

Earthscan Water  
Text Series

David Groenfeldt

# Water Ethics

A Values Approach to  
Solving the Water Crisis

SECOND EDITION

earthscan  
from Routledge

# Water Ethics

Fully revised and updated, this second edition of *Water Ethics* continues to consolidate water ethics as a key dimension of water-related decisions.

The book introduces the idea that ethics are an intrinsic dimension of any water policy, program, or practice, and that understanding what ethics are being acted out in water policies is fundamental to an understanding of water resource management. Alongside updated references and the introduction of discussion questions and recommended further reading, this new edition discusses in depth three significant developments since the publication of the first edition in 2013. The first is the growing awareness of the climate crisis as an existential threat, and associated concern about adaptive strategies for sustainable water management and ways of using water management for climate mitigation (e.g., practically through agricultural soil management and conceptually through ethics awareness). Second, there has been increased clarity among the religious community, Indigenous leaders, and progressive academics that ethics needs to become an arena for application and action (e.g., the Vatican encyclical *Laudato Si*, protests at Standing Rock and Flint, Michigan, in the US, and climate demonstrations worldwide). Thirdly, there have been new normative water standards ranging from “water stewardship” (industry initiative) to water charters (Berlin) and the on-going initiative to develop a global water ethics charter.

Drawing on case studies from countries including Australia, India, the Philippines, South Africa, and the United States, this textbook is essential reading for students of environmental ethics and water governance and management.

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### **Water Ethics**

A Values Approach to Solving the Water Crisis (second edition)

*David Groenfeldt*

# Water Ethics

A Values Approach to Solving the Water  
Crisis

Second edition

David Groenfeldt

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# Preface

If the message of the first edition of this book was “we need to address the ethics driving our water decisions,” the message of this second edition is “we need to institutionalize ethics into all our water decisions and our water behaviors.” It is not enough to have laws, policies, and regulations about water; we also need ethics as a complementary set of behavioral guidance. An example is environmental flow, or what in the US lexicon is called “instream” flow. In the drier Western states where instream flows are most problematic, there is usually no legally mandated instream flow requirement, but there is nonetheless an ecological ethic that streams should be kept alive. Similarly, clean water regulations can be overturned politically, but the ethic that brands deliberate pollution as unconscionable is immune to political tampering. Ethics adds to the resilience of water systems through systematizing value principles which can endure even through legal and policy changes

This book seeks to contribute to the growth and development of water ethics as a field of study and practice. Just as medical ethics has become a standard component of medical practice, water ethics ought to be a standard component of water governance, and for similar reasons: Both medicine and water are fundamental to individual health and the well-being of society itself. Decisions about both medical services and water services need to consider a wide range of concerns; they are not simple business matters. When ethical responsibility is not recognized, the results can be tragic. The lead poisoning in Flint, Michigan, is a sad reminder of the importance of water ethics.

I look forward to a time when I can receive an affirming nod of the head, rather than a quizzical expression, when I tell a new colleague that my area of interest within the arena of water policy is the subfield of water ethics. The typical response now is “Water ethics? That’s unusual!” And in fact, a concern with water ethics is very unusual and almost unheard of. For six years I’ve written a periodic (ranging between monthly and quarterly) newsletter on water ethics<sup>1</sup> and publicized reports and blog posts that touched on water values, norms, and ethics. I adopted the practice of regularly searching water reports for the word “ethic” and only rarely encountered even a single hit. Clearly there is work to be done!

It is not enough to wave the flag of water ethics through a newsletter, a conference paper, or even this book. For ethics to have a real impact on water decision-making, the field of water ethics needs to have an institutional home or multiple homes. And more than a home, water ethics needs to become a dynamic member of a larger ecosystem of related schools of thought such as environmental justice, resilience, water stewardship, and decolonization. The particular contribution of water ethics, it seems to me, lies in highlighting the value principles within these other normative frameworks, finding commonalities and revealing differences.

Values about water are gaining currency within the mainstream of the water world. The UN High Level Panel on Water recently highlighted the importance of better understanding diverse water values (HLPW 2018). Yet even in this report on water values, the role of ethics, which Aristotle invented to help sort out conflicting values, receives no mention. Instead we are confronted with undigested conflicting values about water with no resolution. This is where water ethics can contribute. If there were no value conflicts, if everything were clearly agreed upon, there would be no need for ethics. It is because we have complicated values that we need to formulate ethical principles to help us navigate through our values.

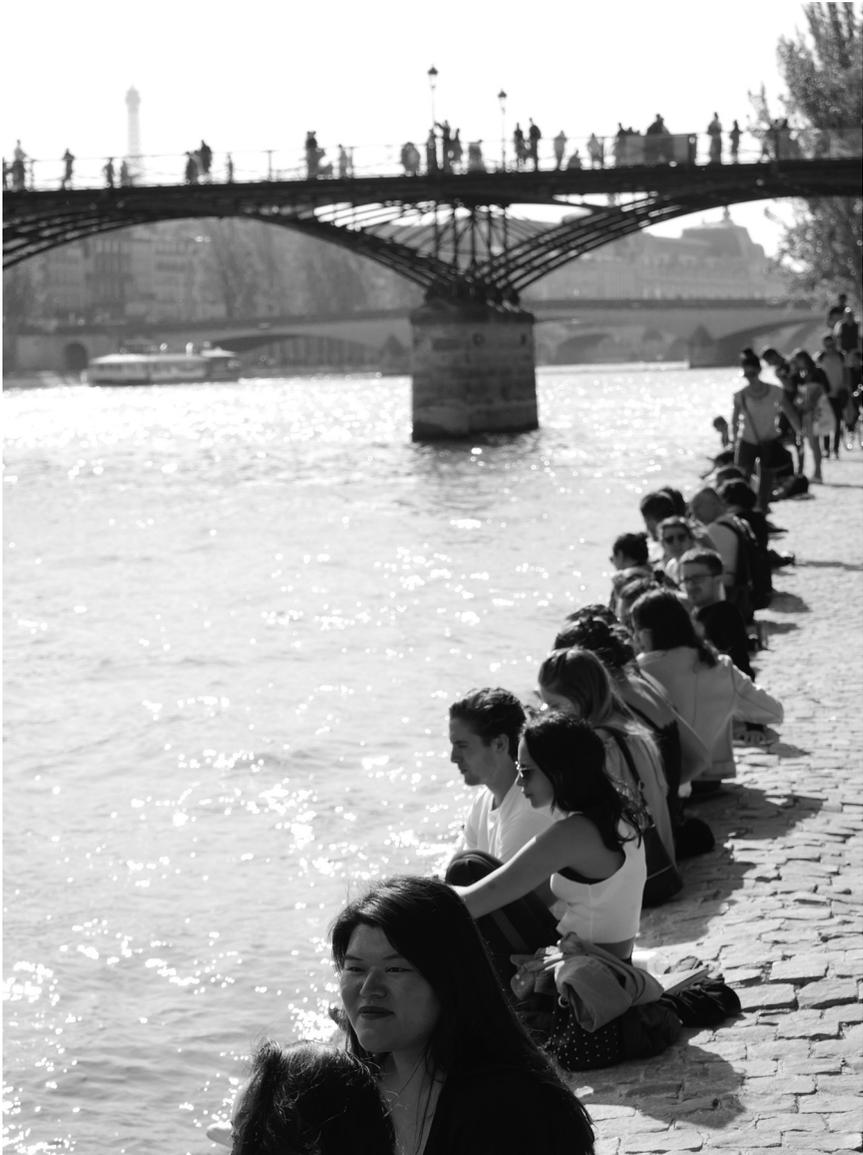
The arena of water values and ethics is not for the faint of heart. There is little solid ground under foot; values need to be teased out from statements and behaviors, and ethics are even murkier. But even if vague and ill-formed, values motivate real behavior with real impacts on nature and people. And because it is a topic that has been relatively little studied, there is opportunity to help shape the field. Aristotle might be surprised to know that even after 2,300 years, ethics, at least as pertaining to water, remains a new frontier of knowledge!

## **Note**

1 <https://waterethics.org/wen-enewsletter/>

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# 1 Introduction to water ethics



Seine River, Paris, May 19, 2018

## 2 *Introduction to water ethics*

How do we judge whether our use of water – whether for brushing our teeth or irrigating a farmer’s field – is wasteful or necessary? When we read about the proposed dam that the government of Laos wants to build on the Mekong river, what determines whether we feel that is a good idea or a terrible one? I use the term “water ethics” to denote these underlying principles that influence our own water behavior and our reaction to other people’s behaviors.

The kind of ethics I am talking about are rarely black and white. We usually need more information to form a judgment about the dam, or even about whether we are using too much water in brushing our teeth: What is the source of the water flowing out of the tap, and what will happen to it when it goes down the drain? What sort of dam is being proposed on the Mekong? What will be the impacts on the river’s fish and on the traditional communities and cultures that depend on fishing? What will the electricity from the dam be used for and what are the alternative energy options? What will happen to the people who live in the proposed reservoir area?

The questions we ask in our inquiry about whether the dam is desirable or not, or whether we are using too much water in our own homes, reflect our values about what is important. What information is relevant to our support or opposition to the dam proposal? Does it matter if fish can navigate around the dam through fish ladders? Does it matter if local communities have to give up fishing and work in a factory powered by the dam’s electricity? Does it matter what is being produced in the factory that uses the electricity from the dam? What about the labor conditions? Where do water ethics end and other ethics begin?

The American conservationist Aldo Leopold believed that an extension of ethics beyond our immediately obvious self-interest, to include the well-being of nature, is “an evolutionary possibility and an ecological necessity” (Leopold 1970 [1949]: 167). Our civilization has already made good progress on the social aspects of our ethical path; embracing nature is the next step. In his most famous essay, “The Land Ethic,” Leopold illustrates how far we’ve come in our ethical evolution, by relating the Greek myth of Odysseus returning after twenty years away from home (ten years fighting the Trojan War and another ten years finding his way back). His wife and son have been loyally awaiting his return, but what about his slaves, and particularly the female slaves? Had they been loyal too? Just to be sure, Leopold tells us, paraphrasing Homer, “he hanged all on one rope a dozen slave-girls of his household whom he suspected of misbehavior during his absence.” What would today be considered mass murder was then seen as justified house-cleaning. “The girls were property. The disposal of property was then, as now, a matter of expediency, not of right and wrong ...” (Leopold 1970 [1949]: 167).

Leopold’s story has been recounted many times not only because of the powerful imagery, but also because there are two deep truths in his example. The first truth is that we have made incredible progress over the past few

millennia, and particularly in the past century, in extending our ethical boundaries. While we continue to give special attention to our immediate families and communities (“charity begins at home”), and contemporary politics of nationalism notwithstanding, there is a prevailing ethical sense that the welfare of all people, even those we do not know and will never meet, has inherent value. Through the United Nations, we have endorsed resolutions proclaiming the rights of people and cultures. In 2010, we (again through the UN) even recognized the right of every person to have safe water to drink. Clearly, we are making progress, uneven though it may seem.

The second truth in Leopold’s account is that, for all our recent progress in caring for the larger human community, we have not yet made room for nature in our ethical sphere. The well documented reluctance to tackle climate change and the phenomenon of “climate deniers” who refuse to acknowledge “inconvenient” scientific evidence is only the latest expression of fundamentalist anthropocentrism. The way we treat our rivers, lakes, aquifers, wetlands, and estuaries has long been governed more by expediency than by reason, much less by ethics. The easiest place to discharge industrial waste is the river that is flowing by.

Our stalled reaction to climate change is Exhibit A for illustrating the missing role of ethics in our decision-making. How is it that normal reasoning about consequences, the sort of logic that we try to instill in our children, is so difficult to apply when our short-term self-interest is at stake? Why are so many political leaders willing to disbelieve what scientists tell them? How is it that my country of the United States can lead a counterattack on the 2015 Paris Accord? Agreements can be broken; laws can be changed. In the absence of clearly established values and ethics (which are more enduring), the legal system is vulnerable to political manipulation. Whether we frame the problem as an absence of any ethics, or the presence of the wrong ethics, the essential role that ethics needs to play cannot be more apparent than in the phenomenon of climate denial.

Whether we attribute climate denial to psychological disorders (Jessani and Harris 2018), conspiracism (Lewandowsky et al. 2018), or moral corruption (Gardiner 2006), a plausible antidote could be to delineate and systematize one’s values and associated ethics. Norgaard (2018) suggests that clarifying one’s values and norms can stimulate “sociological imagination” and help deniers break through their psychological obstacles to operate in a more reasonable manner. In other words, they might choose to believe the 97 percent of scientists rather than the 3 percent. My own ideas about climate denial hinge on the concept of “ethical space” as a container that needs to be filled either consciously or unconsciously. Better to fill that space carefully with well-considered values and structure those values within an ethical framework than to leave the space open where random values might fall in and take over. Particularly when marketing, advertising, and social media are so effective at suggesting what we should value and how we should act, some proactive valuing can be a way of protecting ourselves.

#### 4 *Introduction to water ethics*

This is not to suggest that we need to approach our values about climate change, or water, from the perspective of a blank slate. We do have intellectual ancestors. The water ethics we will be considering in this book grow out of a very respectable legacy of environmental and social thought. The environmental movement of the 1970s and the paradigm of sustainable development, defined at the Rio Conference in 1992, showed that the ethical evolution Leopold anticipated was underway. But looking out from the vantage point of 2018 as I write this, the path to an ecological ethic seems neither imminent nor inevitable. There is no lack of incentives: From the ever-increasing global crisis of climate change to local crises of contaminated water supplies and drying aquifers, the futility of separating nature's welfare from our own should be overwhelmingly apparent. Nor is there any dearth of analytical tools and concepts to document our human dependence on a healthy nature. The economic value of ecosystem services is not in doubt; the Green Economy is widely accepted as the new paradigm of global progress, but terminology like "sustainability" are too easily twisted into old concepts with new names.

What's keeping us from finding new solutions for co-existing with nature on a healthy planet earth? The problem, it seems to me, lies more in "how" we are thinking than "what" we are thinking; how we are using the analytical tools that we already have in abundance. There is nothing wrong with the tools themselves. Ecosystem services is a powerful concept with far-reaching implications. But then, cost-benefit analysis is also a powerful and valuable tool which has been around for many decades, but has not really helped us along the Leopoldian path of evolution. What's missing? In a word, *ethics*. We have ethics, personally, and there are normative ethics in every society, but we are not applying those ethics to our decisions about the natural world: water, forests, fish, soil, minerals, and of course, oil.

The standard explanation for why we (whether "we" as individuals or members of society, citizens of countries, or shareholders in oil companies) so consistently exploit nature in unsustainable ways is that we are greedy and selfish. Powerful people and institutions are better able to manifest their greed, but we all have it, and that's why the world is in such a mess. The standard solution prescribed to counter the "we are all greedy" explanation is better governance and particularly environmental governance. We need a stronger UN system and we need to stamp out the collusion between big business and corrupt governments. In other words, we need to control the dark forces so we do fewer and less egregious bad things: Limit the bad, to make way for the good.

That is probably good advice, but it's not very much fun; the focus is about what not to do (don't pollute), rather than creating inspiration about what *to* do (reuse and recycle so pollution is less of a problem). Ethics, in the sense of guidelines for good actions, cannot solve problems by themselves, but they establish an enabling context to unleash "ethical imagination" (Muehlebach 2013; Werhane and Moriarty 2009) for creative problem-solving. Ethical principles can serve as design parameters that focus our attention and stimulate innovation (Simpson 2017). When we are clear about our values and what's

important, we are not only identifying those values, but we are identifying *with* those values, and some of the values we identify with are going to be in conflict. I want to take water from the river to irrigate my crops, but I also want the river to have enough water for the fish, and I want to tap the river for hydro-power, and I want to transport my crops down the river, etc. These become my design parameters and inspirations for innovation. I don't want to miss out on any of these services from the river, so I look for solutions to each value that leave room for realizing all the other values as well. This is how ethics can drive innovation. A hydroelectric dam can provide energy but interferes with other values, such as a healthy river with fish and using the river for transport. Perhaps modular hydropower pods could operate from the river's flow, would allow fish to migrate, and enable barges to transport my crops, and so forth. Water is multifunctional and so are my values (Netherlands Enterprise Agency 2016).

Water is a technical subject, but that's only part of what water is, and even the technology of water has values embedded in the technical choices. Moreover, the governance of water – the laws, policies, and institutions which set the context for technical water management – is anything but technical. Water governance is all about values, and if we don't take the trouble to offer our own values to the water discourse, we are going to be living with the values of the people who do take (and often make!) trouble.

Imposing our personal ethics onto water discussions in our home communities is not necessarily going to get us very far along Leopold's path either. What I believe Leopold had in mind (and he was rather vague about the details) was that through reflecting on both the moral and practical implications of alternative courses of action (e.g., whether to increase the water supply by building a dam or investing in water conservation to create water savings), we would be able to discern the better choice. Eventually we would also realize that interfering with natural processes, like flowing rivers or atmospheric CO<sub>2</sub>, has limits, and if those are exceeded (e.g., taking too much water out of the river, or putting too much CO<sub>2</sub> into the atmosphere) we will undermine nature's productivity. Bringing nature into our ethical sphere is not necessarily an act of altruism, though it can be. It is also, I believe, in the long-term self-interest of our civilization, and our very survival as a species.

The message of this book is that an awareness of ethics can contribute to better decisions about water management, and that if we can learn how our values are connected to water, we can apply the same ethically informed decision process to the larger domain of human-nature interactions, including that huge elephant in the room: climate change. The process of thinking through the ethical implications of alternative water (or energy) policies and practices will favor outcomes that are better for us as people, and for the planet on whose health we ultimately depend. If our management of water becomes more sustainable, we will be further along Leopold's path, and further away from a water crisis. It is in this sense that water ethics has the potential to "solve" the water crisis.

## **Ethics and values**

In our everyday speech, and in this book, the words “values” and “ethics” are often used interchangeably but it is sometimes helpful to make a distinction. Values refer to “standards or criteria to guide not only action but also judgment, choice, attitude, evaluation, argument, exhortation, rationalization, and, one might add, attribution of causality” (Rokeach 2000: 2). Ethics refers to the principles we adopt in order to apply our values within the complicated settings of actual behaviour. We need ethical principles because most behavioural choices (“Should I do *A* or *B*?”) involve multiple and conflicting values, and we need to choose which values to honour and which values to ignore. Moreover, we need to make these value decisions quickly and efficiently so we can get on with our lives.

