Eds.), *Social Institutions: their emergence, maintenance and effects* (pp. 342): Routledge.

Heinberg, M., Ozkaye, H. E., & Taube, M. (2013, October 2013). *The Effect Chain from Corporate Reputation to Consumer Brand Equity Generation.* Paper presented at the Association of Consumer Research, Chicago, Illinois, USA.

Heinberg, R. (2015). Sustainability Metrics, Growth Limits, and Philanthropy. Retrieved from https://www.postcarbon.org/sustainability-metrics-growth-limits-and-philanthropy/

Helper, J. (2009). *Timber Industry Strategy, Public Consultation Draft*. Victorian Government

Heyman, S. J. (1991). The first duty of government: protection, liberty and the fourteenth amendment. *Duke Law Journal, 41*, 507-571.

High Level Panel on Water. (2018). An Agenda for Water Action; An Open Letter from the High Level Panel on Water. Retrieved from https://sustainabledevelopment.un.org/content/documents/17829Open_Letter_HLPWater.pdf

Hill, P., Langshaw, J., & Ford, A. (2017, 20 January). Mill may close. *Gippsland Times and Maffra Spectator*.

Ho, P. (2006). Trajectories for Greening in China: Theory and Practice. *Development and Change, 37*(1), 3-28.

Hobbes, T. (1651). *Leviathan or the matter, forme and power of a commonwealth ecclesiasticall and civil*: J. M. Dent & Sons, London.

Hofste, R. W., Reig, P., & Schleifer. (2019). 17 Countries, Home to One-Quarter of the World's Population, Face Extremely High Water Stress [Blog]. Retrieved from https://www.wri.org/blog/2019/08/17-countries-home-one-quarter-world-population-face-extremely-high-water-stress

Holley, C., Gunningham, N., & Shearing, C. (2012). *The New Environmental Governance*: Earthscan, New York.

Honoroff, B. (1983). Book Review: Reflections of Richard Posner. *Harvard Civil Rights - Civil Liberties Law Review, 18*(Winter), 12.

Hou, L. (2020). Environmental watchdog says situation grim. Retrieved from http://english.www.gov.cn/statecouncil/ministries/202001/14/content_WS5e1d1605c6d0891feec022a5.html

Howley, W., & Kelly, M. (2007). *Analysis of the Victorian forestry and forest products industry*: URS Australia.

Hu, F., & Tan, D. (2018). *No Water, No Growth: does Asia have enough water to develop?* Retrieved from https://www.chinawaterrisk.org/resources/analysis-reviews/no-water-no-growth-does-asia-have-enough-water-to-develop/:

Huang, Q., & Xu, J. (2019). Rethinking Environmental Bureaucracies in River Chiefs System (RCS) in China: A Critical Literature Review. *Sustainability, 11*(1608).

ICAC. (2020). *Investigation into complaints of corruption in the management of water in NSW and systematic non-compliance with the Water Management Act 2000*. Retrieved from https://www.icac.nsw.gov.au/media-centre/media-releases/2020-media-releases/icac-recommends-changes-to-government-water-management-in-nsw-after-years-of-focus-on-irrigation-industry-interests

IDEEA Group. (2018). *Measuring and communicating impacts from AWS water stewardship: Applying the SEEA framework to two industrial parks in China*: Alliance for Water Stewardship Asia-Pacific,.

IIRC. (2013a). *Capitals background paper for <IR>*. Retrieved from https://integratedreporting.org/wp-content/uploads/2013/03/IR-Background-Paper-Capitals.pdf

IIRC. (2013b). *The International IR Framework*. Retrieved from https://integratedreporting.org/wp-content/uploads/2013/12/13-12-08-THE-INTERNATIONAL-IR-FRAMEWORK-2-1.pdf

Industry Commission. (1992). *Water Resources and Waste Water Disposal*. Retrieved from https://www.pc.gov.au/inquiries/completed/water:

ISEAL. (2019). ISEAL Alliance; what are credible standards? Retrieved from https://www.isealalliance.org/credible-sustainability-standards/what-are-credible-sustainability-standards

Ishii, R. (2007, 13 March 2007). [FSC Certification].

ISO. (2014). ISO Guide 82: Guidelines for addressing sustainability in standards. In (pp. 26): International Organisation for Standardisation, Switzerland.

Ison, R., & Straw, E. (2020). *The Hidden Power of Systems Thinking; Governance in a climate emergency*: Routledge.

Jayasuriya, M. D. A., Dunn, G., Benyon, R., & O'Shaughnessy, P. (1993). Some factors affecting water yield from mountain ash (Eucalyptus regnans) dominated forests in south-east Australia. *Journal of Hydrology, 150*(2-4), 345-367.

Jennings, B., Kish, K., & Orr, C. J. (2020). Introduction. In C. J. Orr, K. Kish, & B. Jennings (Eds.), *Liberty and the Ecological Crisis: Freedom on a finite planet*: Routledge.

Jessop, B. (2003). Governance and Metagovernance: On reflexivity, requisite variety, and requisite irony. from Department of Sociology, Lancaster University

Jiang, M. (2018). *Towards tradable water rights: water law and policy reform in China*: Springer.

Jing, Y. (2015). Introduction; The Road to Collaborative Governance in China. In Y. Jing (Ed.), *The Road to Collaborative Governance in China* (pp. 240): Palgrave Macmillan.

Jolls, C., Sunstein, C. R., & Thaler, R. (1998). Behavioural Approach to Law and Economics. *Stanford Law Review, 50*, 1471-1550.

Jorgensen, D. L. (2011). The Methodology of Participant Observation. In D. L. Jorgensen (Ed.), *Participant Observation* (pp. 12-15): Sage Publications Inc.

Kanowski, P. J. (2017). Australia's forests: Contested past, tenure driven present, uncertain future. *Forest Policy and Economics, 77*, 56-68.

Kareiva, P., Tallis, H., Ricketts, T. H., Daily, G. C., & Polasky, S. (2011). *Natural Capital, Theory and Practice of Mapping Ecosystem Services*. Oxford: Oxford University Press.

Kasner, S. D. (2009). *Power, the State, and Sovereignty: Essays in international relations*: Taylor and Francis Group.

Keelty, M. (2020). *Impact of lower inflows on state shares under the Murray-Darling Basin Agreement*. Retrieved from https://www.igmdb.gov.au/sites/default/files/documents/iig_final_report.pdf:

Keith, H., Vardon, M., Stein, J., Stein, J., & D, L. (2016). *Experimental Ecosystem Accounts for the Central Highlands of Victoria Summary Document for Discussion*. Retrieved from Canberra:

Kekez, A., Howlett, M., & Ramesh, M. (2019). Collaboration in public service delivery: what, when and how. In A. Kekez, M. Howlett, & M. Ramesh (Eds.), *Collaboration in Public Service Delivery; promise and pitfalls* (Paperback (2020) ed., pp. 2-19): Edward Elgar.

Keller, K. L. (2013). *Strategic Brand Management, Building, Measuring and Managing Brand Equity* (4th ed.). Boston: Pearson.

Kessell, S. L. (1944). *Post-war timber supply*. Paper presented at the Timber Development Association of Australia, Sydney.

Khemani, R. S., & Shapiro, D. M. (1993). *Glossary of Industrial Organisation Economics and Competition Law*. Retrieved from oecd.org/dataoecd/8/61/2376807.pdf

Kirner, J. (1985). *Government Response to the Report of the Board of Inquiry into the Timber Industry*: Victorian Government, Melbourne.