If you stop to think about your value choices, you will discover that your daily actions comprise a steady stream of small choices about doing one thing or another thing, and that your decision-making process in dealing with these small choices involves the application of principles that guide your behaviour along certain lines or patterns. If you are someone who places a high value on timeliness, you may still feel the pang of parental emotion as you drop off your toddler at the day care centre on your way to the office, but you will not tarry long in saying your goodbyes. You will want to get to the office on time, and the value of doing so over-rides the impulse to spend a few more moments with your daughter.

Your office mates might describe you as being “religious” about getting to work on time, but they could just as well use the term “principled” because you are acting in accordance with consciously identified principles about the virtue of timeliness. Your values tell you that being on time is important; your ethical principle of timeliness prioritizes that value in your actual behaviour. But does your timeliness ethic mean that you love the office more than you love your daughter? Clearly you have many opportunities for expressing parental love, and you do not need to choose between your office and your daughter. But we can certainly imagine a situation where the zeal to be on-time for work might conflict with the daughter’s well-being: If she is sick, or if the neighbor unexpectedly comes over with a pet hamster, or some other unexpected event, you might decide that it’s OK to be late for work. We need to maintain a sense of perspective even as we strive to maintain our principles. The therapeutic activity of “ethical reflection” helps us sort out our values, establish the principles (ethics) we will try to live by, and assess how we are doing and whether we need to make changes in how we conduct our lives.

The field of ethics encompasses a range of theories and practices about working with values for the purpose of making decisions that will lead to whatever we consider to be good outcomes. There is an intrinsic feedback in the process of using ethics to make decisions that align with your values. We are often juggling multiple values-based priorities. The balance between work-life and family-life is perhaps the most commonly invoked, but there are many

other categories and sub-categories of value principles that we navigate in our daily lives. In the grocery check-out line, should I yield my place to the person behind me who is buying only a single carton of milk? My decision will depend on how many groceries I have in my own cart, how pressed I feel for time, and how I feel about myself. If I'm feeling that I've been too self-centred of late – failing to clean up my breakfast dishes this morning and leaving it to my partner because I was feeling stressed about getting to work on time – I might be more likely to yield my place in the grocery line as a compensatory behaviour.

The realm of values, as with emotions, is partly self-evident, but much is hidden within our psyches. It is not a simple matter even to identify what our values are, much less how we feel we should be responding to our values, which gets into the ethics part of “values and ethics.” Ethics is the manifestation of our values. Our values are challenging to identify in the first place and, once identified, still need to be sorted out to deal with overlapping and conflicting values that we all have. The process of ethical reflection is where our values, which are just theoretical concepts (“I want to spend more time with my children”), start to emerge as guidance for real action. Instead of the abstract notion that you need to be a more engaged parent, you start planning a weekend outing with your kids. You're taking action, guided by ethics, revealed through reflection, but it's not just random thinking-about-things reflection; it's focused reflection on the values you hold. The reflection process itself can be broken down into the aspects of (a) reflecting on whether the values you hold are the values you truly feel are good and right for you to be holding onto, and (b) reflecting on how and to what extent you are actually manifesting those values.

We can embark on the process of values-awareness and ethical reflection by identifying some of our more obvious values first, and ranking these into a two-level hierarchy of major, more or less stand-alone values (e.g., wealth, friendships) and contributing values (e.g., hard work, loyalty) that we are most readily aware of, for example, by asking ourselves, “Are these the values I actually want to express in my behavior?” and strategizing about what actions (behaviors) to take that will be consistent with our values. Through this process of reflection, we might become aware of other different values that might support or conflict with the values we had initially been aware of. By persevering in this iterative exercise of subjecting our ever-expanding awareness of our values to the light of ethical reflection, we gradually gain new insights into both our values and what our response to those values ought to be (ethics).

The field of “water ethics” employs this process of ethical reflection to guide decision-making about water issues. Water ethics, in other words, can serve as a decision-support tool for approaching decisions about water policies, programs, infrastructure, etc. – any decision that implicates water in some way: How strict should pollution regulations be for various contaminants? Is the proposed dam a good idea, or should it be modified or blocked? Should groundwater pumping be restricted to protect the aquifer? Should farmers pay for irrigation canals or should this be subsidized by the government? And since

not only natural ecosystems, but also social systems (e.g., cities) and economic systems (e.g., individual companies or entire industries) depend on water directly or indirectly, decisions about water can have very broad ripple effects and become everybody's concern. This is an important aspect of the larger picture of water ethics. What we might categorize as a water decision has much broader implications for the environment, society, and the economy: The whole "triple bottom line" is affected by water decisions, but how are the interests of the multitude of indirect water stakeholders represented in the decision-making process? This raises a set of issues about water governance, and whose voices should count when decisions about water are made.

Then there is the issue of *how* water decisions are made: What values and ethics are brought to bear on the decision to render the decision legitimate and just? We cannot hide behind the law and conflate what is legal with what is ethical. The whole point of this book is that laws alone are not sufficient to ensure the sustainability of water resources, much less social justice in having access to water, or environmental justice of healthy water ecosystems that both people and wildlife can enjoy now and into the future. Yet the words "ethic" or "ethics" or "ethical" are rarely used in water policy reports. Search for "ethic" in any PDF of a report on water security, climate change impacts, sustainable water management, etc., and see for yourself. Ethics as a word seems to be censored out of our water thinking.

We need to find ways of bringing ethics into water decisions, and the first step in carving out a toe-hold for "water ethics" is to overturn the notion that decisions about water are made through objective logic unencumbered by subjective values. In fact, we would be better off starting with the opposite assumption: Every decision about water reflects values and sets of values (ethics) about the relative importance of different water uses, impacts, and outcomes. Making an effort to understand what tacit values we are bringing to our water decisions (e.g., whether or not to build the dam) will help us make better decisions because we will understand our own motivations more clearly.

Along with the task of discovering what tacit values and ethics we are carrying around in our mental templates about how we think about water, we have another, closely related task: Figuring out what values and ethics we would like to advance through our decisions about water management. The application of ethics to decision-making presupposes that the values we want to advance have been identified ahead of time. Once the values are identified and prioritized, the ethical implications of alternative choices can be more readily deduced. In this sense, the practice of ethics can (and "should") serve as a decision-support tool.

### **Ethics about what? Ethical categories**

Ethics can be applied to just about anything, but it needs to be applied to something. One cannot be simply "ethical" without putting those ethics to the test. To me, this is what makes ethics, as a subject, so fascinating; it is designed

for action and application. We can have beliefs about water – that it is sacred, or healing, or beautiful, or even dangerous – but those qualities are not ethics; rather, they are the basis for values which become expressed in ethics. Ethics is what we do or how we respond to our concept of water as dangerous (we put a fence around the swimming pool) or beautiful (we frame a photograph of water and put it on our living room wall).

If we conceive of rivers as valuable components of the overall environment, we will strive to protect our rivers. Whether explicitly or implicitly, we will adopt a river ethic that we have a collective responsibility (ethic) to keep the river in good health. But even with this ethic of helping the river, we might be concerned about the river’s flooding and decide to build levees to protect people and property. Now we have multiple values interacting in our decision process. We place a high value on human safety and welfare, so we want to tame the floods, yet we want to do this in a way that doesn’t jeopardize the river’s health. For example, we might opt for low levees set far away from the river channel to protect against major floods, but allow the river freedom to “be a river” within that zone. The decisions we make about the best way to manage the river depend on how we value different outcomes, and flood management strategies are a rich topic for exploring competing values and ethics. The apparent conflict between the health of the river, which wants to be free, and the health of people, who don’t want to drown in a flood, illustrates two value categories that invariably come up in controversies about water: nature vs people, or environmental values vs social values.

This book is structured around the ways that water is managed to meet diverse values. We start by considering the values underlying the management of rivers, lakes, and other forms of water ecosystems (Chapter 2), and how we use the water that we remove from those ecosystems in order to grow our food (Chapter 3), provide water for our daily domestic needs (Chapter 4), for industry (Chapter 5), and finally the values we bring to the governance of water (Chapter 6). The last two chapters of this book provide perspective about culturally distinctive values about water (Chapter 7) and how an understanding of water ethics can help us navigate through the challenges of climate change and tough choices about our collective water future (Chapter 8).

### **Five categories of water ethics**

Table 1.1 depicts two contexts of water management along the left-hand column (y axis), and five categories of ethics along the x-axis. The two water management contexts are: (1) managing water within ecosystems (rivers, lakes, aquifers, wetlands, and estuaries), and (2) managing the water that we remove from these ecosystems to use for some purpose or activity, such as agriculture (where most water is used), urban and household water supply, industrial uses (including direct use in manufacturing and indirect use through pollution), and any other purposes such as transportation, recreation (swimming pools), urban fountains, or “cultural flows” (discussed in the chapter on Indigenous water

*Table 1.1* Domains of water (left) and domains of values/ethics (top)

	<i>Environ- mental values/ ethics</i>	<i>Social values/ ethics</i>	<i>Cultural values/ ethics</i>	<i>Economic values/ ethics</i>	<i>Govern- ance values/ ethics</i>
<i>Water in eco- systems (rivers, lakes, wetlands, aquifers, green water, etc.)</i>					
<i>Water use (agriculture urban/domestic water supply, industrial, or other uses)</i>					

ethics). Connecting the two contexts of natural ecosystems and human uses is the management of moisture in soils. Half of the world's crop production (the other half is irrigated), as well as forests and rangelands, depend on soil moisture, also known as "green water."

Within each of these water management cells, defined by context (ecosystem or human system) and values/ethics category, there are choices to be made. Hindu adherents in India want to protect the Ganges (cultural-ecosystem cell), so they form alliances with environmental NGOs (environmental-ecosystem) and city leaders (social-urban cell) to protect the river from over use by agriculture and hydropower (Ag/industrial-economic cell). Mapping out the competing values implicit in competing water demands clarifies the issues and helps identify not only dangers of conflicts but also opportunities for consensus and maybe even synergies.

In the real world there are no clear lines separating these categories; they spill into each other often within a single thought: "We need to protect the economic services of wetlands" simultaneously invokes environmental and economic values. In this book we will be exploring the boundaries and connections among these categories. It is the interactions that can be most interesting for bridging conflicts and finding creative solutions. Additional types of values could also be distinguished, such as spiritual values, psychological values, and aesthetic values. In certain contexts, these or other types of values could be important to consider. For example, in addressing the pollution of the sacred Yamuna River in India, it is difficult to imagine a type of value that is not relevant (Haberman 2006).

Another way of categorizing ethics is in terms of whose interests are being prioritized. Carolyn Merchant (2010 [1997]) identifies three categories of ethical intention: egocentric (self-interest), homocentric (utilitarian social interest), and ecocentric (pure environmentalism). What we really need, she concludes, is a

hybrid of homocentric and ecocentric ethics which she terms, partnership ethics, a “moral consideration for both humans and other species” (Merchant 2010). This seems like a good compromise position, but these three categories are not necessarily mutually exclusive. Distinctions among self, society, and nature fade into insignificance when we consider the prospect of a warming planet and increasingly insecure, and locally scarce, water supplies. We need an ethic that will help us and the next seven generations survive and thrive. Our current ethic of what Leopold calls “expediency” has gotten us into trouble.

This is where the Odysseus story provides hope. Contemporary society no longer accepts slavery. Today there are no international conferences to consider alternative social policies that would reinstate slavery as an institution! Ethics can and do change. An historically more relevant example, also related to slavery, is the civil rights movement in the United States. Precisely how ethics change is not the focus of this book, because I would be moving well beyond my expertise. This book has the more modest goal of promoting ethics awareness and the application of ethics analysis to water decisions. By becoming more aware of the ethical dynamics, our collective ethics around water can change for the better.

### **A brief history of water ethics**

The interest in water ethics from within the ranks of the water profession has been very much linked to initiatives of UNESCO through its Commission on the Ethics of Scientific Knowledge and Technology (COMEST). In 1998 this commission formed a working group on the ethics of freshwater use and issued an initial report, *The Ethics of Freshwater Use: A Survey* (Selborne 2000). This was followed by a series of fourteen reports on various aspects of water ethics, ranging from gender to groundwater to environment. Under the title “Water and Ethics,” the reports were published by UNESCO in 2004 with an introductory volume providing a concise overview (Delli Priscoli et al. 2004). An additional report, *Best Ethical Practice in Water Use* (Brelet and Selborne 2004), identified “fundamental principles” of ethical water use, including human dignity, participation, solidarity, human equality, common good, stewardship, transparency, inclusiveness, and empowerment. A few years later, the Bangkok office of UNESCO produced a report on *Water Ethics and Water Resource Management* (Liu et al. 2011) as part of the project on “Ethics and Climate Change in Asia and the Pacific.” And just recently, UNESCO-COMEST undertook a broader assessment of water ethics, including the oceans, under the title *Water Ethics: Ocean, Freshwater, Coastal Areas* (COMEST 2018).

The UNESCO initiatives had the dual purpose of highlighting how ethics plays a role in decisions about water use and management and also prescribing what that role should be. A more scholarly approach to water ethics was adopted by the Botin Foundation in Spain, which sponsored two seminars on water ethics in 2007 and 2010. The proceedings from the 2007 seminar are

available as the book *Water Ethics* (Llamas et al. 2009) while the 2010 seminar papers were published in a special issue of the journal *Water Policy* in 2012.<sup>1</sup>

More recently, UNESCO published a book, *Water, Cultural Diversity, and Global Environmental Change* (Johnston et al. 2012), which provides a series of case studies showing the interplay of cultural values and water management and governance. And finally, mention should be made of the work of David Feldman whose book, *Water Resources Management: In Search of an Environmental Ethic* (Feldman 1991), pioneered the application of environmental ethics to water management within the United States.

In addition to the interest in ethics from inside the water profession, there are a great many more strands of interest from other disciplines (law, development studies, philosophy, history, religion, geography, anthropology, etc.) and professions (business, social and environmental NGOs, academics, journalists, etc.). But in my view, the most significant contribution to water ethics awareness has come not from scholars or business associations but from Indigenous Peoples' organizations such as Tebtebba in the Philippines, and the Indigenous Environmental Network in the United States. As discussed in Chapter 7, Indigenous Peoples' statements and declarations about water offer an important counter-narrative to the consensus positions of the global water establishment. This divide takes visible form at the triennial World Water Forum, where, since the 2006 meetings in Mexico City, it has become standard procedure for an "NGO Forum" to be held nearby as a protest against the neo-liberal consensus represented by the World Water Forum. While it is tempting to regard that divide as political, which it is, there is also a strong cultural element based less on power politics than on cultural values about nature, society, and "The Right to Be Different" (Boelens 1998:30).

The intellectual ancestry of this book includes Aldo Leopold, his son Luna Leopold, and, though too young to qualify as an ancestor, Sandra Postel. Aldo Leopold's characterization of a land ethic (Leopold 1949) was applied to rivers by his hydrologist son, Luna (Leopold 1977). Sandra Postel breathed new life into the relevance of ethics to water with her book *Last Oasis: Facing Water Scarcity* (Postel 1997). The common message of these writers is that ethics about protecting and respecting water ecosystems have very real practical ramifications. This is good news, because it suggests that the current unsustainable patterns of water behavior and policies could be reformed by changing the ethics that promote those behaviors. If the water crisis is caused by behaviors, which in turn are driven by ethics, then let's find a way to change those ethics!

## **Related concepts**

The water crisis has sparked a number of new ways of conceptualizing water use and policies, which have important overlaps with water ethics. Three discourses in particular advocate for particular water-related norms and thus share some important strands of DNA with water ethics: (1) Water integrity, (2) Water stewardship, and (3) Water justice.

1. *Water integrity.* With roots in the anti-corruption movement, the concept of water integrity centers around transparency, accountability, and participation. Transparency refers to information about financials (and especially how water infrastructure and service contracts are decided) as well as about water quality and water use. Accountability refers to both financial budget processes as well as technical professionalism. Participation refers to both engagement of stakeholders in water planning and policy decisions, and the management participation of water users, with an emphasis on decentralized governance at the level of local basins, irrigation systems, and urban water supply systems. The Water Integrity Network (<http://waterintegritynetwork.net>) is the institutional home of water integrity, having split off from Transparency International in 2010 to focus exclusively on the water sector. The organization focuses on institutional capacity building of operators and decision makers in urban water supply systems, with planned expansion into the areas of dam building and other large infrastructure projects where corruption and lack of transparency can lead to very high economic, social, and environmental costs (WIN 2016).

2. *Water stewardship.* Water stewardship has become the catchword for corporate social responsibility within the water sector. The CEO Water Mandate, a UN-affiliated initiative, uses the term in its advocacy for sustainable water management within the business community, and a number of non-profit partnerships have also adopted the term to describe their sustainable water activities. For example, Business for Water Stewardship (<http://businessforwater.org>) partners with the National Geographic program Change the Course (<http://changethecourse.us>) and other initiatives to provide, “a portfolio of services that catalyze business engagement and leadership in environmental water stewardship” (Business for Water Stewardship 2018). The Alliance for Water Stewardship (AWS, <http://a4ws.org>), a partnership of environmental organizations, businesses, research institutes, and others, has developed the Water Stewardship Standard, a detailed set of guidelines certified by trained compliance consultants. The standard is concerned primarily with environmental indicators but also includes some social justice and engagement indicators as well. Specific standards are also being developed for key water sectors and regions. For example, the European branch of AWS has adapted the standard for use by agricultural businesses in Europe,<sup>2</sup> and the Alliance is working with the Swiss Agency for Development Cooperation (SDC) to support water stewardship among cotton and rice farmers in Central and South Asia.

3. *Water justice.* While social justice has long been a recognized theme of water activism, as witnessed by the UN General Assembly recognition of access to safe water and sanitation as a human right, there has been a more recent application of water justice as an overarching perspective (Zwarteveen and Boelens 2014; Harris et al. 2017; Sultana 2018; Boelens et al. 2018). What distinguishes water justice as a field is the reinterpretation of recognized moral concerns about water rights – such as intergenerational justice, water rights of Indigenous Peoples, and health impacts from water contamination due to chemical spills, agricultural inputs, mining, oil and gas, etc. – as issues of justice

and human rights. As with water ethics, the perspective of water justice can be applied to just about any water issue but focuses particularly on human–human relationships rather than human–nature relationships and rights of nature (Ballet and Bazin 2017).

In addition to these three schools of quasi-water ethics, the larger environmental crisis has prompted the development of new ways to value the natural environment, including water ecosystems. The concept of ecosystem services which recognizes, and typically places a monetary value on, the benefits society derives from natural ecosystems, offers a way to account (literally) for nature’s services. A more radical concept, which does not fit so neatly within the dominant economic paradigm is rights of nature. No longer the exclusive domain of philosophers specializing in environmental ethics (e.g., Nash 1989; Boyd 2017), the idea that we should recognize nature’s intrinsic rights has entered the constitutions of Ecuador and Bolivia, and it receives serious attention within the United Nations.<sup>3</sup>

The net impact of these approaches – integrity, stewardship, justice, ecosystem services, and rights of nature – is an emerging discourse about how to think about water and how to respond to increasing water stress and climate change. “Integrity” in water governance is about cleaning up the governance process (anti-corruption and transparency), but it also begins to address professional integrity and governance outcomes. “Stewardship” is primarily an environmental concept, though it can also include issues of labor conditions and social justice. “Water justice” is about people in a broad context, including intergenerational environmental justice. Ecosystem services is, of course, environmentally focused, but the implications extend to economics and culture, while the deeper issue of “rights of nature” goes beyond environmental ethics per se to the ethics of respecting Indigenous cultures who see nature as sacred. It is no coincidence that the two countries to adopt “rights of nature” provisions into their constitutions, Ecuador and Bolivia, also have majority Indigenous populations.

What is new about the approach to water ethics presented in this book is not any of the details. The literature on water ethics cited previously describes numerous examples and case studies, and there are more than enough concepts, such as the water footprint and water stewardship, or rights of nature, with which to analyze the specifics. Where the present book has something new to offer is in prioritizing ethical analysis as a crucial step in the water management process: planning, designing projects, setting policies, or negotiating conflicts. The ethics proposed here is not merely a perspective to be applied for better understanding why things are the way they are. Ethics can be used as a practical tool for *changing* the way things are, for identifying gaps between what we really want for our future and the trajectory of ecological degradation that our policies are actually creating.

Analyzing our water ethics can help us to confront what we are really doing to water ecosystems and the people and cultures whose lives are interconnected with those ecosystems, but the purpose is not to make us feel bad for all the

harm we are inflicting in the name of water development. The reason to explore our water ethics is to discover new ways of framing our problems, finding opportunities, and formulating solutions and to face our water future with ethically guided creativity and imagination.

### **What is responsible use of water?**

How much water is it ethical to use and for what purposes? Food produced by industrial methods of agriculture has a much higher total water footprint than food produced by small farms and marketed locally. Coal that is mined through mountaintop removal, or gold that is mined and processed with water-polluting methods, or electricity produced by hydropower dams that have severely altered water ecosystems are examples of indirect consumption of water. Whether we use water directly, as in growing food or taking a shower, or indirectly for manufacturing processes or energy production, the effects are the same. Water is being used, and to some extent, “consumed.”

Water use and water consumption are not exactly the same thing. We can “use” water to take a shower, and the drainage water can be used to irrigate your garden. Your garden plants might consume about half that water, and the other half will either infiltrate into the subsurface aquifer (where it is theoretically available to be pumped out and used again) or it will evaporate to return as rain someplace else, and landing either on land (where it will add to local freshwater supplies) or on the ocean (where it is effectively lost by merging with the saltwater). Theoretically you don’t consume any water when you take a shower, since all of it can be recaptured and reused. If you want to get very technical about it, water is not truly consumed by plants, either, or at least not very much. The carrot plant in your garden transforms some of the water from your shower into a carrot, plus some other roots and a leafy top. When you eat the carrot, you are also eating “carrot-water,” while the other roots remain in the soil, to be evaporated. The leafy top goes into your compost, eventually to return to the garden, where some will evaporate. The rest will contribute to the water content of next season’s vegetables, and the cycle starts all over.

Water is both finite and infinite. The stock of water does not expand, but neither does it diminish, at least in theory. We cannot really destroy water, but depending on how we use it, we can make it very difficult, and practically impossible, to reuse it for something else. This is where ethics comes into play. The way we use water should incorporate some consideration for the next person (or fish) who wants to use that water. And that next person will, hopefully, think about the other future users of that same water.

One of the big problems with water use is that, practically speaking, it’s often just not possible to use water without consuming it. When water is diverted from a river to irrigate fields of tomatoes destined for market, those tomatoes will be taking some of the river to wherever that market is. For all practical purposes, that water has disappeared from the river, even though some of it may fall as rain and flow into other rivers somewhere (or the tomato

will be eaten and the water content excreted into a toilet, and then goes on to a wastewater treatment plant and finally a river!). Similarly, the irrigation water that never gets to the tomato but evaporates out of the soil, or the water that gets to the tomato plant but is lost from the leaves through evapotranspiration, is not going to get back into the river from which it was diverted. This “lost” water can be said to be consumed, because, like putting Humpty Dumpty back together, it’s just not practicable to recapture that water and put it back into the river.

Water is also consumed, practically speaking, when it becomes contaminated through some kind of industrial process. Water used to process gold ore, for example, can be tainted by mercury, either from the processing procedure itself or from mercury in the gold-containing ore. Water may be used directly, as part of the mining process, and become contaminated in this way, or water can be indirectly contaminated with mercury, through the leaching of mine tailings or from mercury emitted into the atmosphere and falling into streams and lakes, where it bio-accumulates in fish, as the little fish are eaten by bigger fish. In this case, we might say that water is “consumed” without actually being used! The water still exists, but it is no longer available for anyone else to use unless it is first treated to remove the mercury.

Other forms of water consumption through contamination include uranium mines that contaminate groundwater water with radionuclides and nuclear power plants that use large amounts of water for cooling. The water in this case is thermally contaminated (i.e. it’s warm). It is available to use again, but only if heat is not a problem. For the purpose of providing fish with a habitat, for example, heat is a big problem. Fish adapted to cool rivers are likely to die if the water becomes too warm.

The single biggest source of water contamination in most developing countries is human waste, an easily preventable problem which is attracting global attention. In the industrial countries, in contrast, human waste is no longer a major concern. The biggest problems are not, surprisingly, industrial pollutants, but agricultural ones, especially nitrates from fertilizer applications and poor management of animal wastes. Water polluted by nitrogen can be reused for irrigation but is no longer suitable for many other very important uses such as drinking. Agriculture is also the source of many other pollutants such as pesticides and good old-fashioned dirt from soil erosion. Dirt, however, is a lot easier to deal with than, say, atrazine or Roundup, the two most popular herbicides, but more on these later in the agriculture section.

Water use and consumption should be looked at in cultural context, because ethics are derived from cultural norms and make sense within a set of cultural assumptions. If we try to be too different relative to our own cultural system, we will define ourselves out of the mainstream and lose our leverage in trying to change water policies. Of course, how different one can afford to be and still be taken seriously is both a strategic and a personal decision. One can choose a unique path that is clearly beyond one’s home culture, with the aim of having a positive demonstration effect, showing the mainstream culture that there is a different and presumably better way. This is what “counter-culture” means, and

when it is applied to water use it refers to people like my Santa Fe neighbor, Louise Pape, who very carefully minimizes her water use. Whereas most Americans use about 100 gallons a day for cooking, bathroom flushes, and bathing, Louise averages about ten. “I conserve water because I feel the planet is dying, and I don’t want to be part of the problem,” she said in a *National Geographic* blog.<sup>4</sup>

Americans use two to three times as much water per capita as Europeans, but perhaps even the Europeans are using too much. Africans use far less, particularly West Africans living in the Sahel. Cultural values and a whole system of culturally inspired ways of doing things are intertwined with water use decisions. What John Muir said about the nature of the universe is also true of water ethics: “When we try to pick out anything by itself, we find it hitched to everything else in the Universe” (Muir 1911: 110).

### Water scarcity

The idea that water is scarce is one of those things that is hitched to lots of other things in our culture. The notion that there is only so much water to go around, and that supplies are fixed, seems so obvious that no further explanation is required. But water scarcity has taken on more urgency than, for example, food. In many parts of the world, food is just as scarce as water, and the production and distribution of food pose huge logistical and developmental challenges. Yet we don’t speak of “food scarcity” as the general state of affairs. Rather, food scarcities are seen as problems to be solved. Water scarcity, on the other hand, seems very much like a problem that we actually do not want to solve; there are too many vested interests in keeping scarcity, like terrorism, as a background fear.

In tracing the history of the scarcity concept in water policy discourse, Schmidt (2012) identifies 1977 as the turning point for reframing water as basically scarce, rather than basically abundant. The occasion was a major UN conference on water, held in Mar del Plata, Argentina, which endorsed the then-new paradigm of “Integrated Water Resources Management” (IWRM) as a response to the challenge of water scarcity. Since then, an entire professional discipline has grown up around the idea that water scarcity is the problem and IWRM is the solution.

Critics like Schmidt (2012) and Linton (2012) have suggested that the concept of scarcity is just that – a concept. It is no more real than food scarcity is to a gluttonous child dissatisfied with his small portion of chocolate cake. It would not be heartless to label the child’s demands as subjective and without real merit, nor would such an observation deny that very real food scarcity can and does exist in the world, just not at that particular table. A similar claim might be made that water scarcity is a misleading characterization of the water supply of Phoenix, Arizona. This metropolis of 4.5 million people, constructed at the confluence of three important desert rivers, whose water supply is supplemented by huge water transfers from the Colorado River, suffers only from a very subjective water scarcity. It is a water scarcity resulting from profligate water consumption averaging 173 gallons per capita per day<sup>5</sup> and from an influx of residents lured by local developers to make the desert city their new home.

Economists define water scarcity as the condition when demand for water exceeds the supply. When demand is low and the supply is high, there's enough for everyone. As the demand increases, for example, from more people moving into Phoenix and installing lawn sprinklers, the buffer between demand and supply gets thinner; we are approaching scarcity. What happens next is a moral choice. Is the scarcity a result of too much demand, or not enough supply? As we ascribe causes to the increasing scarcity, we characterize the problem in certain ways. If we see the problem as caused primarily by too much demand, we might focus on the profligate behavior of the people using too much water on their lawns. This definition of the problem will lead us toward solutions aimed at lowering the demand for water, perhaps through awareness campaigns, or by increasing the price of water to discourage wastage, or by imposing a tax on lawns, or incentive programs to replace the lawns with gravel, etc. But if we see the problem as basically one of not enough supply, our proposed solutions will aim at finding new sources of water that can keep up with rising demands.

In practice, supply-focused and demand-focused strategies are usually pursued in combination, but the underlying framing of the issue typically gives more weight to one side than the other. In my home city of Santa Fe, New Mexico, the local water planners have only recently developed plans for decreasing demand. But they have long had very detailed plans, years in the making and continuously updated, describing how total water supplies will be augmented in order to meet the projected demand.

Water resources planners have been schooled in supply management; engineering textbooks refer to urban water supply, but rarely do they refer to urban water demand. Even economists, who specialize in connecting the two concepts, show a professional bias in finding supply-based solutions where everyone can be better off (defined as "more" and not "less"). A water utility is a "water supply utility" providing, we hope, safe and secure water. Water utility managers live in fear that they might not be able to deliver enough supply to meet the demand, though from an economic efficiency perspective, water capacity is over-built if those conditions are always met. Water utilities promote water conservation not because they want people to use less water, but because they want to ensure that the supply can securely meet the demand.

Dryland farmers who depend on the rains, and on residual soil moisture, know all about managing the water demands of their crops to fit within the available supply. Traditional dryland farmers in Rajasthan, India, for example, learned many generations ago to plant their millet and sorghum as soon as the monsoon rains started, so the crops could benefit from the wet soil for as long as possible. Adjusting the supply of water was not an option before canal irrigation was introduced. Indeed, even with canal irrigation, farmers often had insufficient water to meet even quite minimal demands. The British engineers who set the initial design standards for warabandi-based (rotational turns) canal zones designed-in water scarcity. Each farmer's turn in receiving the canal flow would be enough to irrigate no more than half his fields, thus incentivizing him to use

the water frugally. Today the descendants of these farmers have grown up with more supply options; in addition to the unreliable canal, they have installed tube wells powered by electricity or diesel. The farmers have found ways to augment their water supply to meet their growing water demands. No one likes to manage the demand when there is a possibility for managing the supply instead.

While it is easy to sympathize with small farmers seeking more water to increase their production, the plight of Phoenix, Arizona, residents having to curtail the intensity of their lawn watering sounds more like the overweight child wanting more cake. Yet from a supply management perspective, Phoenix suffers from water scarcity. The residents would like to have bigger, greener lawns and are willing to pay what it takes to make that happen. As they enjoy telling visitors, in their region, water flows uphill towards money.

## **Conclusions**

The ethical basis for our decisions about nature, development, and water is constantly evolving. We no longer condone slavery or child labor, no matter how tempting the profits might be. Our ethics are already influencing our behavior. But more often than not, the ethics we manifest are subconscious, creating a wobbly, and potentially catastrophic, basis for decision-making. We can see this in hindsight easily enough. The systematic destruction of America's rivers was not implemented with malice, but with "hubris" (McCool 2012) which my dictionary defines as "exaggerated pride or self-confidence." It was the swagger of the engineer, as much as the swagger of the cowboy, that tamed the Wild West, but this was not only an American phenomenon. A similar hubris among European engineers was busy taming the Rhine (Blackbourn 2006), and still exists today from the Mekong to the Nile. The 21st-century version of engineering hubris is somewhat tempered by considerations of ecosystem services and human rights, but hubris, when backed by a few billion dollars from investors, still tends to carry the day.

There is an interesting, if tragic, disconnect between what the water profession "knows" to be true on the one hand, from science, economics, and UN resolutions about social and cultural justice, and what actually happens when rivers are dammed, polluted, or otherwise impacted. Standards of best practice only go so far in determining outcomes that are actually decided through politics, lobbying, and, too often, corruption. Those pressures are so powerful that they can easily overwhelm the best intentions of water planners. Readers of this book have probably long ago become inured to stories of bad decisions taken not for lack of knowledge but through the power of vested interests.

The promise, or at least the potential, of water ethics is that clarity about ethical principles can strengthen the resolve of the technical professionals, as well as of the citizen-stakeholders who, of course, have a very strong long-term interest in sustainable water management. Just as importantly, clarity about ethics can also weaken the resolve of vested interests lobbying for a dam or mine that violates broadly held ethical principles. So long as the ethical

implications of a proposed water decision remain fuzzy and ill-defined, the proponents are protected from being held accountable by the supposed beneficiaries, the public at large, or even themselves. Careful analysis of the values that will be advanced or violated by a proposed project helps all sides become a little more honest. Clarity about the ethics will not dispel disagreements, but will help focus debate about the deeper values that the project will impact.

### Discussion questions

- What are your personal values about water? Identify, rank, and order your water values as best you can, and compare your responses with your colleagues.
- What synergies can you find among your water values? What conflicts? How do you think you might reconcile these value conflicts? Will it require trade-offs, or is there potential for win-win solutions?
- Which sub-categories of water ethics are most important in your view? Why?

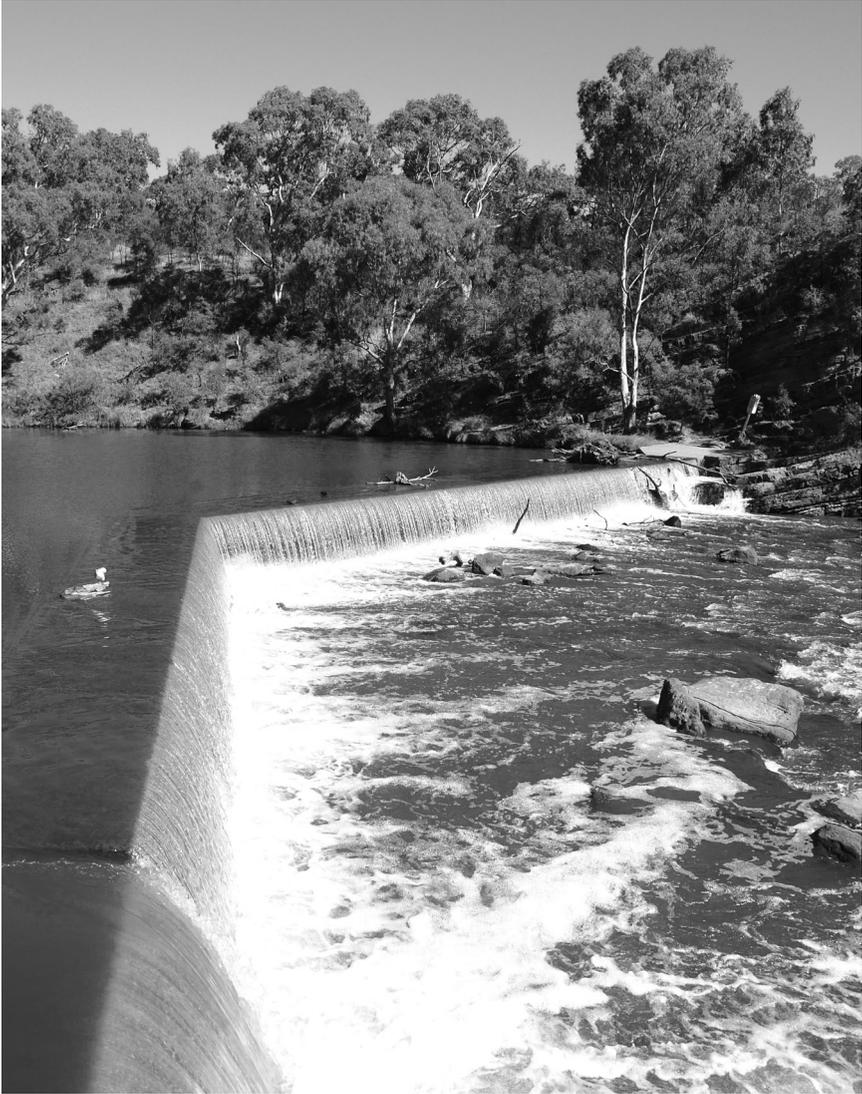
### Notes

- 1 See Llamas (2012) and Delli Priscoli (2012) for an overview of the 2010 seminar.
- 2 See the website of the European Water Stewardship, <http://www.ewp.eu/activities/water-stewardship/>.
- 3 Following the Rio+20 meetings in 2012, the United Nations launched a “Harmony with Nature” website featuring examples of national legislation aimed at protecting nature, <http://harmonywithnatureun.org/>.
- 4 See <http://ngm.nationalgeographic.com/2010/04/last-drop/royte-text>.
- 5 Source: Western Resource Advocates, <http://www.westernresourceadvocates.org/azmeter/phoenixsumm.pdf>.