Kirton, J., & Trebilcock, M. J. (2004). *Hard Choices, Soft Law; voluntary standards in global trade, environment and social governance*. Aldershot: Ashgate.

Kohn, P. (2008, August 2008). FSC "political" says paper consultant. *Proprint*.

Kombat, M., & Watzold, F. (2019). The emergence of environmental taxes in Ghana - A public choice analysis. *Environmental Policy and Governance, 29*.

Korff, J. (2020, 21 May 2020). Meaning of Land to Aboriginal People. Retrieved from http://www.creativespirits.info/aboriginalculture/land/meaning-of-land-to-aboriginal-people

Kosovac, A. (2020). *Fish out of water: the problem of social science in water management*. Paper presented at the University of Melbourne Water Seminar Series, Zoom seminar.

Kosovac, A., Hurlimann, A., & Davidson, B. (2017). Water Experts' Perceptions of Risk for New and Unfamiliar Water Projects. *Water, 9*.

Kuczera, G. A. (1985). *Prediction of water yield reductions following a bushfire in ask-mixed species eucalypt forest*: Melbourne & Metropolitan Board of Works, Melbourne.

Kuipers, S., & Boin, A. (2009). Path Dependence, Institutionalization and the Decline of Two Public Institutions. In G. Schreyogg & J. Sydow (Eds.), *The Hidden Dynamics of Path Dependence: Institutions and Organisations*. London: Palgrave Macmillan.

Kumar, P. (Ed.) (2010). *The Economics of Ecosystems and Biodiversity: ecological and economic foundations*. London: Earthscan.

Lane, M. B. (1999). Regional Forest Agreements: resolving resource conflicts or managing resource politics. *Australian Geographical Studies, 37*(2), 142-153.

Langford, K. J. (1974). *Change in yield of water following a bushfire in a forest of Eucalyptus regnans*: Melbourne and Metropolitan Board of Works, Melbourne.

Lateef, K. S. (2016). *Evolution on the World Bank's Thinking on Governance; Background Paper for 2017 World Development Report*. Retrieved from https://openknowledge.worldbank.org/handle/10986/26197:

Latour, B. (1993). *We have never been modern*. Cambridge, Mass: Harvard University Press.

Lavinsky, D. (2020). The Two Most Important Quotes in Business. Retrieved from https://www.growthink.com/content/two-most-important-quotes-business

Leach, M., Bloom, G., Ely, A., Nightingale, P., Scoones, I., Shah, E., & Smith, A. (2007). *Understanding Governance: pathways to sustainability*. Brighton, UK: STEPS Centre.

Lenders, J. (2010). *Variation to VicForests Order in Council*. Victorian Government Gazette

Lenoble, J., & Maesschalck, M. (2010). *Democracy, Law and Governance*: Ashgate.

Leslie, A. J. (1986). Returns to the state as a forest grower. *Australian Forestry, 49*(2).

Leslie, A. J. (1987). International logic of a high-value policy. In J. Dargavel & G. Sheldon (Eds.), *Propsects for Australian Hardwood Forests*. Canberra: Centre for Resource and Environmental Studies.

Leslie, A. J. (2001). The uncompromising future. *UNasylva - FAO, 52*(204).

Levison, M., Lee, E., Chung, J., Huttner, M., Danely, C., McKnight, C., & Langlois, A. (2008). *Watching Water; a guide to evaluating corporate water risks in a thirsty world*. Retrieved from New York:

Lewin, K. (1946). Behaviour and Development as a Function of the Total Situation. In *Resolving Social Conflicts and Field Theory in Social Science* (1997 reprint ed.): American Psychological Association,.

Li, R., Van Beek, E., & Gijsbers, P. (2004). Integrated water resources management for the Yellow River in China: a discussion of scientific and ethical approaches. In J. C. Rodda & L. Ubertini (Eds.), *The Basis of Civilization - Water Science?* (Vol. IAHS Publication 286): International Association of Hydrological Sciences.

Lin, H. (2019). Government-Business Partnerships for Radical Eco-Innovation. *Business & Society, 58*(3), 533-573.

Lincoln, Y., & Guba, E. (2009). The only generalisation is: There is no generalisation. In R. Gomm, M. Hammersley, & P. Foster (Eds.), *Case Study Method* (pp. 27-45). London: Sage Publications.

Lindenmayer, D. B., Franklin, J. F., Angelstan, P., Bunnell, F., Brown, M. J., Dovers, S., . . . Soule, M. (2004). The Victorian forestry roundtable meeting: A discussion of transitions to sustainability in Victorian forests. *Australian Forestry, 67*(1), 1-5.

Liu, J., & Yang, W. (2012). Water Sustainability for China and Beyond. *Science, 337*(6095), 649-650.

Liu, L., & Xu, Z. (2018). Collaborative governance: A potential approach to preventing violent demolition in China. *Cities, 79*, 26-36.

Lloyd, W. F. (1832). *Two Lectures on the Checks to Population*, Oxford.

Locke, J. (1689). *Second Treatise on Government*.

Lui, C., Wang, Z. Y., & He, Y. (2003). Water pollution in the river mouths around Bohai Bay. *International Journal of Sediment Research, 18*(4).

Lutze, M. T., Campbell, R. G., & Fagg, P. C. (1999). Delevelopment of silviculture in the native State forests of Victoria. *Australian Forestry, 62*(3), 236-244.

Mackey, B., Keith, H., Berry, S. L., & Lindenmayer, D. (2008). *Green Carbon: The role of natural forests in carbon storage*. Canberra: Australian National University E-Press.

Macpherson, C. B. (1973). *Democratic Theory: Essays in Retrieval*: Oxford University Press.

Magness, P. W. (2020). The anti-discriminatory tradition in Virginia school public choice theory. *Public Choice, 183*, 417-441.

Mahoney, J. (2000). Path Dependence in Historical Sociology. *Theory and Society, 29*(4), 507-548.

Malthus, T. R. (1798). *An Essay on the Principle of Population* (6th edition ed.): John Murray, London.

March, J. G., & Olsen, J. P. (1983). The New Institutionalism: Organizational Factors in Political Life. *American Political Science Review, 78*(3), 734-749.

Marglin, S. (2008). *The Dismal Science: How thinking like an economist undermines community*: Harvard University Press.

Marsden Jacob. (2001). *Forestry and National Competition Policy*: Australian Conservation Foundation, Melbourne.

Matthews, K. (2007, 14 June 2007). *Keynote address to the second water stewardship stakeholder meeting.* Paper presented at the Water Stewardship Foum, Melbourne.

Matthews, K. (2017a). *Final Report Independent investigation into NSW water management and compliace, advice on implementation*. Retrieved from https://www.industry.nsw.gov.au/__data/assets/pdf_file/0019/131905/Matthews-final-report-NSW-water-management-and-compliance.pdf

Matthews, K. (2017b). *Independent investigation into NSW water management and compliance; interim report* (S. Department of Industry Ed.): NSW Department of Industry,.

Matthews, N., & Missingham, B. (2009). Social accountability and community forest management; the failure of collaborative governance in the Wombat Forest. *Development in Practice, 19*(8), 1052-1063.