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## 2 Managing rivers



Yarra River near Melbourne, Australia

The prevailing ethic about how we should manage rivers and other forms of aquatic ecosystems (including lakes, wetlands, and aquifers) is in the process of a slow but profound shift from command-and-control to a more accommodating coexistence with nature. The aim of river engineering used to be the transformation of a river's natural meandering into a straight channel confined within its banks by equally uniform levees to protect against flooding. Engineers were taught, implicitly, that this was their ethical duty: to tame unruly rivers and harness their waters for irrigation, transportation, flood control, and hydropower.

The art and science of river management has become far more complex as the perspectives of ecology, economics, and the desires of local stakeholders are taken into account, and in the face of relentless increased diversions and climate change (Kennen et al. 2018). There is now widespread agreement that rivers should not be totally engineered, but should retain some basic natural functions essential to their sustainability. But what is the right balance? Around the world, there are examples of dams being removed to allow fish passage (Lejon et al. 2009), levees being moved further from the river channel to provide "room for rivers" (de Groot and de Groot 2009), and flows being partially restored to support basic river function (Arthington 2012). In the US state of Oregon, two dams on the Elwha River were removed between 2012 and 2014, including Glines Canyon dam, at 64m the highest dam ever removed up to that time (Kober 2016). The two dams had decimated the river's salmon population, and the dams' removal has resulted in a dramatic recovery.

Even as large dams are seeing a resurgence as a low-carbon path to energy production (Crow-Miller et al. 2017; Dye 2016), the ecosystem services of healthy rivers are being valued more highly as well. Rivers are becoming appreciated not only for their direct economic importance for energy, manufacturing, and agriculture, but also for their social and cultural values. From riverfront renewal programs to water festivals, rivers are seen as fundamentally important urban assets.

The economic and social value of rivers underscores the political importance of good river governance. But what should be the aim of river governance? Is it to create more economic value, or can river governance also serve broader interests of society through strengthening civic identity and engagement? Water policies which acknowledge the importance of social justice and participatory governance, or which respect the customary water rights of Indigenous Peoples (cultural ethics) typically reflect multifunctional ethical motivations. A specific water policy, such as a water quality standard, can serve many interests simultaneously: political, social, and cultural, as well as economic.

What are the particular ethical principles that could be advanced through a proposed water policy? It is not mere semantic quibbling to try to identify the ethical categories at work in a policy which has overlapping types of benefits. Those overlaps can be important. If the policy of participatory watershed management governance, for example, is promoted for primarily economic ethics, it leaves open the question of whether there might also be some missed

opportunities for meeting additional social or cultural goals. Perhaps a bigger investment in organizational training for a local water cooperative would be justified on the basis of social benefits even if an economic cost-benefit analysis would not justify the additional training costs.

Following the ethical trail of motivations can uncover intertwined and multidimensional logics operating behind seemingly mundane water decisions, whether we are consciously aware of the ethics or not. Why bother with such investigations? Because unless we understand what the motivations (ethics) really are, we will make decisions based on potentially false assumptions rather than on solid information. The importance of good quantitative data is patently obvious; everyone likes numbers. But is qualitative information about motivations and ethics any less important? When millions, and sometimes billions, of dollars or euros are being invested for flood control levees, isn't it important to know whether we are trying to protect property, or to revitalize the river's floodplain, or both? And if both, what the relative priorities might be?

### **A brief history of rivers**

Human civilizations have coevolved with bodies of water, usually rivers, and often very large rivers: the Nile, the Tigris and Euphrates, the Indus, the Yangtze, the Mekong. Manipulating rivers through engineering projects is as ancient as civilization itself. Indeed, the social requirements of river engineering projects – mobilizing a labor force, a surplus of material on-hand for the construction, not to mention the planning and decision-making involved – may have been the spark (or sparks) that brought our great ancestral civilizations into being. To the oft-quoted mantra “Water is life” might be added, “Manipulating water is civilization!”<sup>1</sup>

The dams and canals constructed by the ancient civilizations were significant accomplishments which defined their identity and character. The ancient Egyptians built not only pyramids, but also a network of levees and canals to retain the floodwaters of the Nile on which their agriculture was totally dependent. The ancient Sumerians did the same thing, though with slightly smaller rivers to deal with; they were able to construct diversions from the Tigris and Euphrates to feed a network of canals. On the other side of the world, the ancient Incas did not have large rivers to work with. Instead they manipulated their mountainous lands into a network of terraces and diverted small streams to irrigate terraced fields. The ancient kingdoms of South India and Sri Lanka took a hybrid approach of constructing dams along small streams and rivers to create reservoirs used to irrigate their crops during the dry season.

The engineering works developed by the ancient Romans and their Chinese contemporaries took on a character that still seems familiar to us today. The Dujiangyan irrigation project in China was perhaps the largest irrigation system in the world in 200 BC and is still functioning today. It has been recognized as a UNESCO World Heritage Site.<sup>2</sup> The Romans' unique contribution to water engineering was not so much irrigation canals as urban water supply, with

many of their aqueducts still functioning today. Roman technology freed cities from the constraints of local topography, allowing them to pull water from vast hinterlands and grow unencumbered by water constraints. The Romans also developed ways of removing excess water through drainage canals, starting with draining the valleys of Rome itself, and making the city a much healthier environment in the process. The famous Roman Forum was drained by the Cloaca Maxima (“the big drain”), which Lewis Mumford described as a perfect public works project (Mumford 1961: 214–215). Carefully constructed and monumentally sized, the stone drain is still in use today. A perhaps not unrelated feature of this drain is that it was, in antiquity, presided over by a statue of the goddess Venus (Schladweiler 2013). This “Venus of the Drain” (Venus cloaca) attests to the blending of religion and everyday life in ancient Rome and to the sanctity accorded to the management of water.

How did the manipulation of rivers and swamps shift from being a sacred task worthy of divine oversight to the image, which remains with us today, of a war against nature? David Blackbourn (2006) traces one strand of what we might call the anti-nature ethic to the Prussian concept of swamps in the mid-18th century. Swamps were associated with dark, malevolent, and mysterious forces, which could be transformed into tamed and productive lands through drainage projects. The massive influx of settlers into the newly drained lands of the Odenbruch (northwest of Berlin) transformed and civilized the region (Blackbourn 2006: 49–62).<sup>3</sup>

The utilitarian ethic of taming nature for the benefit of people, forged through swamp reclamation, was later applied to the much greater challenge of taming the Rhine River. Napoleon’s empire established the enabling conditions for implementing large-scale engineering projects without having to worry about national boundaries. Napoleon’s empire facilitated large engineering works, but the vision was motivated by an ethic that the river needed to be tamed for the well-being of the towns and cities along the way. The Prussian engineer Johann Gottfried Tulla was the man with that vision, convincing the Napoleon-appointed Magistracy of the Rhine in 1812 to make the first six cuts through the meandering river channel. Though not fully realized for another 60 years, the “rectification” (straightening) process had begun. Dozens of cuts later, the river was shortened nearly 25 percent, from 220 miles to 170 miles (Blackbourn 2006: 97).

Meanwhile, a similar engineering ethic was developing in America, inspiring the construction of transportation canals in the early 1800s. With competition from railroads in the latter part of that century, and the growing colonization of the arid West, the focus of water engineering shifted to dams and reservoirs for irrigation. By the beginning of the 20th century, the dam-building era was underway in the American West. The twin (and often competitive) national agencies of the US Bureau of Reclamation and the US Army Corps of Engineers operated according to a common formula of constructing dams in response to politically influential land and water speculators eager to transform the Western landscape into profits. Donald Worster’s landmark book, *Rivers of Empire*,

traces the major construction dam projects that collectively tamed the waters of the West (Worster 1985).

### *Alternatives to water imperialism*

The prevailing ethic of transforming rivers into profits did not go unchallenged at the time, but the alternative voices were overwhelmed by the forces of capitalism coupled with both patriotic (love of country) and professional (the romance of engineering) boosterism. Who comprised the counter-chorus? Worster recounts the story of Mary Hallock Foote, a writer and wife of an engineer who designed dams and irrigation networks in Idaho and elsewhere in the West. Her 1892 novel, *The Chosen Valley*, depicts the tensions between the capitalists who financed the irrigation projects and the engineers, like her husband, who designed them, but to what end? As one of her characters asks, “Isn’t there land enough, with water belonging to it, without spending millions to twist the rivers out of their courses?” (quoted in Worster 1985: 145).

In addition to the intuitive romanticism that nature deserves more respect than she was being accorded, two important alternative schools of thought can be discerned in the water history of the American West, which have broad implications for water ethics today. The first is what I will call the natural history school, embodied by John Wesley Powell, famous for exploring the Colorado River and later serving as the director of the US Geological Survey. Powell saw the arid landscape of the West as requiring a qualitatively different approach to land and water, and to participatory democracy (deBuys 2001). Since water is the critical, defining resource, development planning should be based on science to ensure the optimal use of scarce supplies, with agriculture being limited to only the best and most easily irrigated soils. Governance should be on the basis of watershed units to facilitate wise management.

The second type of alternative development vision for the West was offered by the conservationist John Muir, who shared Powell’s love of natural science, but infused his interest in nature with a strong spiritual dimension. Known today as the founder of the Sierra Club and a driving force behind the establishment of the US national park system, “Muir’s sense of the sacredness of nature as the ground for environmental protection may be his most enduring legacy” (Taylor 2010: 62). Taking inspiration from the New England transcendentalists, particularly Henry David Thoreau, Muir applied these principles to specific conservation campaigns. A defining battle for Muir, and emblematic of the conservation movement, was the unsuccessful effort to save the Hetch Hetchy Valley. Originally included as part of Yosemite National Park in California, the US government withdrew the valley’s protected status to allow construction of a reservoir to supply the growing city of San Francisco. Muir argued that there were many other potential sources of water for San Francisco, but only one Hetch Hetchy Valley: “Dam Hetch Hetchy! As well dam for

water-tanks the people's cathedrals and churches, for no holier temple has ever been consecrated by the heart of man" (Muir 1912: 262).

Neither the aesthetics of romanticism (Mary Hallock Foote), nor scientific logic (John Wesley Powell), nor spiritual appeals (John Muir) could counter the juggernaut of Western water development fuelled by a combination of greed and self-serving visions of Manifest Destiny. There seemed to be nothing that could stop the consumptive form of progress that took hold of the American West, annihilating Native American tribes, the herds of buffalo, and the virgin forests, to create a tabula rasa on which to construct a new nation (see Limerick 1987). The legal code governing water in the Western states was written in response to facts on the ground in the wake of the California Gold Rush of 1849. Faced with tens of thousands of gold miners illegally occupying federal lands and diverting water (needed for the mining operations) from public streams, the federal government yielded authority of water to the individual states. Within two decades, the Western states had followed the lead of Colorado in legalizing existing water claims based on "prior appropriation" and "beneficial use." Those who diverted water earliest, and could show that they were using the water for a beneficial activity (e.g., mining, irrigation, or municipal drinking water) were given legal title to the water they were using, with priority of use based on the date they first started diverting the water for the stated use (Hundley 1988).

The ethos of exploitation in the western United States was reinforced by this legal framework based on prior appropriation. This set the stage for a 20th-century construction boom in manipulating rivers unprecedented at the time, and only recently surpassed in the 21st century by China's river engineering projects. While the rate and scale of river exploitation in the United States was unique between, say, the 1870s to the 1970s, the drive to dominate nature was broadly shared with other developed countries, particularly those in Europe, and the language about "conquest" and "domination" is easily interchangeable. Consider these quotes from German engineers around 1900 (from Blackbourn 2006: 191):

To dam a river was "to place shackles on a gift of nature and make it useful for our purposes," "to compel natural forces to serve the economy," "to force the unregulated hydrological cycle of nature into ordered channels" ...

The evolution of water ethics in Germany and the western United States, however, also reveal important differences. The strong tradition of romanticism within German thought during the 17th and 18th centuries provided a refuge for critical questioning of the prevailing paradigm which equated human progress with the embrace of technology. More so than their American contemporaries, Germans were concerned about what was being lost in the blind rush to manipulate rivers. Perhaps because the American landscape was so much vaster and seemingly uninhabited, the power of nature appeared more frightening, and dominance even more necessary. Or perhaps the disruptive history of modern Germany during the course of two World Wars rendered the

logic of technology and dominance over nature less self-evident. Certainly there was a strain of naturalism that ran through Hitler's National Socialism and which was absorbed by the mainstream political parties after the war. The American conservation movement, meanwhile, was largely ineffectual during and immediately after World War II, becoming a force in policies (though never very effectively in politics) only in the 1970s.

American environmentalists struggled to promote legislative reforms to air and water standards in the late 1960s and 1970s, with some success, but their track record in blocking dam projects for environmental reasons was mixed. Echo Park Dam, proposed for a major tributary of the Colorado River, was defeated, but Glen Canyon Dam went ahead on the Colorado River main stem. Meanwhile in Germany, the environmental debate shifted dramatically in the early 1970s. Water development issues started to be debated in terms of "renaturing."

The question now was not whether to preserve, but how best to do it. By the 1980s the environmental imperative was built into West German public debate ... to a degree that was probably unmatched in any other large developed nation.

(Blackbourn 2006: 334)

Today, "good ecological status" is the required standard for rivers under the EU Water Framework Directive, and programs for re-naturalizing rivers are becoming routine (Voulvoulis et al. 2017).

A similar trend can be discerned in the United States, but the process was slower and more superficial. In his masterful history of water development in the West, *Cadillac Desert*, Marc Reisner pleads for leaving rivers intact for posterity (Reisner 1993 [1986]). In a later book, *Overtapped Oasis*, Reisner reviews the history of Western water development up to that time, and notes that the bleak picture he had painted only a few years earlier in *Cadillac Desert* was already looking better (Reisner and Bates 1990). The era of new dam construction in the United States had come to a close, partly because the best locations for dams already had them, but also because the environmental costs were being more carefully assessed and more strongly valued.

Today, Reisner's hope for more environmental awareness about water management is being at least partly realized, but the situation is complicated. Restoration projects aimed at mitigating the ecological damage from unfortunate construction projects of the past have become almost routine, sometimes implemented by the same agencies that caused the problems in the first place. Yet even as the conventions of water resources management are shifting toward more emphasis on sustainability and ecosystem services, the conventional paradigm of command and control lurks just below the surface, and occasionally breaks out into the open.

Exhibit "A" for the endurance of the conventional engineering paradigm is the worldwide resurgence in constructing large dams. Considered a dead issue

following the devastating critique of the World Commission on Dams in their 2000 report (WCD 2000), large dams have gained new proponents citing the need for low-carbon energy to power “green growth” (Zarfl et al. 2015). The speed at which global norms shifted against large dams, and then for them, demonstrate yet again that the conventional paradigm of water management as a series of physical challenges to be solved through engineering, remains well entrenched. The old policies persist, even as the justifications have evolved to embrace new concepts of water security, resilience, and sustainability in the face of climate change.

But before we consider the ethics of dams, it is important to consider the larger policy context of water management and the still-emerging paradigm of ecological water management that, new dams notwithstanding, seems destined to replace the discredited approach of command and control. It remains to be seen how “ecological” the new paradigm will turn out to be and how fully we will be willing to put our trust in nature, particularly amidst the fears of growing water scarcity. Will a new generation of ecologically oriented engineers view themselves as allies, and not enemies, of natural forces?

### *Ecological water management*

The ecological approach to water management builds on natural riparian principles and ecological relationships that are becoming increasingly well understood (Richter et al. 2003; Postel and Richter 2003; Brierley and Fryirs 2008; Arthington 2012). The fundamental feature of this approach is a commitment to maintaining the health of water ecosystems so that both rivers and people can enjoy the benefits of Nature’s services: “We believe that the compatible integration of human and natural ecosystem needs ... should be presumed attainable until conclusively proven otherwise” (Richter et al. 2003: 207). This position assumes that sustainable economies and social systems can best be supported, and indeed can only be realized, through healthy and sustainable ecosystems. Managing rivers on the basis of ecosystem principles becomes the means for implementing the “triple bottom line” of sustainability, bringing the environment, the economy, and communities into balance. River management then focuses on how to work with the natural dynamics of the river to enhance both the social and environmental benefits from those services. Economic market forces play an important role in establishing the right balance, but ecological values are only partially and imperfectly reflected in economic valuations. Freshwater biodiversity, for example, barely registers as an economic issue unless commercial or sports fisheries are implicated, whereas for ecologists, diversity of all species that comprise the ecosystem carries profound importance (Garcia-Moreno et al. 2014). Indeed, the inability of the prevailing market forces to value biodiversity prompted the establishment of the UN Convention on Biodiversity during the 1992 Earth Summit. Signed by 150 countries, the Convention lays out principles for protecting biodiversity and sharing the benefits (United Nations 1992) with subsequent protocols added since.<sup>4</sup>

Ecological water management is distinguished from conventional command-and-control approaches on the basis of goals, process, and outcomes. The goal of ecological management reflects an ethical starting point that the needs of nature are equal with society's interests. In contrast, the command-and-control approach puts people first and foremost, and sees the river as a resource which can, and indeed "should," be controlled and exploited for human benefit. In this view, ecological concerns enter into the equation only at the operational level, where the deciding factor will be whether the interests of people are advanced, or not, through environmental protection (e.g., regulating pollution to protect the fishing industry).

Proponents of ecological water management believe in a "sweet spot" between the interests of people and nature. Taking measures to support ecosystem health will ultimately help the people who depend on a healthy natural ecosystem. The management decisions involved in implementing an ecological approach follow from this assumption. Rather than damming or constricting the river with levees, which would protect people and property, but harm the river, an ecological approach looks for alternative solutions to meeting both human and riparian needs. As part of this process, "soft" solutions are explored that rely on indirect measures to relax pressure on the natural systems, while providing human benefits. Instead of conventional flood control levees, for example, other alternatives would be considered: smaller levees set back further from the river, or perhaps no levees at all, and instead an insurance program to pay compensation when farms, residences, and businesses are inundated by floodwaters. Thus, the implications of ecological management extend beyond infrastructure and technologies to institutional, educational, and planning measures.

The following sections consider ecological approaches to three key challenges of river management: (1) the question of dams, whether or not to construct them under particular conditions, and what to do with the dams already in operation worldwide; (2) flood management and ways of mitigating flood risk through eco-friendly approaches; and (3) establishing water quality and flow policies to ensure sustainable water use and protect rivers for future generations.

### **The ethics of dams**

There are more than 57,000 large dams (defined as dams higher than 15m) in the world today, with more than 300 of these classified as mega dams more than 150m high.<sup>5</sup> Dams have caused huge disruptions to natural systems, but also deliver huge benefits of irrigation water, electricity, flood control, and water supplies for cities and industry. Along the way, dams have sparked high-profile controversy by displacing some 40 to 80 million people, obliterating indigenous communities and sometimes entire cultures, and squandering scarce development resources that might have been spent far more usefully in other ways.

Emotions about dams run strong on all sides. Dams are uniquely destructive and uniquely beneficial. The higher the dam, the more efficient it becomes in generating electricity, but the environmental impacts are magnified as well. Dams can be boons for democracy by sharing the resources of one region with an entire country through distributing the water and power produced. And dams can be monuments to despots who gratify their political egos with the grandiose projects which Western development banks agree to finance. Are the benefits of dams justified by their tremendous environmental, social, and economic costs? As economists like to say, “It depends!”

A great many large dams were constructed in the decades immediately following World War II, when neither environmental nor social impacts were given serious attention in the rush to stimulate economic growth. Eventually, however, the high economic costs, coupled with the obvious impacts on rivers, and the forced resettlement of angry citizens, became too much to ignore. The controversy ignited in the early 1990s by India’s mega-scheme of building dams along the Narmada river was a critical flashpoint (Iyer 2013; Choudhury 2014), and it brought pressure on global financial institutions, particularly the World Bank, to reconsider the reliance on building large dams as a central feature of economic development. With ever more examples of hugely expensive dams leaving the developing world worse off than before, something was clearly amiss, but what exactly was wrong? Was it a case of a few problem projects giving all dams a bad name, or was there something inherently flawed in dam-building as an approach?

Analyses of dam-related resettlement by social scientists such as Elizabeth Colson, Thayer Scudder, Michael Cernea, and others, and a growing body of work by environmental historians, document problems at every phase of dam projects. The process of assessing the problems that dams were intended to solve, such as urban flooding or water scarcity for agriculture or lack of electrical power, and then estimating benefits was too often based on unexamined assumptions. The very real costs to people forced to move out of the reservoir areas, or to the communities nearby who depended on the forests that would be forever altered by the construction of the dams and related roads, were conveniently excluded from the cost calculations of dams until well into the 1980s when “resettlement” started to become a recognized concern. The environmental impacts of dams, though closely linked to the human and cultural costs, took even longer to be recognized as important considerations that needed to be addressed.

The crescendo of controversy surrounding large dams led to a precipitous drop in investment in the 1990s as the financial risks from protests and armed conflict became too large to ignore by Western governments who directly or indirectly set the standards. Environmental groups allied with social justice organizations effectively blocked new dams, but as with dams themselves, the pent-up pressure from the natural flow of financial investments prompted a high-level global dialogue in the form of the World Commission on Dams (WCD). Created by an exasperated World Bank, with support from borrowing

countries and many of the same groups that were in deep dispute with the dam industry, the commission was charged with assessing the experience of large dam projects in developing countries (explicitly not including the already developed countries), and issuing recommendations about what to do. Should dam construction continue? Should there be restrictions? Should there be some new guidance? The Commission's recommendations would not have any legal power, but based on the legitimacy of the Commission itself (which was carefully staffed with a cross-section of critics and supporters) the recommendations would have to stand or fall on their perceived merits.

When the WCD issued its report in 2000, there were some surprising recommendations (WCD 2000). "Surprising" partly because the heterogeneous commission was able to agree at all, and even more surprising because of the recommendations themselves, calling for "free, prior, and informed consent" ahead of dam projects, and careful assessment of non-dam options. Dams were acknowledged to be singularly destructive, but also, under the right conditions, uniquely beneficial. Dams were given not a "green" light, but a "yellow" signal to proceed with caution, but nonetheless, to proceed.

The WCD report acknowledged that there are many sides to the issue of dams in general and any one dam in particular. The way to deal with these conflicting interests is through a thorough process of consultation and information sharing. Only with the free, prior, and informed consent of the people who would be dispossessed from their project area (and particularly if Indigenous Peoples are involved) should the dam proceed. Regardless of the potential benefits to downstream populations, the people who were being asked to move in order for the dam to be constructed should have the ultimate decision-making authority over their own fate. Cost-benefit analysis based on utilitarian principles, in other words, should not be the deciding factor. The issue of forced evictions of Indigenous Peoples from their ancestral lands thus became re-categorized from an economic question (Do the downstream benefits justify the social and economic costs?) to an issue of human and cultural rights protected by already existing UN resolutions.

From the perspective of water ethics, the WCD report was revolutionary in shifting into a new paradigm of decision-making about dams and resettlement. Instead of the utilitarian logic that served as the framework for the 45,000 large dams constructed up to that time, a new logic was now proposed. The rights of people, at least Indigenous People (the moral standing of non-Indigenous residents of prospective reservoir areas remains ambiguous in the WCD guidance), take precedence over economics. Cost-benefit analysis remains a useful tool for understanding economic trade-offs in dam projects, but economics could no longer be invoked as the deciding factor on whether the indigenous communities within the planned reservoir area should be evicted. They now had a moral right to stay put.

The WCD report, while lacking any official authority, was highly influential among the international development agencies (World Bank and regional and bilateral agencies), private banks, and the engineering firms that specialize in dam building (Moore et al. 2010). Even though many of the most active dam-

building countries (China, India, and Turkey) officially rejected the report, the WCD recommendations nonetheless served as an international standard. The rate of new dam construction, which had already been in decline, slowed even more with the publicity about dam-building's sorry history of less-than-projected benefits at far higher-than-promised costs. Yet within a few years of the report's release, investment in new dams started ticking upwards, as dam builders discovered a new way to justify them: climate change. In a global review of hydropower dam construction, Zarfl et al. (2015) documented 3,700 major dams projected to increase hydroelectricity capacity by 73 percent, while reducing the number of free-flowing rivers by 21 percent. Can an ethics perspective add some clarity to the dams debate?

### *Can dams be good?*

Dams are uniquely destructive to river ecosystems, but they are also uniquely "natural" as a category of engineered structure. Does the river flow decrease to a trickle in the dry season? Build a dam to capture the excess wet season flows. Is there an unmet demand for electricity? Install turbines in the dam to power a generator. The very simplicity of the concept of dams has spurred their popularity among political leaders eager to demonstrate national progress and among downstream beneficiaries keen for more reliable supplies of water and energy. The siting of dams, often in remote mountain ranges, has served to keep the victims, the local populations whose homes and lands would be inundated, at a convenient distance from where the decisions are made that affect their lives. And the rivers, of course, are not invited to offer their views!

India's Prime Minister Nehru famously referred to dams as "the temples of modern India" (Morrison 2010: 192) Whereas traditional temples are constructed to honor God, these modern temples are built in praise of man's ingenuity in taming nature, the original gift from God. In his 1935 dedication of the Hoover Dam, the first dam on the main stem of the Colorado River, Franklin Roosevelt, once a critic of massive infrastructure projects as a gross misuse of public funds, admitted that he had been won over. "This morning I came, I saw and I was conquered, as everyone would be who sees for the first time this great feat of mankind." Roosevelt went on to elaborate:

We know that, as an unregulated river, the Colorado added little of value to the region this dam serves. When in flood the river was a threatening torrent. In the dry months of the year it shrank to a trickling stream. ... Labor makes wealth. The use of materials makes wealth. To employ workers and materials when private employment has failed is to translate into great national possessions the energy that otherwise would be wasted. Boulder Dam is a splendid symbol of that principle. The mighty waters of the Colorado were running unused to the sea. Today we translate them into a great national possession. Today marks the official completion and dedication of Boulder Dam. This is an engineering victory of the first

order – another great achievement of American resourcefulness, American skill and determination.<sup>6</sup>

What were the values that stirred President Roosevelt to effuse about the dam he had earlier criticized? The theme of conquest is certainly at the forefront of responses; so too are social values about creating employment in the midst of the Great Depression. Harold Ickes, Roosevelt's Secretary of the Interior, declared that "no better example of understanding cooperation between man and nature can be found anywhere than this imagination-stirring project ... that ranks as one of the greatest engineering undertakings in the history of the world" and demonstrates, "the prudent use of ... our natural resources for the greatest good of the greatest number of our people."<sup>7</sup> On what basis are decisions made about the design, the siting, and the scope of dam projects? Whose values and ethics prevail?

### **Box 2.1 Cochiti Dam**

Cochiti Dam, on the main stem of the Rio Grande, 50 miles north of Albuquerque, takes its name from the Pueblo of Cochiti, which sits precariously under the dam's shadow. One of nine pueblo communities still remaining along the river, some 400 years after the Spanish conquest, the members of Cochiti Tribe have borne the brunt of a different sort of foreign conquest, the damming of their ancestral river. The US Army Corps of Engineers decided in the 1950s that a dam on the Rio Grande, inside the Pueblo's territory, would be the best location for controlling floods that might otherwise threaten downstream levees (also constructed by the Corps) and flood portions of the city of Albuquerque. Never mind that those levees were unnecessarily constricting the river, and if they had been set back further into the floodplain, the city and the river would have been able to coexist. But that solution would have taken up floodplain land that the city could use for development, if the river's floodwaters could be stored instead in a reservoir sitting on the Pueblo's land.

Constructing what at the time was the largest earth-filled dam in the world, on lands belonging to an indigenous community, for the purposes of reducing the threat of floods downstream which (we now know) were actually necessary for the ecological health of the river, met with little controversy in the 1950s and 1960s when the planning was taking place. Cochiti tribal members were themselves divided over the prospect of the dam, with recent World War II veterans convincing the more conservative tribal members that the development which would surely be sparked by the dam would bring modern conveniences and opportunities. Once the tribe conceded to the request from the Army Corps, construction of the world's largest earth-filled dam got underway, night and day, just a mile from what had, for the past 700 years, been a peaceful village. Here is the memory of one of the residents, Regis Pecos:

One of the most emotional periods in our history was watching our ancestors torn from their resting places, removed during excavation. The places of worship were dynamited, destroyed, and desecrated by the construction. The traditional homelands were destroyed. When the flood gates closed and waters filled Cochiti Lake, to see the devastation to all of the agricultural land upon which we had walked and had learned the lessons of life from our grandfathers destroyed before our eyes was like the world was coming to an end. And all we could do was watch.

(Pecos 2007)

### *The problems and opportunities of dams*

Why have dams become so controversial? Part of the reason is that so many bad dams have been built through autocratic processes that rode roughshod over the will of local people and the good sense of impartial observers. That part of the reason is relatively easy to deal with conceptually. The thornier issue about dams is deciding when they do represent a good solution to the problems at hand. What constitutes a good dam? The WCD report identified five functions of dams which we can also use to describe broad categories of potential benefits: (1) irrigation, (2) hydropower, (3) water supply, (4) flood control, and (5) additional purposes such as recreation, transportation, fisheries, etc. Weighing these diverse benefits against the social, environmental and, of course, economic costs depends not only on the economic costs of those services, but how we choose to accord value to those services.

One of the innovative contributions of the WCD report was to outline a process of “comprehensive options assessment” (WCD 2000: 221) which has two parts. One is to explore options for meeting a given demand, for example, the anticipated irrigation demand for water during the dry season. A dam is one way to store the water, but an alternative might be to store the water in natural aquifers and then pump the groundwater during the dry season. The other dimension of the options assessment is to question the need for that much water in the first place. Could farmers grow other crops that are less thirsty? Perhaps agriculture is not well suited to this particular location and should not be supported at all.

In the case of Cochiti Dam (Box 2.1), the goal of flood control benefits was part of a larger flood control strategy, which included a system of already constructed levees downstream, to protect the city of Albuquerque and allow urban development in the floodplain. The levees in turn were part of a “command-and-control” approach to channelize the river into an artificially narrow space. An alternative to building the dam might have been to modify the land use within the floodplain so that flood-waters could be accommodated, or a

hybrid alternative of building a much smaller dam upstream along with floodplain management downstream. Choosing among competing alternatives depends on the values given to the impacts, and the range of impacts of those alternatives. The large dam at Cochiti has allowed the development of the floodplain, which is considered a benefit to developers, but a harmful impact to environmentalists. Similarly, the lack of fish ladders in the dam results in severely negative impacts to endogenous fish populations (Cowley 2003), but is perceived as a benefit to developing fisheries within the reservoir, based on introduced species.

### **Box 2.2 Dams and fish in the Lower Mekong River**

Fish are a critical component of diets as well as household income along the Lower Mekong River. Freshwater fish consumption averages 80g per person per day for each of the 60 million people in the basin. The economic value of these fish is estimated at US\$2.5 billion. But the Mekong River is “under construction.” More than 120 tributary and mainstream projects are either operational, planned, or under construction throughout the basin. Within the Lower Mekong, 11 mainstream dams are proposed, which would reduce the production of fish in this part of the river by 60–70 percent (Orr 2013).

Aside from the direct impacts of the dams on river-bank agriculture, floodplain ecology, and traditional lifestyles, the indirect impacts from the lost fisheries are very substantial. Within the Lower Basin, estimates of the additional pasture land required to replace fish protein with domestic livestock ranges from 7,080 to 24,188km<sup>2</sup>. Increased food prices associated with higher costs of livestock production could impact the poor and exacerbate poverty, as would the additional stress on already scarce land and water resources. Yet the very predictions of impact on the fisheries, viewed against the near certainty that many of the proposed dams will actually be built, gives rise to the self-fulfilling prophecy that since the fisheries will be severely damaged in any case, there is little reason not to move ahead with constructing the dams (Hirsch 2010: 318).

### *Varieties of impact*

The WCD report distinguished two main categories of impacts: on the environment and on people. Both these categories include not only the direct impacts (e.g., to the river itself and to the people who were living in the reservoir area) but also indirect impacts whose cumulative effects can be far greater than the direct impacts. Like an iceberg, the magnitude of impact from what we see superficially is not immediately visible. Environmental impacts include the plants, animals, and soils adjacent to the dam and reservoir, as

well as the aquatic ecosystems upstream and down, and particularly the fish, and the downstream floodplain interactions. Human impacts start with the socio-economic dynamics throughout the project planning cycle, displacement of people from the reservoir and dam area, social and cultural impacts on Indigenous Peoples, inundation of archaeological resources, gender and social impacts (e.g., from the influx of dam workers over a multi-year period), health impacts from the dam itself, and the health and socio-economic and cultural impacts from the resettlement process (WCD 2000: 74–93).

### *Social vs. cultural ethics*

One of the innovations of the WCD report, and the consultation process that went into the report, was to give special treatment to Indigenous communities. The report recommended that in the case of Indigenous Peoples living within a proposed reservoir area, the project should go ahead only with their “free, prior, and informed consent.” In other words, if the Indigenous community refused to leave their ancestral lands, they should not be evicted; rather, the dam and reservoir should be situated somewhere else. This provision does not apply, in the logic of the WCD report, to non-Indigenous communities. The long-established principle of eminent domain applies in their case, whereby the state can evict local populations who stand in the way of development projects.

In making this special provision for Indigenous communities, the WCD report adopts a specific cultural ethic which is distinct from a social ethic. A social ethic might argue in favor of a dam that would displace local people, if the dam would provide important benefits to society as a whole. A cultural ethic, however, recognizes the rights of Indigenous cultures to exist as an inalienable right, institutionalized in the 2007 UN Declaration on the Rights of Indigenous Peoples (see Chapter 7). Since anthropological research demonstrates that removing Indigenous communities from their ancestral lands can lead to the extermination of the culture (e.g., Cernea 2003; Scudder 2006), a strongly held cultural ethic logically leads to opposition to a dam that would precipitate Indigenous resettlement. In the case of non-Indigenous communities, their cultural identity is not so specifically tied to their lands. They are not at risk of losing their cultural identity, so if they are forcibly removed, they have the capacity to regenerate their lives in a different place. The ethics of resettling non-Indigenous communities from dam-affected areas involves considerations of social, environmental, and economic justice, but not specifically cultural justice.

Even “free, informed, and prior consent” is not a guarantee that cultural justice will prevail, however. In the Cochiti Dam case described in Box 2.1, the indigenous community did give its consent, following an intensive internal deliberation about the best course of action. Yet today, in hindsight, the community regrets that choice; indeed, “regret” cannot convey the deep sense of remorse which the community continues to feel over that decision taken 50 years ago. Allowing the dam to be built and forever altering the sacred

river-*scape* of their ancestors would be firmly rejected by the community today for both environmental and cultural reasons. The assumptions about what constitutes ethical water development have shifted for both the Cochiti people and for the US government as well. The federal policy of assimilating Indian tribes, in other words, obliterating their culture in favor of blending into the US melting pot, has also changed. Cultural diversity has become a desirable feature of national society, and the sustainability of native American indigenous cultures is now a stated priority of the federal government, as well as of the tribes themselves.

*In the eye of the beholder*

The benefit side of dams depends not only on the intrinsic merits of the dam design, or the siting of the dam, but also on the way in which these direct and indirect impacts are managed. In this complicated process, there are ethical choices at every turn, starting with the very logic of building the dam in the first place. Buying into the concept of a dam as a desirable development activity depends upon buying into the larger gestalt that supports the logic of the dam and provides a basis for placing values on the multiple benefits and costs of the dam's impacts. The dam's benefits and costs, in other words, are only partly a result of what the dam "does" and mostly are a result of how we perceive what the dam does. Benefits, like beauty, are to a considerable extent, in the eyes of the beholder and depend, ultimately, on our values.