McCarthy, M. (2017, 27 October 2017). SA water minister accuses NSW of water theft cover up as Basin states trade blows. *ABC Rural*.

McGrath, K. P. (1965). Approaches to the solution of the problem of future wood supply for Australia. *Australian Forestry, 29*(3), 199-207.

McKelvey, P. J. (1979). Consulting the Owners. *Australian Forestry, 42*(1), 3-7.

McKinnell, F. H. (1993). Presidential Address, 15th Biennial Conference. *Australian Forester, 56*(4).

MDBA. (2020a). Basin Plan Report Card, June 2020.

MDBA. (2020b). *Water Recovery*. Retrieved from https://www.mdba.gov.au/basin-plan-roll-out/water-recovery:

MEA. (2005). *Millennium Ecosystem Assessment - Ecosystems and Human Well-being: Synthesis*. Retrieved from https://www.millenniumassessment.org/en/index.html:

Meadows, D. H. (2008). *Thinking in systems: a primer*: Chelsea Green Publishing, White River Junction, Vermont.

Meadows, D. H., Meadows, D. L., Randers, J., & Behrens, W. (1972). *Limits to Growth*: New American Library, New York.

Meadows, D. H., Randers, J., & Meadows, D. L. (2004). *Limits to Growth, the 30 year update*: Chelsea Green Publishing Company, White River Junction, Vermont.

Milder, J. C., Newsom, D., Lambin, E., & Rueda, X. (2016). Measuring impacts of certification on biodiversity at multiple scales; Experience from the SAN/Rainforest Alliance system and priorities for the future. *Policy Matters*(21).

Mirriam-Webster. (2020). Merriam Webster Dictionary. Retrieved from https://www.merriam-webster.com/dictionary/stewardship#note-1

Moberg, F., & Simonsen, F. H. (2014). *What is Resilience? An introduction to social-ecological research*. Retrieved from https://www.stockholmresilience.org/download/18.10119fc11455d3c557d6d21/1459560242299/SU_SRC_whatisresilience_sidaApril2014.pdf:

Moggridge, B., Carmody, E., & O''Donnell, E. (2020). Recognising regulatory capture as a form of corruption in government water agencies. *Global Water Forum*(18 December 2020).

Mol, A. P. J., & Carter, N. T. (2007). China's Environmental Governance in Transition. In N. T. Carter & A. P. J. Mol (Eds.), *Environmental Governance in China*. Oxford: Routledge.

Morrison, J., & Gleik, P. (2004). *Freshwater Resources: Managing the Risks Facing the Private Sector*. Retrieved from Oakland (CA):

Friends of Leadbeater's Possum Inc v VicForests (No4) FCA 704, (2020).

Morton, A., & Fyfe, M. (2012). Industry Pushes Against the Grain. *The Age*.

Morton, T. (2018). *Being Ecological*: Penguin Random House, London.

MPS. (2020). The Mont Pelerin Society. Retrieved from https://www.montpelerin.org

Msuya, J. (2019). Foreword. In UNEP (Ed.), *Frontiers 2018/19 Emerging Issues of Environmental Concern*: United Nations Environment Program, Nairobi.

Munger, M. C. (2018). On the Origins and Goals of Public Choice: Constitutional Conspiracy. *Independent Review, 22*(3).

Munro, C. (2012). *Address to Water Stewardship Australia and International Alliance for Water Stewardship Dinner*, Melbourne.

Murphy, R. (2018). Foreword. In M. Bostrom & B. Davidson (Eds.), *Environment and Society: concepts and challenges* (pp. 394): Palgrave.

Nash, R. F. (2014). *Wilderness and the American Mind* (Fifth ed.). New Haven: Yale University Press.

Natural Capital Coalition. (2015). *Natural Capital Protocol Principles and Framework*. Retrieved from https://naturalcapitalcoalition.org/wp-content/uploads/2016/07/Framework_Book_2016-07-01-2.pdf:

NCC. (1999). *NCP Second Tranche Assessment*. Retrieved from http://ncp.ncc.gov.au/docs/AST2V2-004.pdf

NCC. (2003). *Assessment of government's progress in implementing the National Competition Policy and related reformsL Volume three - Water reform*. Retrieved from http://ncp.ncc.gov.au/docs/2003%20water%20assessment.pdf

Neales, S. (2010, 10 July 2010). Bargaining chips down. *The Mercury*.

Neighbour, S. (2006, 2 October 2006). The A Team. *Four Corners.*

Nelson, A., & Pettit, C. (2004). Effective community engagement for sustainability; Wombat Community Forest Management case study. *Australian Geographer, 35*(3), 301-315.

Nestle. (2018a). Nestle Waters Dashan Factory in China Achieves Gold-level Alliance for Water Stewardship (AWS) Certification [Press release]. Retrieved from https://www.prnewswire.com/news-releases/nestlé-waters-dashan-factory-in-china-achieves-gold-level-alliance-for-water-stewardship-aws-certification-814579211.html

Nestle. (2018b). Water Stewardship. Retrieved from https://www.nestle-waters.com/creating-shared-value/water-stewardship

Neuman, W. L. (2011). *Social Research Methods: qualitative and quantitative Approaches* (Seventh ed.). Boston: Pearson Education Inc.

Newborne, P., & Dalton, J. (2016). *Water Management and Stewardship: Taking stock of corporate behaviour*. Retrieved from https://www.odi.org/publications/10645-private-companies-water-management-water-stewardship-drivers-corporate-water-behaviour-connection:

Nicastro, D. (2003). *Victorian Rainforest Politics: Past, present and future?* Retrieved from http://www.vicrainforest.org/images/Victorian%20Rainforest%20Politics-D_Nic2003.pdf:

Nicholson, E. A. (1983). *Presidential Address*. Paper presented at the Facing the issues, Institute of Foresters Australia.

NIEIR. (2009). *Opportunities, issues and implications for a transition of the Victorian wood products industry from native forests to plantations* (NIEIR Ed.): National Institute of Economic and Industry Research, Melbourne.

Nielsen, T. W. (2007). *Metagovernance in the global compact*: Centre for Democratic Network Governance, Roskilde University, Denmark.

NVivo. (2019). What is NVivo.

O'Donnell, E. L., & Talbot-Jones, J. (2018). Creating legal rights for rivers: lessons from Australia, New Zealand, and India. *Ecology and Society, 23*(1). Retrieved from https://www.ecologyandsociety.org/vol23/iss1/art7/

O'Shaughnessy, P., & Jayasuriya, M. D. A. (1991). *Water supply catchment hydrology research, status report*. Retrieved from https://www.ccmaknowledgebase.vic.gov.au/soilhealth/soils_resource_details.php?resource_id=1116:

O'Shaughnessy, P., Langford, K. J., Duncan, H., & Moran, R. J. (1979). Catchment experiments in mountain ash forests at North Maroondah. *Australian Forestry, 42*(3), 150-160.

Oberschall, A. (2018). Incentives, Governance and Development in Chinese Collective Agriculture. In M. Hechter, K.-D. Opp, & R. Wippler (Eds.), *Social Institutions; their emergence, maintenance and effects* (pp. 348): Routledge.

Obst, C., & Eigenraam, M. (2017). *Linking AWS and the SEEA: Applying advances in accounting for natural capital to support implementation of AWS*: Alliance for Water Stewardship Asia-Pacific, Melbourne.