In a study of how different types of water professionals in China view dam development, researchers identified 21 biophysical, socio-economic, and geopolitical impacts of dams and then asked a diverse group of stakeholders to evaluate the importance of each impact (Tullos et al. 2010). The stakeholders were recruited from an international conference on the impact of dams, held in Yunnan, China, in July 2009. They were divided into three groups: (1) engineers and public officials, (2) representatives from environmental and civil-society NGOs, and (3) academics from a mix of disciplines. Each group was asked to ascribe values to each of the 21 impacts (e.g. water quality, social capital, etc.) representing whether it is a positive or negative impact, and an indication of its magnitude (from 1 to 4). The test group of stakeholders discussed the indicators to arrive at a common understanding of the "facts" that were being assumed for purposes of the study, for example, the number of people displaced by dams, the amount of sediment trapped by the dams, and other quantifiable information. The values each group gave to the 21 different impacts was therefore reflective of their own interpretations of the impacts, and not about the quantitative facts.

The results? As might be expected, the NGOs and the academics gave strongly negative valuations about dam impacts, while the engineers and government officials gave strongly positive valuations. Dams were seen as highly negative or highly positive, depending not on the physical impacts of the dam, but on the values accorded to those impacts. For example, all respondents

agreed on the “fact” that dams inundate features of cultural importance to local people. How bad is it to lose cultural heritage? According to the engineers and officials, the dam and the reservoir constitute a new cultural feature that can be a symbol for a new cultural identity for the local communities. According to the NGOs and academics, the local communities have lost irreplaceable heritage. Environmental accounting follows a similar dynamic. Does the dam result in the loss of valuable riparian habitat, or in the gain of a new reservoir (lake) environment?

Along with viewing dam impacts with different eyes, the three groups in this example are also viewing the dam with different minds. Presumably the engineers had less understanding about the ecological costs of blocking a river than did the NGOs or the academics. In a critique of the WCD report, Baghel and Nüsser discuss the cultural assumptions that dam builders bring to their craft.

Both advocates and opponents of large dams form coalitions in order to strengthen their position and influence in the planning and implementation phases, and to reinforce their perspective. However, the positions of these actors are derived not only from their political and economic interests, but also from the symbolic and cultural aspects of both rivers and dams.

(Baghel and Nüsser 2010: 234)

If we explore the underlying assumptions that both critics and proponents bring to the debates about large dams, we will come closer to an understanding of why they hold their positions, but we will not necessarily be any closer to a practical assessment of whether a particular dam proposal is a good idea or not. It is not “we” – as outside observers of the battles over dams – who can decide, but it is very much we – as policy analysts – who can offer a perspective to the protagonists that can help them winnow out their personal preconceptions from the elusive objectivity of assessing costs and benefits.

## **Flood control**

Floods hold a special place in the human psyche as the archetype of nature’s dominance over man, immortalized in myths from Mesopotamia to China. Even today, with modern flood management measures, floods continue to be the most frequent and damaging type of disaster, accounting for 55 percent of disaster-related deaths globally in the decade from 1985–1996, with the remainder mostly from cyclones and earthquakes (Green et al. 2000). Casualties from flooding are likely to rise in the future with climate change and the combined pressure of increasing populations and degraded lands and riparian corridors.

It is no mystery why people choose to live in or near floodplains in spite of the dangers. The many advantages of living near water outweigh the risks most of the time. Alluvial soils tend to be good for farming, while cities enjoy access to transportation routes and abundant water. In river valleys where flooding is recurrent and predictable, as in the Nile before the Aswan Dam, or along the Mekong River to the present time, the floods themselves are welcomed for their

ecological services of nourishing and refreshing the land. Societies that have evolved along floodplains incorporate floods into their cultural identity. Traditional villagers in the floodplains of Bangladesh, which constitutes the majority of the country, or along the Amazon River, view the annual floods the way Scandinavians view the annual swings of winter darkness and summer sun, as an expected and reassuring cycle that defines their relationship to the natural world and to each other.

### *The war against floods*

From the perspective of floods as natural events, the taming of floods through flood control measures introduces a separation between man and nature which helped to justify the role of early states. This lesson in statecraft was identified by Karl Wittfogel in his study of ancient “despotic” kingdoms which developed along rivers and utilized the organizational requirements of water control to legitimize control over their subjects (Wittfogel 1957). Ancient rulers, however, viewed their control over rivers as an alliance with the river deities, as mentioned previously. The metaphor of war between people and the hostile forces of nature is a later development that required a new religion, Christianity, coupled with post-Enlightenment rational materialism. In the war against nature, engineers serve as generals. This is more than a metaphor. In the United States, the government agency charged with the task of flood control is a branch of the military, the Army Corps of Engineers. These engineers implement their responsibility through a mix of offensive and defensive measures. Offensively, the Corps leads the charge with pre-emptive attacks to weaken the capacity of rivers to flood, through dams and channel straightening (“rectification”), and defensive levees to contain the inevitable floodwaters and prevent harm to people or property.

The US Army Corps of Engineers (USACE) is run by generals, who, like generals in other branches of the army, are concerned not only with fighting battles, but in developing strategies for conducting, and winning, the larger war. The Corps traces its history to a “corps” of engineers hired by General George Washington to construct forts during the War of Independence and formally established in 1802 as the Army Corps of Engineers. After building forts in New Orleans during the War of 1812 to protect the city from the British, the Corps took on the added role of building levees to protect the city from another enemy, the Mississippi River. This was the start of river works, mostly focused on dredging and canal building for transportation, as a major part of the Corps’ work during the 19th century. The formal mandate to keep the nation safe from floods came with the Flood Control Act of 1936, which delegated river flood control to the Army Corps, while the Department of Agriculture was charged with building preventative works in upstream watersheds.

### *From “control” to “management”*

If you utter the term “flood control” in a meeting with USACE technical staff, you are likely to be corrected. The preferred term is “flood risk management,”

whose objectives are not necessarily to do away with floods, but rather to reduce the risk of flood damage. There is a long history behind this change in terminology, but the short version is that “flood control” doesn’t work. River channels can be controlled with dams, levees, dredging, and channel straightening, much as ropes and chains can control an unruly prisoner. But just as physical abuse to prisoners can produce hardened criminals who lash out at the first opportunity, rivers that are “tamed” have a way of unleashing even more ferocious floods when nature provides an opportunity.

The Oder River between Germany and Poland became a poster child of the futility of flood control with the flood of 1997, exactly 50 years after the “once-in-a-century” flood of 1947 (Blackbourn 2006: 352). Exceptionally heavy rain at the beginning of July in the Czech and Polish catchment areas of the Oder River was exacerbated by deforestation which sped the runoff. The highly regulated (straightened and walled) stream systems sped the passage of water down to the main river, pushing more water into a river whose channel had been narrowed by flood control levees. Partly because of this massive network of flood control levees, when the water broke through, it had catastrophic consequences. Some 1,200 towns and villages were inundated, and scores of lives were lost. Greater destruction of downstream cities was inadvertently spared by the levees breaching further upstream and providing relief for the raging floodwaters. A direct result of the flood was the decision to create 1,500 acres of wetlands along the river to serve as a future flood-retention basin.

A similar lesson was learned, or at least experienced, with the 2011 floods along the Missouri River in the United States. Fueled by record snowpack in the upper watershed of the Rocky Mountains, along with near record spring rains in the Midwestern states, the river could no longer be contained into the artificial straitjacket created by years of flood control projects. Again, this was a case of heavy summer rains in the upper and middle catchment swelling a river that had been disconnected from its floodplain by levees. Faced with a choice between sacrificing farmland or downstream cities, the US Army Corps took the decision to blow up the levees and send the floodwaters into 130,000 acres (59,000ha) of farmland.<sup>8</sup>

The extreme precipitation events that resulted in the Oder and the Missouri floods were reminders of what flood managers have always known, but seldom talk about: flood control is a temporary strategy awaiting the next record flood that will overwhelm the defenses. Lowering the public’s expectations to that of “managing” rather than “controlling” floods provides a signal to the cities, towns, and farmers along the way that floods can and do happen. More importantly, it sets the stage for a different kind of strategy which looks for opportunities for buffering the impact of floods. Some of those buffers will be natural, like wetlands which can store extra water without being damaged (since they’re already wet), and natural meanders that can slow down the water, and upland forests and farms that can retain some of the water that would otherwise rush to the already swollen streams below.

The concept of managing floods also presumes an understanding that floods have beneficial attributes as well as destructive ones, and it is worth looking for opportunities to create artificial floods to replace the lost ecological functions imposed by dams. The Manantali dam on the Senegal River, for example, drastically altered not only the downstream ecology but also the farming economy which relied on the annual floods to irrigate fields in the floodplain and provide moisture for an entire growing season. Constructed in the 1980s primarily for hydropower, efforts were made in the 1990s to adjust dam releases to provide artificial floods for downstream flood-recession agriculture, while still meeting hydropower needs. While economic analysis demonstrated a win-win opportunity, politics intervened to the detriment of agricultural interests (Scudder 2006: 311). The Glen Canyon dam on the Colorado River upstream of the Grand Canyon has experimented with periodic floods released to enhance the health of the river channel. Flushing the banks of the channel is needed for vegetation and fish habitat and to deposit silt and sand along the way.

Decentralized water storage through wetlands or agriculture can reduce the need for dams. In Japan, one of the most important ecosystem services of paddy rice agriculture is considered to be the water retention capacity of the paddies themselves. Like filling an ice cube tray by holding the tray at an angle and letting the tap water run into the spaces, rice paddies can capture the initial rainfall from sudden downpours and provide a buffer against flooding. As the captured water infiltrates into the soil, the groundwater table is replenished, and while there is standing water in the paddies, there are opportunities for raising fish and ducks (Groenfeldt 2006). The rice paddies are providing the same kind of ecosystem services that wetlands would otherwise offer.

Releasing artificial floods from dams to restore lost ecological functions or using rice paddies as surrogate wetlands are examples of “environment as infrastructure” (Smith and Barchiesi 2009). By going beyond the black-and-white concepts of floods as bad and flood control as good, the door is open for a new paradigm based on a mix of structural and non-structural measures. The new paradigm of working with nature to manage floods is, of course, not entirely new. In his 1954 book *The Flood Control Controversy*, Luna Leopold advocated a two-part strategy for working with nature in flood control (Leopold and Maddock 1954). In the upper watershed, land management aimed at trapping water with vegetation on hill slopes, plus very small dams to catch rainfall-induced rivulets, to help the soil fill its potential as a sponge. In the lower, flatter reaches of the river, a combination of planning and infrastructure are needed. Leopold cites the case of the Miami Conservancy District in Ohio, where farmland was designated as a flood overflow area, with houses and farm structures designed to survive periodic inundation.

The Dutch have been implementing a similar strategy in their “Room for Rivers” program. As global experts in constructing dykes and levees to keep both sea and river waters off their reclaimed lands, the Dutch historical

approach was based on controlling the water. This has been a good strategy for sea water, which would destroy the agricultural potential of farmland, but the Dutch have decided that it no longer makes sense to try to control river floodwaters in the same way. Farmland flooded by rivers creates only a temporary inconvenience; once the waters recede, the land can be put back into production. Wetland areas formed by periodic flooding provide wildlife habitat and serve to recharge groundwater aquifers. There is no real need to keep fresh water off the land, nor is there any guarantee of being successful in doing so, especially given the bigger floods anticipated with future more erratic climatic conditions. A smarter strategy is to create enough room for rivers and their floodplains so that floodwaters can be accommodated temporarily, without causing undue damage to roads, bridges, houses, and other high value infrastructure. Levees are used not to control the river, but to manage small floods within the levees while allowing larger floods to overtop the levees and flow into wetlands, or fields that can serve as temporary wetlands until the floodwaters subside (de Groot and de Groot 2009).

At an international level, and especially in Europe, the new paradigm of flood management which the Room for Rivers program reflects, has already become the new convention. The European Floods Directive<sup>9</sup> and the Associated Programme on Flood Management<sup>10</sup> (a joint program of the Global Water Partnership and the World Meteorological Organization) have endorsed the concept of living with floods and making room for rivers using the framework of “integrated flood management.” Within the United States, there are competing views about whether to design flood management infrastructure for 100-year floods or 500-year floods, but no one, not even the Army Corps, is arguing for a return to command-and-control approaches. The Association of State Floodplain Managers (ASFPM), a professional association, has called for re-imagining floods as both inevitable, and, except for the case of severe floods, as having many welcome environmental benefits (ASFPM 2008). In urban settings where high value infrastructure has been built in or adjacent to floodplains, levees are a practical necessity, but they should not be used to encourage new development in floodplains (ASFPM 2008).

While the concept of “room for rivers” has broad acceptance, deciding exactly how much room the river should get is still controversial. The current standard of building levees to withstand a 100-year flood, used by the Army Corps of Engineers, serves as encouragement to develop floodplains which are better left in a natural state. Eventually (and usually considerably before 100 years has elapsed), a flood will exceed the 100-year mark, resulting in a bigger catastrophe than if no levees had been built at all. Levees capable of holding back a 500-year flood may sound expensive, but they do not need to be very large if they are set far enough back. The aim is not to build big levees, but rather to build smarter to allow the river to handle larger volumes of water. Under the Room for Rivers program, the Dutch plan to steadily increase the capacity of the Rhine River to hold water (without flooding) from 15,000m<sup>3</sup> to

16,000m<sup>3</sup> by 2015, and to 18,000m<sup>3</sup> by 2050. This is being done through buying and converting agricultural land to provide room for the project.

In the United States there is usually a lot more land available that can be converted into room for rivers, and the approach is gaining some traction in both rural and urban settings. Following disastrous floods in 1993, Iowa farmers within the Mississippi floodplain were interested in a different solution to the cycle of floods and recovery. They opted to sell their lands under a federal program to convert floodplain fields into a wildlife preserve.<sup>11</sup> In California's Napa River Valley, which is famous for vineyards but also is increasingly urbanized, local residents rejected a series of proposed levee projects which the US Army Corps of Engineers designed to protect against flooding. Instead, the communities endorsed the concept of a living river which would not require huge and costly levees for flood management. Existing levees have been lowered, some bridges were relocated, and 900 acres of new wetlands created so floodwaters have a place to go.<sup>12</sup>

### *Ethics in flood management*

The paradigm of integrated flood management, or integrated flood risk management, is characterized by the integration of structural and non-structural measures, considering the whole basin (rather than a piecemeal approach) and recognizing the ecological benefits of floods (Driessen et al. 2016). Floods are no longer seen as something to avoid at all costs, but rather something to prepare for and manage. Instead of a false sense of security, flood managers offer a plan for minimizing, but not eliminating, damage.

Integrated Flood Management recognizes the need to manage all floods and not just those floods up to some design standard of protection. Flood plans must consider what will happen when a flood more extreme than the design standard flood occurs, and must foresee how such a flood will be managed. Plans must clearly identify areas to be sacrificed for flood storage in order to protect critical areas in an extreme flood event.

(World Meteorological Organization 2009: 15)

Recognizing flood risk management as involving policy choices also reveals those choices to be connected to values and ethics. Doorn (2018) identifies three main sets of ethical issues in flood risk management: (1) the distribution of risks and particularly the risks borne by poor and vulnerable populations who have fewer options for recovery than do the wealthier groups; (2) value conflicts and whose values are protected. Here the tendency is to over-value economic impacts (because they can be quantified) over cultural or environmental values; and (3) Distribution of responsibilities between public sector (governmental agencies that build levees and enforce zoning within the floodplain), private sector (e.g., insurance companies), and individual stakeholders who have a responsibility to become engaged in the process of setting flood risk management strategies.

**Box 2.3 Flood “control” along the Rio Grande, New Mexico**

With such sophisticated understandings of the limits to engineered flood control and the ecological benefits of floods, one might assume that old-style flood control projects are a thing of the past. But old-style approaches are not so easily reformed. Take the example of a levee construction project along the Rio Grande in central New Mexico. In the 1950s the Army Corps of Engineers “rectified” the meandering, braided river channel and helped local communities and the City of Albuquerque construct flood control levees. A few years later the Corps of Engineers built the massive Cochiti Dam (see discussion about dams in this chapter) for flood and sediment control, further impinging on the river’s ecological health and further reducing the chance of dangerous floods. However, in the wake of Hurricane Katrina in 2004, new design standards for levees were adopted by the Federal Emergency Management Agency (FEMA). Residents along the Rio Grande learned that they would no longer be eligible for flood insurance until the levees were strengthened.

Faced with the possibility of a drop in land value resulting from outdated levees, local communities successfully appealed to the Corps of Engineers for help. In 2012, federal funds were allocated to the Corps of Engineers to improve existing levees and construct some new levees along the Rio Grande near the town of Socorro, New Mexico. The use of the funds, while approved in 2012, needs to comply (for legal and political reasons) with the federal Flood Control Act of 1948. As the title implies, the focus of the 1948 Act is to control floods, not to “manage” them, much less to worry about the health of the river ecosystem. The levee improvement project implemented in the second decade of the 21st century will reflect the flood control paradigm of the first half the 20th century.

Part of the economic justification of the project is to protect the existing levees (by enlarging and strengthening them) even though, from an environmental perspective, some of them should not be there in the first place. Another critical part of the economic justification for the Rio Grande Levee project is to safeguard the Bosque del Apache National Wildlife Refuge (a wetland in the river’s flood-plain) from inundation by floodwaters. Protecting a riparian wetland from floods, when wetlands depend on floods for their ecological functions, can make sense within the logic of the old flood control paradigm.

When the US Army Corps of Engineers justifies flood control infrastructure on the basis of protecting levees that were built too close to the river channel and a wetland that is located in the middle of the floodplain (see Box 2.3), then one wonders if anything is really changing. Fortunately, there are many more

examples of significantly new approaches to managing floods, from “room for rivers” to integrated flood and risk management. The Rio Grande Levee project is an anachronism that would not have even raised eyebrows a few decades ago. The standards really are changing. But are the ethics changing as well? Or are the new standards of flood management merely a more sophisticated expression of the old ethic of controlling nature?