OECD. (2002a, 2003). Glossary of Statistical Terms. Retrieved from https://stats.oecd.org/glossary/detail.asp?ID=3215

OECD. (2002b). *Handbook of Biodiversity Valuation; A guide for policy makers*: Organisation for Economic Cooperation and Development.

Olssen, M. (2003). Totalitarianism and the 'Repressed' Utopia of the Present: moving beyong Hayek, Popper and Foucault. *Policy Futures in Education, 1*(3), 526-552.

Ostrom, E. (1990). *Governing the Commons*. New York: University of Cambridge Press.

Ostrom, E. (1998). A Behavioral Approach to the Rational Choice Theory of Collective Action: Presidential Address, American Political Science Association, 1997. *The American Political Science Review, 92*(1), 1-22.

Ostrom, E. (2010). Analyzing collective action. *Agricultural Economics, 41*(s1), 155-166.

Ostrom, E., Gardner, R., & Walker, J. (1994). *Rules, Games and Common Pool Resources*. Ann Arbour: The University of Michigan Press.

Ostrom, E., Gardner, R., & Walker, J. (1994). *Rules, Games, and Common Pool Resources*: The University of Michigan Press, Ann Arbour.

Owen, N. (2003). *The failure of HIH insurance, the HIH Royal Commission*. Retrieved from https://parlinfo.aph.gov.au/parlInfo/download/publications/tabledpapers/19869/upload_pdf/HPP042016000816.pdf;fileType=application%2Fpdf#search=%22publications/tabledpapers/19869%22

Pagden, A. (1998). The genesis of 'governance' and Enlightenment conceptions of the cosmopolitan world order. *International Social Science Journal, 155*, 7-15.

Painter-Morland, M., & ten Bos, R. (2016). Should Environmental Concern Pay Off? A Heideggerian Perspective. *Organisational Studies, 37*(4), 547-564.

Palinkas, L. A., Horwitz, S. M., Green, C. A., Wisdom, J. P., Duan, N., & Hoagwood, K. (2015). Purposeful Sampling for Qualitative Data Collection and Analysis in Mixed Methods Implementation Research. *Administration and Policy in Mental Health and Mental Health Services Research, 42*(5), 533-544.

Pang, P. (2020, 18 June 2020). China's evolving Environmental protection laws. Retrieved from https://www.mondaq.com/china/clean-air-pollution/955486/china39s-evolving-environmental-protection-laws

Paterson, J. (1989). Foreword. In J. M. Powell (Ed.), *Watering the Garden State*. Sydney: Allen & Unwin.

Patton, M. Q. (2002). Two Decades of Developments in Qualitative Inquiry: A personal experiencial perspective. *Qualitative Social Work, 1*(3), 261-283.

Paul, K. B. (2017). The import of Heidegger's philosophy into environmental ethics; a review. *Ethics & the Environment, 22*(2), 79-98.

PC. (2018). *Murray-Darling Basin Plan: Five-year assessment*. Retrieved from https://www.pc.gov.au/inquiries/completed/basin-plan#report:

Pearce, D. W. (Ed.) (1991). *Blueprint 2 Greening the World Economy*. London: Earthscan.

Pearce, D. W., & Turner, R. K. (1990). *Economics of Natural Resources and the Environment*. Baltimore: The John Hopkins University Press.

Pegram, G., Orr, S., & Williams, C. (2009). *Investigating Shared Risk in Water; corporate enegagement with the public policy process*. Retrieved from Berlin:

Peng, S. (2015). The nutrient, total petroleum hydrocarbon and heavy metal contents in the seawater of Bohai Bay, China. Temporal-spacial variations, sources, pollution statuses, and ecological risks. *Marine Pollution Bulletin, 95*(1), 445-441.

Peters, B. G. (1999). *Institutional Theory in Political Science: The new institutionalism*: Pinter, a Cassell imprint.

Petheram, R. J., Stephen, P., & Gilmour, D. (2004). Collaborative forest management: a review. *Australian Forestry, 67*(2), 137-146.

Pierson, P. (2000). Increasing Returns, Path Dependence, and the Study of Politics. *American Political Science Review, 94*(2), 251-267.

Pigou, A. C. (1932). *The Economics of Welfare* (4th ed.). Basingstoke: Palgrave Macmillan.

Pigram, J. J. (2006). *Australia's Water Resources; from use to management*: CSIRO Publishing, Melbourne.

PIMC. (2002a). Primary Industries Ministerial Council 2 May 2002 [Press release]

PIMC. (2002b). Primary Industries Ministerial Council, Second Meeting [Press release]

Pitt, K. (2020a). Forward. In *Murray-Darling Communities Investment Package* (pp. 6): Department of Agriculture, Water and the Environment, Canberra.

Pitt, K. (2020b). New chapter in Murray-Darling Basin Plan centres on communities [Press release]. Retrieved from https://minister.awe.gov.au/pitt/media-release/new-chapter-mdbp

Pittock, J., & Finlayson, C. M. (2011). Australia's Murray Darling Basin: freshwater ecosystem conservation options in an era of climate change. *Marine and Freshwater Research, 62*(3), 232-243.

Platt, R. H. (2014). *Land Use and Society: Geography, law, and public policy* (Third ed.). Washington: Island Press.

Polasky, S. (2008, January 31 - February 1 2008). *Valuing Nature: Biophysical or Monetary Measures.* Paper presented at the Economics and Conservation in the Tropics.

Pollard, D. (2019) *Interview about his role as founding CEO of VicForests/Interviewer: M. Spencer*. Unpublished.

Popper, K. (1943). *The Open Society and Its Enemies*: Taylor & Francis Group.

Popper, K. (1959). *The Logic of Scientific Discovery* (Second English Edition ed.): Taylor and Francis Group.

Porter, M. E., & van der Linde, C. (1995). Towards a new conception of the Environment-Compeitiveness Relationship. *Journal of Economic Perspectives, 9*(4).

Posner, R. (2011). *Economic Analysis of Law* (8th ed.). New York: Aspen Publishers.

Potoski, M., & Prakash, A. (2005). Green Clubs and Voluntary Governance: ISO 14001 and Firms' Regulatory Compliance. *American Journal of Political Science, 49*(2), 235-248.

Potoski, M., & Prakash, A. (2013). Green Clubs: Collective Action and Voluntary Environmental Programs. *Annual Review of Political Science, 16*, 399-419.

Powell, J. M. (1989). *Watering the Garden State: water, land and community in Victoria 1834 - 1988*: Allen & Unwin.

Poynter, M. (2005). Collaborative forest management in Victoria's Wombat State Forest - will it serve the interests of the wider community? *Australian Forestry, 68*(3), 192-201.

Poynter, M. (2012). Response to Jim Douglas's rejoinder to my comments on his guest editorial in Australian Forestry. *Australian Forestry, 75*(1), 68-69.

Prakash, A., & Potoski, M. (2007). Collective Action through Voluntary Environmental Programs: A Club Theory Perspective. *The Policy Studies Journal, 35*(4).

Preiss, B., Towell, N., & Grieve, C. (2019, 7 November 2019). Feds, fellers furious over Andrews' plan to halt native forest logging. *The Age*.

Pulford, J. (2017). Heyfield Timber Mill Secured [Press release]. Retrieved from http://www.premier.vic.gov.au/heyfield-timber-mill-secured/

Raffaelli, D. (2016). Ecosystem Structures and Processes; Characterising natural capital stocks and flows. In M. Potschin, R. Haines-Young, R. Fish, & R. K. Turner (Eds.), *Routledge Handbook of Ecosystem Services* (pp. 62 - 73). Oxford: Routledge.