My sense is that the ethics of flood management are in a state of flux, much like the state of the art of flood management itself. The lesson of “don’t mess with Mother Nature” is a significant advance over the old paradigm of conquest which ruled during most of the 20th century. As the Rio Grande levee project demonstrates, the old paradigm is not yet dead, but it is dying. Much as I would like to claim that the evolution of ethics can be the cutting edge of change, the recent history of evolving best practice in flood management suggests to me that progress has been made through hard-won practical experience with what works and doesn’t work in managing floods. Changes in water ethics are, perhaps, evolving in a similar way, as experience is gained in the practical effects of competing principles.

## **River ethics**

While dams and levees represent deliberate modifications of rivers to benefit society, the other side of river management involves protecting rivers from the unintended consequences of that same society. Dams hold water for later use, but what happens to the river downstream? Is there adequate flow for the river to function effectively? Are the needs of downstream water users, both human and non-human, being accommodated? The downstream impacts of dams are relatively easy to assess, however, because everyone can see that the dam is there and that it will have a major impact. The more common and far more complicated impacts come from the myriad of direct and indirect uses of the river as it flows along: diversions for agriculture, industry, and city water supplies, and the pollution streams flowing back to the river through pipes (point-source pollution) or seeping in through groundwater or surface runoff (non-point source pollution).

The ethics of diverting water from the river for a particular use fall under the category of “water use ethics.” This topic, to be discussed in the next chapter, concerns the fair allocation of water across competing demands, and the responsible use of that water. The ethics of river protection, to be discussed here, is concerned with how much water to leave in the river, and how much effort to invest in ensuring the water is clean (and the definition of “clean”). These issues are difficult in the best of times, but are becoming even more challenging with the added stress of climate change. Our discussion will be broken down into the following topics: (1) environmental flow (how much water to leave for the river), (2) cultural flows (water is for people and not only for rivers), (3) water quality (what kind of water do we want in our river?), and (4) climate change (what should we do when there is just not enough water to go around?).

### **1. Environmental flow**

A fundamental feature of ecological water management, in contrast to “command-and-control” approaches, is a commitment to a living river, with at least a minimally adequate environmental flow (Postel and Richter 2003; Poff and Matthews 2013). An environmental flow is the natural water regime of a river, wetland, or coastal zone which maintains the ecosystem. A minimum environmental flow is the smallest amount of water required at any given time to allow the ecosystem to function (Petts 2009). But why bother keeping the ecosystem functioning? There are two very different answers that are commonly confused. One reason is that it’s the economically sensible thing to do; a living river provides valuable ecosystem services: “Environmental flows provide critical contributions to both river health and ultimately to economic development, ensuring the continued availability of the many benefits that healthy river and groundwater systems bring to society” (Dyson et al. 2003). The other reason is that it’s the right thing to do. Rivers have intrinsic rights to exist, and we have an intrinsic responsibility to respect those rights (Boyd 2017). The “rights of rivers” ethic is also relevant to dams, levees, and pollution standards, of course, but it is most naturally invoked around the issue of environmental flow. Without at least a minimum flow, the river ceases to exist, until flow is restored. A polluted river is a sick river, but a dry river is a dead river!

Since the 1990s, the concept of environmental flows has been gradually incorporated into water laws from Europe to South Africa to Australia. The South African National Water Act, adopted in 1998, granted water resources the status of public goods, under state control; the national government is the custodian of the water resources, and its powers are exercised as a public trust. It has the responsibility for the equitable allocation and usage of water and the transfer of water between catchments. The Act established a reserve consisting of an unallocated portion of water that is not subject to competition with other water uses. It refers to both quality and quantity of water and has two segments: the basic human need reserve and the ecological reserve. The former refers to the amount of water needed for drinking, cooking, and personal hygiene, and the latter refers to the amount of water required to protect the aquatic ecosystem.

In Europe, the Water Framework Directive, enacted in 2001, required that European rivers and groundwater attain “good ecological status.” The Directive does not require any particular flow levels, but instead defines ecological status in terms of biological communities, water quality, and channel morphology. In order to meet healthy standards, rivers need a certain flow quantity and flow regime. The details are different for each river, hence the practical wisdom in setting outcome indicators of ecological status, rather than stipulating the flow inputs (Acreman and Ferguson 2010). Australia initiated environmental flow policies during the 1990s when new water laws were enacted both nationally and at the state level mandating water resource planning and environmental flows. The water resource plans set caps on total water abstractions, regulated

the annual allocation of water, and established water markets. New institutional arrangements were developed to hold and manage environmental water allocations, including programs to buy back water entitlements from water users and return the water to the environment (Le Quesne et al. 2010: 47–8).

Does it make a difference whether environmental flows are protected for reasons of economics or ethics? Will the outcome be the same either way? When IUCN released its landmark report, *Flow*, in 2003 (Dyson et al. 2003), the rationale for environmental flows was couched almost exclusively in economic terms:

Rivers and other aquatic ecosystems need water and other inputs like debris and sediment to stay healthy and provide benefits to people. Environmental flows are a critical contributor to the health of these ecosystems. Depriving a river or a groundwater system of these flows not only damages the entire aquatic ecosystem, it also threatens the people and communities who depend on it.

(Dyson et al. 2003: 3)

But though a river's flow has “intrinsic value to people” (Dyson et al. 2003: 3) no explicit appeal is made to an environmental ethic, much less to rights of nature.

The concept of environmental flow took on a formal guise in a Declaration endorsed by participants at the 2007 Brisbane River Symposium (Box 2.4). This was the first consensus document on what the term should convey, and marks a turning point for elevating environmental flow to the status of a global standard that has become generally accepted (Arthington et al. 2018). Though the concept is incorporated into actual policies, and has contributed to many river restoration efforts, the ecological health of rivers on a global scale continues to decline. A ten-year review of the Declaration at the 2017 Brisbane River Symposium resulted in reaffirming the original principles, and adding new statements about the importance of cultural heritage and “local knowledge and customary water management practices [which] can strengthen environmental flow planning, implementation, and sustainable outcomes” (Arthington et al. 2018: 11).

#### **Box 2.4 The 2007 Brisbane Declaration on Environmental Flows<sup>13</sup>**

*Freshwater ecosystems are the foundation of our social, cultural, and economic well-being.*

Healthy freshwater ecosystems – rivers, lakes, floodplains, wetlands, and estuaries – provide clean water, food, fiber, energy and many other benefits that support economies and livelihoods around the world. They are essential to human health and well-being.

Freshwater ecosystems are seriously impaired and continue to degrade at alarming rates.

*Aquatic species are declining more rapidly than terrestrial and marine species.* As freshwater ecosystems degrade, human communities lose important social, cultural, and economic benefits; estuaries lose productivity; invasive plants and animals flourish; and the natural resilience of rivers, lakes, wetlands, and estuaries weakens. The severe cumulative impact is global in scope.

*Water flowing to the sea is not wasted.* Fresh water that flows into the ocean nourishes estuaries, which provide abundant food supplies, buffer infrastructure against storms and tidal surges, and dilute and evacuate pollutants.

*Flow alteration imperils freshwater and estuarine ecosystems.* These ecosystems have evolved with, and depend upon, naturally variable flows of high-quality fresh water. Greater attention to environmental flow needs must be exercised when attempting to manage floods; supply water to cities, farms, and industries; generate power; and facilitate navigation, recreation, and drainage.

*Environmental flow management provides the water flows needed to sustain freshwater and estuarine ecosystems in coexistence with agriculture, industry, and cities.* The goal of environmental flow management is to restore and maintain the socially valued benefits of healthy, resilient freshwater ecosystems through participatory decision making informed by sound science. Ground-water and floodplain management are integral to environmental flow management.

*Climate change intensifies the urgency.* Sound environmental flow management hedges against potentially serious and irreversible damage to freshwater ecosystems from climate change impacts by maintaining and enhancing ecosystem resiliency.

## 2. *Cultural flows*

If water that benefits the ecological health of the river is called “environmental flow” then the water that is needed for ceremonies or for enabling the growth of medicinal plants, or connected in some way to culture, can be called “cultural flows.” It’s helpful to make the distinction of cultural use vs. environmental use even while recognizing that the same water can serve both purposes. The concept of cultural flow was developed in Australia and has been defined in the context of Indigenous understandings of water ecosystems. “The river is part of who we are. It is about respecting that traditional knowledge, to bring it into the twenty-first century, and to put it as two words: Cultural Flows” (Cheryl Buchanan, Kooma (Gwama) Nation, quoted in the National Cultural Flows Research Project website).<sup>14</sup> That website also refers to the Echuca Declaration of 2010, where representative from 31 Indigenous nations in Australia endorsed the following definition:

Cultural Flows are ‘water entitlements that are legally and beneficially owned by Indigenous Nations of a sufficient and adequate quantity and quality, to improve the spiritual, cultural, environmental, social and economic conditions of those Indigenous Nations’. This is our inherent right.

Cultural values can also be considered within the concept of environmental flow without resorting to a separate category of “cultural flow” (Finn and Jackson 2011). Both strategies can be used compatibly, as they accomplish different tasks. The trend within the e-flow literature to pay more attention to cultural values focuses on the informational needs for establishing e-flow recommendations for a particular location. For such practical purposes, the “what” is more important than the “why.” The revised Brisbane Declaration of 2018 cites “the intangible spiritual attachments between people, rivers and wetlands” which need to be factored into setting an e-flow standard. In this context, “cultural flow” can refer to that portion of the e-flow setting which accommodates the flow needed to support a particular cultural practice that depends on certain flows, for example, to attract wildlife into the riparian forest, or to induce a certain species of fish to enter a floodplain pool. Adjusting the flow (volume and timing) of regulated rivers can often support locally important cultural practices. But when it comes to representing Indigenous cultural values about protecting the integrity of the sacred river, or whether the dams on the Elwha River in Oregon (cited previously) should be removed to allow salmon to return, the cultural flow is about the very existence of the cultural group that has co-evolved with the river, and with the salmon.

The meaning of the term “cultural flows” continues to evolve (Taylor et al. 2016). A Google search will provide multiple pages of links to Australia and (less often) New Zealand before any other regions of the world appear. A study incorporating cultural values about the Ganges River into e-flow recommendations may be unique in using the term “cultural flow” outside Australia and New Zealand (Lokgariwar et al. 2014). This does not mean that other regions are ignoring cultural values about water (though they often are), but rather that they are addressing cultural flows through the language of cultural values. The role of cultural values in water might be more readily noticed if both researchers and practitioners adopted the term, cultural flows, and explored its potential meanings not only in the context of Indigenous cultures, but in mainstream Western cultures as well. Cultural flow as a term might help us integrate both diverse cultural values of water (recreation, psychological wellbeing, aesthetic enjoyment, cultural heritage) and all-round *buen vivir* into water planning.

### 3. Water quality and pollution standards

Water pollution is defined as contamination, and it is patently undesirable. It is variously considered to constitute an economic cost (and often an external cost

not factored into production functions), a human health issue, an environmental concern, and an ethical issue. It can be serious, if the pollution interferes with intended uses, benefits, or services, or the pollution might be inconsequential, not interfering with water management or use. Pollution of water bodies is normally thought of as pollution of the water itself, but pollution from trash is also an important issue which can cause direct contamination of water, or indirect contamination by obstructing normal flows and creating stagnant pools conducive to biochemical actions and the breeding of organisms (and especially mosquitos) which give rise to the spread of disease.

Ethical issues arise with the framing of pollution safeguards. What is it that we are trying to protect, and what methods will we favor in that process? For example, if human health is our concern, but not (at least not directly) the ecological health of the water body, we might opt for treating wastewater the way it is done in my home town of Santa Fe, New Mexico. All household gray and black water is delivered, by gravity, to a single large wastewater treatment plant located far downstream from the city, and the treated effluent is then disposed into the riverbed where it is further cleaned by natural biological action as it makes its way downstream. It is a sanitary solution, but it deprives the upstream reaches of the river of the wastewater which, in this semi-arid climate, is much needed for environmental flow. A concern for the overall health of the river would argue for a different approach of smaller neighborhood wastewater treatment plants along the course of the river through the city, so that the treated effluent from each plant could recharge the thirsty river as it goes along.

Perhaps the most obvious ethical question relating to water pollution is the setting of water quality standards. How clean should the water be (and who decides)? Which pollutants will be monitored, and how will risks be assessed in the many instances where scientific studies have not been completed or show uncertain impacts to people and/or other species? Under what circumstances should we invoke the precautionary principle? How should we weigh the competing costs and benefits of economics vs. human health vs. environmental impacts in the case of fracking or oil drilling or Concentrated Animal Feeding Operations (CAFOs) which are almost certain to have significant water impacts?

Most pointedly, and a question that will undoubtedly grow in importance in the near future, do people have a right to clean water bodies and aquifers? Fifty years ago, in testimony before President Kennedy's Scientific Advisory Committee, Rachel Carson urged their consideration of

a much neglected problem, that of the right of the citizen to be secure in his own home against the intrusion of poisons applied by other persons. I speak not as a lawyer but as a biologist and as a human being, but I strongly feel that this is or ought to be one of the basic human rights.

(cited in Boyd 2012: 4)

Since then there has been a global movement to recognize the human right to a healthy environment either in national constitutions (92 countries) or some other law or international agreement (an additional 85 countries). However, some 13 countries still lack formal recognition of this right, including the United States, Canada, Australia, China, and Japan (Boyd 2012).

Laws are an important expression of ethical norms, but do not in themselves ensure law-abiding behavior. Compliance with the laws depends on monitoring and enforcement, and these measures in turn depend on the ethics reflected in the laws being broadly shared and strongly felt. Without these enabling conditions, laws regulating water pollution will be too easily circumvented to have any practical impact. The significance of Rachel Carson's work, and in particular her 1962 book on water pollution, *Silent Spring*, was in raising public awareness and thereby shifting the ethical norms about tolerating pollution. The US Congress passed the Clean Water Act ten years later, partly as a consequence of Carson's awareness-raising. This Act has become the official representation of water ethics, establishing a new level of debate about specific situations. Questions about whether a particular chemical should be regulated and at what standard could proceed on the premise that regulation of water contaminants, and sanctions against polluters is a legitimate and necessary function.

When companies, cities, or individuals violate water quality standards, what kinds of penalties should be exacted? How much effort should go into enforcement and who should perform that function: government agencies, industry self-policing, a citizen's watershed group, or some other arrangement? Is the principle of "polluter pays" an acceptable approach? On what basis should the fines and penalties be established (e.g., full cost of clean-up or a token fine to encourage voluntary compliance)? The answers to these and other questions will depend upon the relative priorities – the ethics – attached to social justice (ensure people's health is not put at risk), economic efficiency and fairness (hold polluters accountable) and ecosystem functions (keep fish and wildlife healthy).

#### *4. Adapting to climate change*

Climate change brings greater urgency to the ethical challenge of making the right choices about water. When there's not enough water to meet the diverse demands, and when water ecosystems are undergoing more and growing stress (from overall increased demands, more dams and levees, more pollution, and extreme swings of droughts and floods), how should we respond? And do we need to simply adapt to these unfortunate conditions, or can our decisions about water also help with mitigating climate change? The prevailing view is that we should focus on adaptation where we clearly have a lot to worry about. In the words of Frank Rijsberman, "While reducing greenhouse gas emissions is all about energy, adapting to climate change will be all about water" (Rijsberman 2008). No argument about that, but there are some important connections between energy policies and water ethics on such issues

as large dams (climate change savior or river assassin?) and water contamination from energy extraction.

Climate change has become the latest justification for continuing the command-and-control engineering paradigm: Water security through more dams to store more water, more pipelines to cross basin boundaries, and more pumping to tap ever deeper sources of groundwater (Perry and Praskiewicz 2017). From the perspective of an ecosystem management paradigm, however, the need to accommodate the bigger floods and longer droughts associated with climate change (and in some regions generally drier conditions) places an even greater importance on healthy water ecosystems that can literally “weather” these changes (Seavy et al. 2009). This is precisely not the time to inflict greater damage to natural processes. Instead we should be focusing on river and aquifer restoration, water recycling and reuse, and water conservation. When we see a need for infrastructure, we should look first to “nature’s own infrastructure” (Smith and Barchiesi 2009; UN Water 2018). If we can keep nature functioning, we can survive the tribulations of climate change and prevent further damage to the rivers, lakes, and aquifers on which our still growing population will depend.

The dilemma of finding consensus around the best response to climate change stems from the fundamental incompatibility between the conventional and ecological water management paradigms. Proponents of an ecological approach have science, at least ecological science, on their side. There is a clear trend within the scientific community in favor of ecological solutions which lend themselves to unanticipated synergies, rather than conventional responses which often result in costly collateral damage. But there are political and emotional forces pushing in the opposite direction. Faced with popular pressure from anxious constituents to “do something” about anticipated water scarcity, and added pressure from engineering firms and land developers, the water response to climate change is in danger of abandoning many of the lessons of ecological management.

A report by the Washington-based National Resources Defense Council, titled *Pipedreams*, concludes that many of the water infrastructure projects being considered in the western United States will actually exasperate long-term water scarcity (Fort and Nelson 2012). Rivers that no longer reach the sea, as is already the case of the two largest rivers in the American Southwest, the Colorado and the Rio Grande, have no more water to impound with new dams and pipelines. Rather than focusing on increasing water supplies through new pipelines, or even decreasing demand through new conservation measures, the evolving water crisis needs a broader assemblage of solutions that incorporate values as well as behavior, and institutions as well as infrastructure.

A sustainable ‘water world’ must reflect social and political dynamics, aspirations, beliefs, values and their impact on our own behavior, along with physical, chemical and biological components of the global water system at a range of spatial and temporal scales.

(Bogardi et al. 2012)

## Conclusions

The water ethics we choose, or tacitly accept by default, establish the underlying principles for addressing the challenges of river management. Intervening with natural rivers is inherently harmful to rivers but necessary for people. We are going to have an impact, regardless of our ethics, but what kinds of impacts will they be? What are the alternatives? How can we, and indeed, how should we, sift through the options to arrive at our policy choices? There are two basic types of inputs needed for sound decisions about river management alternatives. The first type of input is objective data about water supply resources, projected demands, and alternative scenarios. For example, if we construct a dam at this location, we can predict certain impacts on fish populations. The second type of input needed for decision-making is subjective: What priority do we place on one alternative or another? How important are fish vs. electricity? Are the fish so important that we should look for another source of power other than the hydroelectric dam? Is resettlement of the communities within the proposed reservoir area simply an economic issue, or are there moral issues of cultural rights and social justice? Are those issues irreconcilable with the dam, or can we see the possibility of a negotiated outcome acceptable to all parties and to our own standards of fairness?