Rambaud, A., & Richard, R. (2015). The "Triple Depreciation Line" instead of the "Triple Bottom Line": Towards a genuine integrated reporting. *Critical Perspectives on Accounting, 33*, 92-116.

Ransome, S. (2020). [Note].

Rawlinson, P. A. (1977). *Woodchipping in Victoria*: Patchwork Press and Native Forests Action Council, Victoria.

Read Sturgess and Associates. (1992). *Evaluation of the economic values of wood and water for the Thomson Catchment*. Melbourne: Read Sturgess and Associates.

Reinis, S. (2015). 22 Quotes to Celebrate Milton Friedman Day. Retrieved from https://www.dailysignal.com/2015/08/01/22-quotes-to-celebrate-milton-friedman-day/

Renckens, S. (2020). *Private Governance and Public Authority; Regulating sustainability in a global economy*: Cambridge University Press.

Reuters. (2018, 15 June 2018). China's listed firms need to beef up Communist party-building activities, regulator says. Retrieved from https://www.reuters.com/article/us-china-governance-party-idUSKBN1JB16F

Robbins, L. (1935). *An essay on the nature and significance of economic science* (2nd ed.). London: Macmillan.

Rockström, J., Steffen, W., Noone, K., Persson, Å., Chapin, F. S. I., Lambin, E., . . . Foley, J. (2009). Planetary boundaries:exploring the safe operating space for humanity. *Ecology and Society, 14*(2), 32. Retrieved from http://www.ecologyandsociety.org/vol14/iss2/art32/

Rogers, E. M. (2003). *Diffusion of Innovations* (5th paperback edition ed.): Free Press, New York.

Romzek, B. S., LeRoux, K., & Blackmar, J. M. (2012). A preliminary theory of informal accountability among network organisational actors. *The American Society for Public Administration, 72*(3), 442-453.

Rosanvallon, P. (2011). *Democratic Legitimacy: Impartiality, Reflexivity, Proximity*: Princeton University Press.

Rosanvallon, P. (2018). *Good Government; democracy beyond elections* (M. DeBevoise, Trans.): Harvard University Press.

Ross, A., Pickering, S. K., Snodgrass, J. G., Delecore, H. D., & Sherman, R. (2011). *Indigenous Peoples and the Collaborative Stewardship of Nature; Knowledge binds and institutional conflicts*. Walnut Creek (CA): Left Coast Press Inc.

Routley, R., & Routley, V. (1974). *The Fight for the Forests: the takeover of Australian forests for pines, wood chips, and intensive forestry* (Second ed.): Research School of Social Sciences, Australian National University, Canberra.

Rule, A. (1967). *Forests of Australia*: Angus and Robertson, Sydney.

Ruskin, J. (1989). *The seven lamps of architecture*. New York: Dover Publication.

Russell, B. (1961). *History of Western Philosophy* (Second Edition ed.). London: Routledge.

Ruston, A. (2018). Media Release: International Recognition for Renmark Water Management [Press release]

Samuel, G. (2001, 22 February 2001). It's too late to stop now … political panic shouldn't derail economic reform, Opinion Piece. *The Australian*.

Samuelson, P. (1976). Economics of Forestry in an Evolving Society. *Economic Inquiry, XIV*.

Sax, B. C. (1989). Foucault, Nietzsche, History: Two modes of the genealogical method. *History of European Ideas, 11*(1-6), 769-781.

Schein, E. H. (2017). *Organizational Culture and Leadership* (5th ed.). New Jersey: John Wiley & Sons.

Schwartz, H. M. (1994). Public Choice Theory and Public Choices: Bureaucreats and State Reorganisation in Australia, Denmark, New Zealand, and Sweden in the 1980s. *Administration & Society, 26*(1), 48-77.

Sefton, R. (2020). *Independent Assessment of Social and Economic Conditions in the Basin: A draft report for The Hon. Keith Pitt MP, Minister for Resources, Water and Northern Australia*. Retrieved from https://www.agriculture.gov.au/sites/default/files/documents/panel-report.pdf

Segerfeldt, F. (2005). *Water for Sale: How business and markets can solve the world's water crisis*: Cato Institute, Washington DC.

Serpa, S., & Ferreira, C. M. (2019). The Concept of Bureaucracy by Max Weber. *International Journal of Social Science Studies, 7*(2), 12-18.

Sharp, L. (2017). *Reconnecting People and Water; Public engagement and sustainable urban water management*: Earthscan from Routledge, Oxford and New York.

Shepherd, K. R. (1979). Managing the forested environment. *Australian Forestry, 42*(2), 74-86.

Shogren, J. F., & Taylor, L. O. (2008). On behavioural-environmental economics. *Review of Environmental Economics and Policy, 2*(1), 26-44.

Sidebottom, S. (2013). Government delivers support for new forest certification scheme [Press release]

Simon, H. A. (1955). A Behavioural Model of Rational Choice. *The Quarterly Journal of Economics, 69*(1), 99-118.

Simon, H. A. (1956). Rational choice and the structure of the environment. *Psychological Review, 63*, 129-138.

Simon, H. A. (1986). Theories of Bounded Rationality. In C. B. McGuire & R. Radner (Eds.), *Decision and organisation: a volume in honor of Jacob Marschak* (2 ed.). Minneapolis: Univeristy of Minneapolis Press.

Simons, M. (2020). Cry Me a River; the tragedy of the Murray-Darling Basin. *Quarterly Essay*(77), 114.

Slee, B. (2001). Resolving production-environment conflicts: the case of the Regional Forest Agreement Process in Australia. *Forest Policy and Economics, 3*, 17-30.

Smith, A. (1776). *An Inquiry into the Nature and Causes of the Wealth of Nations* (Wordsworth Classics ed.). Edinburugh: Wordsworth.

Smith, D. I. (1998). *Water in Australia: resources and management*: Oxford University Press, Melbourne.

Solomon, S. (2010). *Water: the epic struggle for wealth, power and civilization*. New York: Harper Collins.

Sparkes, G. (2019a). *State of the Forests Report, Victoria*. Retrieved from https://www.forestsandreserves.vic.gov.au/forest-management/state-of-the-forests-report:

Sparkes, G. (2019b). *Victorian State of the Environment 2018 Report, Summary Report*. Retrieved from https://www.ces.vic.gov.au/sites/default/files/SoE2018_SummaryReport.pdf:

Spencer Consulting Group, One World Standards, Pinnacle Consulting, & SGS. (2008). *Water Stewardship: A project to test the concept with cotton growers - evaluation and business case*: Water Stewardship Initiative.

Spencer, M. (2006). Strong momentum develops around FSC in Australia. *FSC News and Notes*.

Spencer, M. (2008, October 2008). *Governance Options Paper.* Paper presented at the Third Water Stewardship Stakeholder Forum, Melbourne.

Spencer, M. (2009). Pre-Pilot Development and Verification Project: Water Stewardship. In (pp. 3): Unpublished funding submission.

Spencer, M. (2010). *FSC in Tasmania - questions and answers*. Draft note to members. FSC Australia.

Spencer, M. (2018). Foreword. In IDEEA Group (Ed.), *Measuring and communicating impacts from AWS water stewardship: Applying the SEEA Framework to two industrial parks in China*: Alliance for Water Stewardship Asia-Pacific.

Spencer, M. (2021). The Culture of Water Needs to Change. In C. Davis & E. Rosenblum (Eds.), *Sustainable Industrial Water use*: International Water Association (IWA).

Spencer, M., & Ge, S. (2019, 14 March 2019). *Water Stewardship in the Supply Chain.* Paper presented at the Legacy responsible fashion summit, Sydney.

Spencer, M., & Xu, Z. (2021). Water stewardship: Engaging business, civil society and government in collaborative solutions to China's freshwater challenges. In Y. Jing, D. Guttman, & O. Young (Eds.), *Non-state actors in China and global environmental governance*: Palgrave.

Spencer, R. (2013). Natural Capital: we need leadership, trust and room for dissenting voices. *The Guardian*.

Spencer, R. D., Bugg, A. L., & Frakes, I. A. (2003). Evaluating trade-offs in regional forest planning. *Australian Forestry, 66*(2), 120-128.

Starke, R. (2009). The Case Study Method in Social Inquiry. In R. Gomm, M. Hammersley, & P. Foster (Eds.), *Case Study Method* (pp. 18-27). London: Sage Publications.

State Council. (2015). China announces action plan to tackle water pollution. Retrieved from http://english.gov.cn/policies/latest_releases/2015/04/16/content_281475090170164.htm

Steffen, W., Richardson, K., Rockström, J., Cornell, S. E., Fetzer, I., Bennett, E. M., . . . Sörlin, S. (2015). Planetary boundaries: Guiding human development on a changing planet. *Science, 347*(6223).

Stehr, N., & Grundmann, R. (2005). *Experts: The Knowledge and Power of Experts*: Taylor & Francis Group.

Stern, M. J., & Coleman, K. J. (2019). Trust ecology and collaborative natural resource management. In W. H. Butler & C. A. Schultz (Eds.), *A new era for collaborative forest management; policy and practice insights from the collaborative forest landscape restoration program*. Oxford, UK: Routledge.

Stern, N. (2007). *The Economics of Climate Change*. London: Cambridge University Press.

Stiglitz, J. E., & Walsh, C. (2006). *Economics* (Fourth ed.): Nortun & company.

Stone, C. D. (1972). Should trees have standing - toward legal rights for natural objectives. *Southern California Law Review, 45*(2), 450-501.

Strachan, L. T. (1965). Public policy and the saw milling industry in Victoria. *Australian Forestry, 29*(1).

Sukhdev, P. (2012). *Corporation 2020; transforming business for tomorrow's world*. Washington: Island Press.

Sullivan, K. (2019, 13 July 2019). Water trading's 'unintended' consequences across Australia's southern Murray-Darling Basin. *ABC Rural report*. Retrieved from https://www.abc.net.au/news/2019-07-13/water-trade-in-murray-darling-basin-has-unintended-consequences/11291450

Sutton, P. (2003). *Native Title in Australia; an ethnographic perspective*: Cambridge University Press.

Sweden Textile Water Initiative. (2015). *Global Results 2015; Collaborating to drive global change towards sustainable textile and leather production*. Retrieved from https://stwi.se/stwis-2015-results-and-achievements-summarised/:

Swineheart, T. (2013). The real history of the commons and today's environmental crisis. Retrieved from http://www.utne.com/environment/history-of-the-commons-zm0z13mjzbla.aspx?PageId=1#ArticleContent

Synnott, T. (2005). Some notes on the early years of FSC. Retrieved from ic.fsc.org/download.notes-on-the-early-years-of-fsc.a-798.pdf

Tan, D. (2018). 5 Trends for 2018: The Year of the Dog. *China Water Risk*.

Taylor, C., Blair, D., Keith, H., & Lindenmayer, D. B. (2019). Modelling water yields in response to logging and Representative Climate Futures. *Science of the Total Environment, 688*, 890-902.

Thaler, R., & Sunstein, C. R. (2008). *Nudge: improving decisions about health, wealth and happiness*. New Haven: Yale University Press.

The Economist. (2013). Desperate measures; water in China. *The Economist, 409*(8857).

The Economist. (2014). A canal too far; water consumption. *The Economist, 412*(8906), 44-45.

The Economist. (2018, 5 April 2018). A massive diversion: China has built the world's largest ever water diversion project. *The Economist*. Retrieved from https://www.economist.com/china/2018/04/05/china-has-built-the-worlds-largest-water-diversion-project

The Economist. (2020, 14 November 20202). Blown off course: China takes aim at its entrepeneurs. Private enterprise faces formidable obstacles. Retrieved from https://www.economist.com/business/2020/11/14/china-takes-aim-at-its-entrepreneurs

The World Bank. (2019). World Development Indicators. Retrieved from https://datacatalog.worldbank.org/dataset/world-development-indicators

Thunberg, G. (2019). Transcript: Greta Thunberg's Speech at the U.N. Climate Action Summit.

Tollefson, C., Gale, F., & Haley, D. (2008). *Setting the Standard; certification, governance, and the Forest Stewardship Council*: UBC Press, Vancouver.

Toonfish. (2004, 16 May 2004). Wombat Latest not good.

Torok, S., Boyle, C., Gray, J., Arblaster, J., Bettio, L., Webster, R., & Morgan, R. (2018). Earthrise, a photo that changed the world. Retrieved from www.theconversation.com/earthrise-a-photo-that-changed-the-world-109009

Towell, N., & Preiss, B. (2019, 18 December 2019). CFMMEU launches robocall attack on Dan Andrews over end of native logging. *The Age*.

Trevelyan, R. (1999). Organisational Design: Corporate Culture and Forms of Organisation. In *Managing People and Organisations*: AGSM.

Trump, D. (2020). *Remarks by President Trump at the World Economic Forum*. Paper presented at the World Economic Forum, Davos, Switzerland. www.whitehouse.gov/briefings-statements/remarks-president-trump-world-economic-forum-davos-switzerland

Tsang, E. W. K. (2013). Case study methodology: causal explanation, contextualisation and theorising. *Journal of International Management, 19*, 195-202.

Tucker, A. L., Bailes, A. S., Baker, T., Balfour Burton, J., Duggan, D. J., Ham, D., . . . Turner, G. J. (1899). *Fifth Progress Report of the Royal Commission on State Forests and Timber*

Reserves. The Otway Forest its Resources, Management and Control. Retrieved from https://www.parliament.vic.gov.au/papers/govpub/VPARL1899-1900No45.pdf:

Tucker, A. L., Bailes, A. S., Baker, T., Ham, D., Kerr, D., McBride, P., . . . Turner, G. J. (1901). *Forestry in Victoria, Australia: The Legislation, Control and Management Requisite; with some account of the forest resources of the other colonies of Australasia and of the forestry in other countries.* Retrieved from https://www.parliament.vic.gov.au/papers/govpub/VPARL1901No8.pdf:

Tucker, A. L., Baker, T., Bailes, A. S., Balfour Burton, J., Duggan, D. J., Ham, D., . . . Turner, G. J. (1899). *Fourth Progress Report of the Royal Commission on State Forests and Timber Reserves. Wombat Forest: Its resources, management, and control.* Retrieved from https://www.parliament.vic.gov.au/papers/govpub/VPARL1899-1900No25.pdf:

TWS. (2005). *Certifying the incredible, the Australian Forest Standard. Barely Legal and Not Sustainable*: The Wilderness Society.

UN. (1972). The United Nations Conference on the Human Environment. Retrieved from http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=97&ArticleID=1503&l=en

UN. (2020). Sustainable Development Goals. Retrieved from https://www.un.org/sustainabledevelopment/development-agenda/

UNEP. (1972). Stockholm Declaration. Retrieved from https://www.soas.ac.uk/cedep-demos/000_P514_IEL_K3736-Demo/treaties/media/1972%20Stockholm%201972%20-%20Declaration%20of%20the%20United%20Nations%20Conference%20on%20the%20Human%20Environment%20-%20UNEP.pdf

UNEP. (2019a). *Environmental Rule of Law: First Global Report*. Retrieved from https://www.unenvironment.org/resources/assessment/environmental-rule-law-first-global-report

UNEP. (2019b). *Global Environment Outlook – GEO-6: Summary for Policymakers* (U. N. Environment Ed.). Cambridge: Cambridge University Press.

UNSD. (2014). System of Environmental-Economic Accounting. Retrieved from https://unstats.un.org/unsd/envaccounting/seea.asp

URS. (2000). *Feasibility of Audit and Certification for Irrigation in the Murray-Darling Basin*: MDBC.

URS. (2007). *Non-use Values of Victorian Public Land: Case Studies of River Red Gum and East Gippsland Forests*. Retrieved from http://www.veac.vic.gov.au/publications/non-use-values-of-victorian-public-land:

VAGO. (1993). *Special Report 22 Timber Industry Strategy*. Retrieved from https://www.parliament.vic.gov.au/papers/govpub/VPARL1992-94No25.pdf:

VAGO. (2013). *Managing Victoria's Native Forest Timber Resources*. Retrieved from https://www.audit.vic.gov.au/report/managing-victorias-native-forest-timber-resources?section=31106:

Valters, C. (2015). *Theories of Change: Time for a radical approach to learning in development*. Retrieved from https://www.odi.org/publications/9883-theories-change-time-radical-approach-learning-development:

van Dijk, A., Beck, H., Crosbie, R., de Jeu, R., Liu, Y., Podger, G., . . . Viney, N. (2013). The Millennium Drought in southeast Australia (2001-2009): Natural and human causes and implications for water resources, ecosystems, economy and society. *Water Resources Research, 49*(2), 1040-1057.

van Kersbergen, K., & van Waarden, F. (2004). 'Governance' as a bridge between disciplines: Cross-disciplinary inspriation regarding shifts in governance and problems of governability, accountability and legitimacy. *European Journal of Political Research, 43*, 143-171.

Vanclay, J. K. (2012). The House of Representatives inquiry and the future of forestry *Australian Forestry, 75*(1), 1-2.

Vanclay, J. K., & Turner, B. (2001). *Evaluation of Data and Methods for Estimating the Sustainable Yield of Sawlogs in Victoria; Report of the Expert Data Reference Group*. Retrieved from https://www.academia.edu/19667956/Evaluation_of_data_and_methods_for_estimating_the_sustainable_yield_of_sawlogs_in_Victoria:

VEAC. (2017a). *Conservation values of state forests, Assessment Report*. Retrieved from http://www.veac.vic.gov.au/documents/Complete%20report%20for%20web%20page.pdf:

VEAC. (2017b). *Fibre and wood supply, Assessment report*. Retrieved from www.veac.vic.gov.au:

Vekötter, F. (Ed.) (2018). *Exploring Apocalyptia: Coming to terms with environmental alarmism*. Pittsberg: University of Pittsberg Press.

VicForests. (2008). *Annual Report 2008*. Retrieved from https://www.vicforests.com.au/about-vicforests/corporate-reporting-1/corporate-reports:

VicForests. (2009). *Annual Report 2009*. Retrieved from Melbourne:

VicForests. (2014). VicForests 2014 Resource Outlook. Retrieved from http://www.vicforests.com.au/planning-1/resource-outlook

VicForests. (2015). *Annual Report 2015*. Retrieved from https://www.vicforests.com.au/about-vicforests/corporate-reporting-1/corporate-reports:

VicForests. (2016). *Native Timber Harvesting in Melbourne's Water Catchments*. Retrieved from http://www.vicforests.com.au/static/uploads/files/fs-water-web-wfrouxwzendz.pdf:

VicGov. (1986). *Victorian Timber Industry Strategy*: Department of Conservation, Forests and Lands, Melbourne.

VicGov. (1987). *Victoria The Next Decade*. Retrieved from Melbourne:

VicGov. (2003). State Owned Enterprises (State Body - VicForests) Order 2003. *Victorian Government Gazette*(No. S198).

VicGov. (2010). Variation to the VicForests Order in Council. *Victorian Government Gazette*(No. G17).

Waddell, S. (2007). Realising Global Change: Developing tools; building the infrastructure. *Journal of Corporate Citizenship, 26*, 69-84.

Waddell, S. (2018). Networking Action, organising for the 21st century. Retrieved from https://networkingaction.net/about-us/roles/

Waddell, S., & Khagram, S. (2007). Multi-stakeholder networks: emerging systems for the global common good. In P. Glasbergen, F. Biermann, & A. P. J. Mol (Eds.), *Partnerships, Governance and Sustainable Development: Reflections on Theory and Practice*. UK: Edward Elgar.

Walker, B. (2019). *Murray-Darling Basin Royal Commission*. Retrieved from https://www.environment.sa.gov.au/topics/river-murray-new/basin-plan/murray-darling-basin-commission:

Walker, B., & Salt, D. (2006). *Resilience Thinking, Sustaining Ecosystems and People in a Changing World*. Washington DC: Island Press.

Walker, B., & Salt, D. (2012). *Resilience Practice, Building Capacity to Absorb Disturbance and Maintain Function*. Washington DC: Island Press.

Wallace, R. W. (1971). *Presidential Address*. Paper presented at the Man and his forests, Thredbo, NSW.

Walmsley, R., & Brennan, D. (2019). Good laws are not enough: flawed implementation in the Murray-Darling Basin. *Australian Environment Review, 34*(3&4), 46-50.

Walsh, P. (2011). *Long-term security for Victoria's timber industry, Timber Industry Action Plan*. Victorian Government

Walsh, P. (2013). Allocation Order. *Victorian Government Gazette, S343*.

Wang, J. (2018). Drop by Drop, Better Management Makes Dents in China's Water Stress. Retrieved from http://www.wri.org

Wang, Q. J., & Horne, A. (2019, 8 July 2019). Billions spent on Murray-Darling water infrastructure: here's the result. Retrieved from https://theconversation.com/billions-spent-on-murray-darling-water-infrastructure-heres-the-result-119985

Wang, S. (2006). *Resource-oriented water management: towards harmonious coexistence between man and nature* (Second edition ed.). Singapore: World Scientific Publishing Co. Pte. Ltd.

Ward, B., & Dubos, R. (1972). Only One Earth: The Care and Maintenance of a Small Planet. *Columbia Journal of World Business, 7*(3).

Waterfind. (2020). Waterfind home page.

Weber, M. (2002). *The Protestant ethic and the spirit of capitalism* (P. Baehr & G. Wells, Trans.): Penguin Books.

Weir, J. K. (2009). *Murray River Country: an ecological dialogue with traditional owners*. Canberra: Aboriginal Studies Press.

Welch, C., Piekkari, R., Plskoyisnnski, E., & Paavilainen-Mantymaki, E. (2011). Theorising from case studies: Towards a pluralist future for international business research. *Journal of International Business Studies, 42*, 740-762.

Wentworth Group. (2020). *Assessment of river flows in the Murray-Darling Basin: Observed versus expected flows under the Basin Plan 2012-2019*. Retrieved from https://wentworthgroup.org/2020/09/mdb-flows-2020/2020/:

Whitebrook, A. (2019). *Rural Water Stewardship; A stakeholder analysis for implementing water stewardship practices in rural China.* (Master in Development Studies). Graduate Institute of International Development Studies,

Widlok, T. (2017). *Anthropology and the Economy of Sharing*: Routledge.

Willett, E. (2009). *Promoting efficient and effective water trading across the Murray-Darling Basin*. Paper presented at the Australian Economic Reform Conference.

Williams, W. E. (2005). Forward. In *The Road to Serfdom with Intellectuals and Socialism* (pp. 129): The Institute of Economic Affairs.

Williamson, O. E. (1996). *The Mechanisms of Governance*: Oxford University Press, New York.

Willmott, H. (2015). Why Institutional Theory Cannot be Critical. *Journal of Management Inquiry, 24*(1), 105-111.

Wishart, M. (2020). Taming the Nine Dragons. *World Energy, 46*, 84-87.

World Bank. (1991). *Managing Development: The Goverance Dimension*. Retrieved from http://documents1.worldbank.org/curated/en/884111468134710535/pdf/34899.pdf:

World Economic Forum. (2018). *Global Risks Report 2018*. Retrieved from http://wef.ch/risks2018

World Economic Forum. (2019). *Global Risks Report 2019*. Retrieved from https://www.weforum.org/reports/the-global-risks-report-2019:

World Resources Institute. (2019). Aqueduct Water Risk atlas. Retrieved from https://www.wri.org/aqueduct

Worrell, R., & Appleby, M. C. (2000). Stewardship of natural resources: definition, ethical and practical aspects. *Journal of Agricultural and Environmental Ethics, 12*, 263-277.

WQA. (2012). Indigenous Cultural and Spiritual Values of Waterways. *Guidelines for Fresh and Marine Water Quality.*

WRI. (2013). Acaeduct Water Risk Atlas. Retrieved from https://www.wri.org/resources/maps/aqueduct-water-risk-atlas

WRI. (2019). Aqueduct Water Risk atlas. Retrieved from https://www.wri.org/aqueduct

Wright Mills, C. (1954). Politics, Economics and Welfare by Robert A. Dahl and Charles E. Lindblom book review. *American Sociological Review, 19*(4), 495-496.

WSA. (2012). *Field Trial of the Australian Water Stewardship Standard (Version 2) with the dairy industry in the Goulburn Broken catchment*. Retrieved from Melbourne:

WSA. (2018). Renmark Irrigation Trust Gold Certification. In (pp. 4): Water Stewardship Australia and Renmark Irrigation Trust.

WWF. (2014). *Water stewardship experiences in the Western Cape*. Retrieved from

WWF. (2018). The Water Risk Filter (updated version). Retrieved from http://waterriskfilter.panda.org

WWF. (2020). Water Risk Filter 5.0 Methodology Documentation. In. https://waterriskfilter.panda.org: World Wildlife Fund.

Xing, L. (2015). Stress and Challenges: What's Facing China's 'Nine Dragons of Water'. *Global Asia, 10*(1). Retrieved from https://globalasia.org/v10no1/cover/stress-and-challenges-whats-facing-chinas-nine-dragons-of-water_lyu-xing

Xinhua. (2017, 18 October 2017). Principal contradiction facing Chinese society has evolved in new era: Xi. Retrieved from http://www.xinhuanet.com/english/2017-10/18/c_136688132.htm

Xinhua. (2020, 03 March 2020). China to establish modern environmental governance system. Retrieved from http://english.www.gov.cn/policies/latestreleases/202003/03/content_WS5e5e60a5c6d0c201c2cbd75a.html

Xu, Y. (2017a). China's River Chiefs: Who are they? Retrieved from http://www.chinawaterrisk.org/resources/analysis-reviews/chinas-river-chiefs-who-are-they/

Xu, Y. (2017b). Green Development for a Beautiful China. *China Water Risk*.

Xu, Y. (2018). 5 Laws to Watch Out For In 2018. *China Water Risk*.

Xu, Y. (2020, 18 June 2020). Two Sessions 2020 - Ecological Roadmap. Retrieved from https://www.chinawaterrisk.org/resources/analysis-reviews/two-sessions-2020-ecological-roadmap/

Xu, Y., & Chan, W. (2018, 18 April 2018). Ministry Reform: 9 dragons to 2. Retrieved from https://www.chinawaterrisk.org/resources/analysis-reviews/ministry-reform-9-dragons-to-2/

Yang, A. (2017). *Industrial Park Water Stewardship in China; the case of Kunshan.* Paper presented at the Alliance for Water Stewardship Global Forum, Edinburgh, Scotland.

Yang, D. L. (2004). *Remaking the Chinese Leviathan: Market transition and the politics of governance in China*: Stanford University Press.

Yang, H., Flower, R., & Thompson, J. (2013). Sustaining China's Water Resources. *Science, 339*(6116), 141-141. Retrieved from http://www.jstor.org.ezproxy.lib.monash.edu.au/stable/23337806

Yang, W. (2018, 17 March 2018). New ecological environment ministry is a milestone. *China Daily*. Retrieved from http://www.chinadaily.com.cn

Ylönen, M. (2018). Risk and Resilience. In M. Bostrom & D. J. Davidson (Eds.), *Environment and Society: concepts and challenges* (pp. 394): Palgrave.

York, R. (2006). Ecological Paradoxes: William Stanley Jevons and the Paperless Office. *Research in Human Ecology, 13*(2), 143-147.

Young, M. D. (2013). Environmental effectiveness and economic efficiency of water use in agriculture: The experience of and lessons from the Australian Water Reform Program. In R. Q. Grafton, J. Pittock, M. Tait, & C. White (Eds.), *Water: Security, Economics and Governance*: Tilde Publishing and Distribution, Melbourne.

Zak, P. (2013). Measurement Myopia. Retrieved from https://www.drucker.institute/thedx/measurement-myopia/

Zhang, B., Chen, Z. M., Zheng, L., Qiao, H., & Chen, B. (2016). Demand-driven water withdrawels by Chinese industry: a multi-regional input-output analysis. *Frontiers of Earth Science, 10*(1), 13-28.

Zhang, J. Y., & Barr, M. (2013). *Green Politics in China: Environmental governance and state-society relations*. London: Pluto Press.

Zhou, D. (2020). China's Environmental Vertical Management Reform: An effective and sustainable way forward or trouble in itself? *Laws, 9*(25), 27.

Zhu, D. (2015, 24 August 2015). *The place of water stewardship in China's new water policy and basin pollution control - In the case of Tai Lake Basin.* Paper presented at the International Rivers Symposium, Brisbane.

Zhu, G. (2016). *Ecological Civilization: A national strategy for innovative, concerted, green, open and inclusive development*. Retrieved from www.unep.org/ourplanet/march-2016/articles/ecological-civilization