We have a multitude of tools to help us identify alternatives and assess the trade-offs. Ecological science and hydrology can define the conditions that we can expect from a particular flow regime and water quality standards. Engineering studies can show how particular designs for dams and levees will affect the riparian dynamics. Economic analysis can reveal how the material costs and benefits, when combined with social and cultural analysis, can provide a solid picture of the likely impacts of alternative water management strategies.

But who can advise us about prioritizing the alternatives? How should we decide whether fish populations are more or less important than hydropower production, or whether local communities should be forcibly evicted from the proposed reservoir area? On what basis should these decisions be made? The conventional answer in water development has been economic analysis based on comparing costs and benefits. The concept of ecosystem services, and social and cultural capital has helped refine and improve economic analysis by reducing all the values, whether social, cultural, or environmental, to economic values. If the fish have a higher economic value than electricity, then don't build the dam, or else construct a very effective fish ladder, not to protect the fish per se, but to protect the value of the fish. The main problem with economic valuations, however, is that non-economic values cannot be adequately captured in monetary terms. This is the problem of incommensurability; money cannot replace the loss of your ancestral homelands, as the community of Cochiti learned after Cochiti Dam was constructed (see Box 2.1). Analyzing the ethics does not supplant the need for good economic analysis, but neither does economic analysis supplant the need for ethics analysis. Ethics is all about asking "why?" in the decision-making process. Economics often assumes an answer (for profit!) but is not designed to explore the question.

The reason for analyzing ethics by sub-category (e.g., economic, environmental, social, and cultural ethics) is that new, interesting, and practical answers will emerge. Why should we restore meanders to the Kissimmee River in Florida, that was straightened, at great cost, a few decades ago? The initial answer was economic and environmental (the ecosystem services of the meandering river were not seriously considered, but became obvious as the river's health declined), but social and cultural ethics also came into view as the issue was studied further. A rural way of life, with an emphasis on fishing and hunting, is being restored along with the river (McCool 2012: 40–42).

While ethics analysis offers a way of understanding the nuanced motivations behind water policies, ethics can also serve as guideposts to inform policies. This is the distinction between descriptive ethics (objectively describing the ethics that exist) and prescriptive ethics (subjectively proposing what the ethics ought to be). The two roles become easily mixed, since an uncovering of the tacit values operating in, say, a levee construction project will almost certainly expose gaps between what the project is actually doing (e.g., disconnecting ecologically valuable wetlands from the river) vs. the stated goals of the project (e.g., safeguarding the city from flood devastation). Water ethicists can take a cue from the role of investigative journalists, who uncover twisted motives, but are expected to produce an objective report. Simply by exposing ethical inconsistencies (e.g., between economic and environmental values), the water ethicist can provide a valuable service.

### Discussion questions

- Find an example of a large dam that you consider to be “good” and contrast that with another large dam that you consider “bad.” What is the basis for your judgement?
- Under what circumstances would you consider it ethical to use force to resettle communities from within a proposed reservoir area (in anticipation of dam construction)?
- What rights should rivers have? How might those rights be enforced?

### Notes

- 1 See Scarborough 2003 and Mithen 2012 on the role of water engineering in ancient civilizations.
- 2 For details of the history of the Dujiangyan irrigation system, see the UNESCO World Heritage website at <http://whc.unesco.org/en/list/1001>.
- 3 For a global overview of cultural perceptions of swamps, see the book *Swamp: Nature and Culture* (Wilson 2017).
- 4 The Convention on Biodiversity (CBD) is headquartered in Montreal and undertakes programs, monitors progress and responds to emerging priorities. See the CBD website for details: <https://www.cbd.int>. For a critical review of the CBD, see Klein 2016.

- 5 Reference: International Rivers, <https://www.internationalrivers.org/questions-and-answers-about-large-dams>.
- 6 Taken from the transcript of Roosevelt's Dedication speech at Hoover Dam, September 20, 1935, <http://xroads.virginia.edu/~ma98/haven/hoover/fdr.html>.
- 7 Transcribed from the audio: [www.history.com/topics/hoover-dam/speeches#secretary-of-the-interior-ickes-dedicates-hoover-dam](http://www.history.com/topics/hoover-dam/speeches#secretary-of-the-interior-ickes-dedicates-hoover-dam).
- 8 For details, see Wikipedia: [http://en.wikipedia.org/wiki/2011\\_Missouri\\_River\\_floods](http://en.wikipedia.org/wiki/2011_Missouri_River_floods).
- 9 For details about the EU Floods Directive, see the website of the European Commission, [http://ec.europa.eu/environment/water/flood\\_risk/index.htm](http://ec.europa.eu/environment/water/flood_risk/index.htm).
- 10 See the website for the Associated Programme on Flood Management, [www.apfm.info](http://www.apfm.info).
- 11 [https://www.nwf.org/~media/PDFs/Water/WRDA/Low\\_Impact\\_Solution\\_Success\\_Stories\\_WRDA.ashx](https://www.nwf.org/~media/PDFs/Water/WRDA/Low_Impact_Solution_Success_Stories_WRDA.ashx) (p. 2)
- 12 [https://www.nwf.org/~media/PDFs/Water/WRDA/Low\\_Impact\\_Solution\\_Success\\_Stories\\_WRDA.ashx](https://www.nwf.org/~media/PDFs/Water/WRDA/Low_Impact_Solution_Success_Stories_WRDA.ashx) (p.1)
- 13 Excerpts from the Declaration proclaimed at the 10th International River Symposium held in Brisbane, Australia, on 3–6 September 2007, attended by more than 750 scientists, economists, engineers, resource managers and policy makers from more than 50 countries. The full text is available on the website of the International River Foundation, <http://riverfoundation.org.au/wp-content/uploads/2017/02/THE-BRISBANE-DECLARATION.pdf>
- 14 <http://culturalflows.com.au> [accessed 5 September 2018]

### Further reading

- Boyd, D. 2017. *The Rights of Nature: A Legal Revolution that Could Save the World*. ECW Press, Toronto.
- Crow-Miller, B., Webber, M., and Molle, F. 2017. The (re)turn to infrastructure for water management? *Water Alternatives*, 10(2): 195–207. [www.water-alternatives.org/index.php/alldoc/articles/vol10/v10issue2/351-a10-2-1/file](http://www.water-alternatives.org/index.php/alldoc/articles/vol10/v10issue2/351-a10-2-1/file)
- Reisner, M. 1993 [1986]. *Cadillac Desert: The American West and Its Disappearing Water*. Penguin Books, New York. [Excerpts from a 4-part 1997 documentary film based on the book are available YouTube.]
- Taylor, K.S., Moggridge, B.J., and Poelina, A. 2016. Australian Indigenous Water Policy and the impacts of the ever-changing political cycle. *Australasian Journal of Water Resources*, 20(2): 132–147. [http://westkimbwater.com/onewebmedia/Taylor%20et%20al.%20-%20-%202017%20-%20Australian%20Indigenous%20Water%20Policy%20for%20email.pdf](http://westkimbwater.com/onewebmedia/Taylor%20et%20al.%20-%202017%20-%20Australian%20Indigenous%20Water%20Policy%20for%20email.pdf)

### *Two special issues of the open-source journal Water Alternatives are particularly relevant to the theme of this chapter:*

- Moore, D., Dore, J., Gyawali, D. (eds.) 2010. *Special Issue: WCD+10: Revisiting the large dam controversy*. *Water Alternatives*, 3(2). [www.water-alternatives.org/index.php/tp1-2/1879-vol3/139-issue3-2](http://www.water-alternatives.org/index.php/tp1-2/1879-vol3/139-issue3-2)
- Barraud, R., Germaine, M., and Sneddon, C. (eds.) 2017. Social, cultural and political issues. *Water Alternatives*, 10(3) (*Special Issue: Dam removal*). [www.water-alternatives.org/index.php/current-issue/1895-articles-toc/vol10/309-issue10-3](http://www.water-alternatives.org/index.php/current-issue/1895-articles-toc/vol10/309-issue10-3)

### 3 Ethics of agricultural water use



Rice paddies in Polonnaruwa, Sri Lanka

Most of the water that we humans take out of nature, some two-thirds of it, is used in agriculture, for irrigating crops. All the water used by cities, factories, mines, and rural communities comprise the other one-third of global water use. Does the agricultural sector really need all that water? Using less water to support the existing agricultural production system would certainly be an improvement, and in this sense, ethical. Indeed, most water research and investment within the agriculture sector focuses on deriving “more crop per drop,” through more efficient irrigation practices, or improved seeds or cultivation practices.

In this chapter we will skirt around the question of whether agriculture needs so much water, and ask a slightly different question: What should the agricultural sector be doing with the water it takes? What sort of agriculture do we want? Is agriculture making best use of water, or could that water be put to better use in another sector? What do we want agriculture, and more specifically, agricultural water, to produce? More crop per drop, more money per drop, or more value in overall human well-being, or perhaps the well-being of nature?

We will consider a range of benefits that we might want to ask of agriculture, corresponding to the five categories of ethics outlined in Chapter 1: economic, environmental, social, cultural, and governance, spilling into additional benefit categories as well (e.g. nutritional, psychological, aesthetic, and spiritual). The potential benefits from agricultural water are not limited only to the agricultural sector, since that water could also be transferred to other sectors (e.g. the energy sector or for urban water supply) or back to nature, where there is a chronic and growing water deficit.

### **Thinking about agriculture**

We all depend on agriculture for the food that we eat, for many of the clothes we wear (cotton and linen), and even for some of the energy we consume (biofuels). Agriculture, in turn, depends on water. Every plant needs to have water somehow, supplied either from nature in the form of the rain or snow, or through built infrastructure such as irrigation canals or sprinklers or drip systems. The proportion of the world’s agriculture that depends on irrigation water to meet some or all of its water needs has increased steadily during the past many decades, as new canals, dams, pipelines, and pumps come online. According to the UN’s Food and Agriculture Organization (FAO), the 20 percent of the world’s agricultural lands that are irrigated produce 40 percent of the world’s food, with the other 60 percent of the world’s food coming from rain-fed lands.<sup>1</sup>

It does not take much ethical deliberation to conclude that it makes sense to use water to grow food, since it is so obvious that everyone needs food for survival. But that’s part of the dilemma. Agricultural interests, not just farmers, but the agribusinesses that dominate the food sector, can invoke the universal need for food to defend their water use. Irrigated agriculture already accounts

for about 70 percent of global freshwater use. Do we really “need” 70 percent of the world’s water to grow just 40 percent of our food? Perhaps we should make better use of agricultural lands already blessed with adequate rainfall and grow more food there (Davis et al. 2017). Of course water to ensure food security has to be a priority, but what are some alternative strategies for meeting that goal, and what are the ethical assumptions underlying the competing strategies? Is the goal of a resilient food supply best achieved through centralized mega-scale agribusiness operations and global trade networks, or localized, agriculturally diverse small-scale farming systems, or some combination? What are the social, cultural, economic, and environmental side-effects of these competing strategies? And what are the implications for water quantity and quality impacts? Is one strategy clearly superior in terms of water productivity? What criteria should we rely on in setting agricultural policies?

If we look at water as a fundamental input for agriculture, we can think in terms of “investing” water into the agricultural sector. Since we are investing 70 out of every 100 units of our precious water into agriculture, we want to be sure that we are getting some good returns on our investments. What are those returns? What benefits are we receiving from the agriculture that is absorbing so much of our water? What are the underlying ethics that motivate the agriculture that uses that water?

The conventional American focus for the agricultural sector has been cheap and abundant food, a concern more with quantity than quality. This concept of agriculture as a kind of industrial process that converts inputs of water, nutrients, seeds, and soils into a box of cereal or a hamburger lends itself to simple quantitative indicators of success, such as calories of food produced per unit of land. But agriculture is not only about raw production. The process of farming and the range of associated co-benefits take on almost as much importance as the food itself. The water invested in agriculture is seen as not only an investment in food production, but an investment in regional cultural identity (“terroir”), rural employment generation, wildlife habitat, landscape aesthetics, cultural heritage, and ecotourism, to name a few.

Taking a broader view of farming that encompasses rural landscapes and local cultures can lead to new possibilities about the uses of agricultural water. In this big-picture view of agriculture, the water which makes food production possible also makes all the other benefits possible. In Japan, for example, rice farmers are cultivating not only rice, but also fish that live in the paddies, and ducks that eat the fish. Consumers are willing to pay a premium for rice grown in this way. Along with buying rice, these consumers are also endorsing an important cultural tradition and supporting the farmers and shop keepers who are part of it. (Groenfeldt 2006).

What kind of agriculture do we, as a society, want to support? Where and how should we invest the precious allocations of water to make that agriculture possible? What are the benefits, and what are the opportunity costs, of the

agriculture approach that we are currently following? If we could go back in time and choose the kind of agriculture that would provide the best overall package of benefits, what would that agriculture look like?

These questions can relate to your home vegetable garden, to the farms near your town or city, or to the agricultural sector of your state or province, your country, or the entire globalized food system. What relationship do we wish to have with the food that we eat, and perhaps also grow? We cannot *not* have some kind of relationship with food; eating, along with drinking water, are non-optional behaviors. We can choose the path of least resistance and accept the default food system that we already have, but we can also choose to be very deliberate about what we eat, where it came from, how it was grown, and how it has been handled between its harvest and our plate.

There is a renewed interest in food, and indirectly in agriculture, as part of the overall increased environmental, social, and cultural awareness sweeping the planet (Smith et al. 2016). In North America and Europe, labels of organic and fair trade have become de rigueur on our coffee, while fresh produce from the local farmers' market is the preference for summer meals. For urban dwelling professionals, the incentive is about taste and nutrition, as well as social solidarity, environmental stewardship, and cultural statements (Pollan 2008). But for farmers, who are also food purchasers for whatever they don't grow themselves, the choices are very personal. Via Campesina has emerged as a collective voice for small farmers around the world to assert their rights of food and seed sovereignty (Claeys 2015). The Slow Food movement fills in the spaces between, with both food producers and consumers joining to support an agricultural system that is more meaningfully integrated into daily life.<sup>2</sup>

Consumers' decisions about food choices and farmers' decisions about agricultural practices are indirectly choices about water use. The water footprint of a normal hamburger is estimated at 2400 liters, whereas a vegetarian soy burger requires only 160 liters (Ercin et al. 2011). Clearly, diet has an impact on water use, but particular farming practices also make a difference to the overall impact on water systems. If the soy is being produced on lands carved out of old-growth Amazon rainforest and is polluting the rivers that local Indigenous Peoples depend upon, and if the hamburger is sourced from free-range cattle on a fair-trade, sustainable ranch located on well established grasslands, we might want to choose the hamburger anyway! There are many considerations that can be conflicting but can also be synergistic: The grasslands where the cattle roam are also (or could be) sequestering carbon, whereas the Amazonian soya farming operation may be a net emitter of carbon when all the chemical and energy inputs are factored in. How can we, and how *should* we, make decisions about what sort of agriculture to support in our individual consumption patterns, and in our collective (governmental) policies about agriculture and water use?

The most commonly used analytical tool for choosing among multiple agricultural options is "cost-benefit" analysis, which, as the name suggests, adds up the costs and compares these against the benefits. Which costs and benefits

to include in the analysis is a process that entails a great many value assumptions (Soderbaum 2008). In its classical form as promoted by my erstwhile employer, the World Bank, a purely economic analysis was applied “to estimate the income-generating potential of proposed [agricultural] projects” (Gittinger 1982: xii). The variables included in the analysis stayed very close to measurements of the costs of production inputs (fertilizer, labor, land rent, etc.) while the indicator for the benefits side of the analysis was the market price of the product.

With the rise of “sustainable agriculture” in the late 1980s and 1990s, the application of economic analysis also evolved to include indirect environmental and social costs and benefits, such as the indirect costs of water pollution from fertilizer and pesticide runoff, or benefits of employment opportunities in depressed regions (National Research Council 1989: 195–241). Additional value categories such as landscape values or farmer health impacts could also be included to the extent that their benefits or costs could be quantified in monetary terms. These new social and environmental concerns were incorporated into the concepts of “ecosystem services” (Daily 1997) and “multifunctional agriculture” (OECD 2001), discussed in more detail later.

Even as the range of value categories expanded beyond classical economics to include environmental and social considerations, however, the method of cost-benefit analysis continued to be applied to decision-making about agricultural policies. The new broader set of concerns was still evaluated in the classic way of finding quantifiable indicators that could be monetized. Instead of looking only at the cost of agricultural inputs against market prices, the concept of sustainability called for placing monetary values on environmental costs and benefits as well. This led to methods where farmers or consumers would be asked about their “willingness to pay” (de Groot and de Groot 2006) for particular benefits such as a beautiful pastoral landscape, or avoiding the cost of applying pesticides by maintaining woodland habitat for birds to control the insects.

As the biggest water user, the agricultural sector can claim a place of privilege in the pecking order of water demands. But there is competition with other water demands from cities, industry, and from nature herself. Agriculture’s moral justification for taking so much water stems not only from the obvious need to grow food, but also from making good use of the water within the agricultural sector through adopting water conserving practices, and finding ways to accommodate the priorities of other economic sectors and society as a whole. In dry regions, such as New Mexico where I live, farmers and cities have historically competed for the rights to divert water from life-giving rivers. The prevailing trend has been for cities to buy-out farmers so the cities can use the water that previously was growing food. The economics favor the cities, which can afford to pay far more for water than farmers can ever hope to earn from their crops (Molle and Berkoff 2009).

The inevitable competition between water for agriculture and water for growing cities can be resolved through objectively considering both sets of

needs together, along with any other demands for that same water, e.g., from industry, and of course, from the natural ecosystems that might like to keep some of their water for the purposes that nature intended in the first place. The framework that has evolved to help integrate these diverse demands for water is known as Integrated Water Resources Management (IWRM), which has become a central tenet of global water discourse. This approach is most typically applied at the level of a hydrological basin or watershed<sup>3</sup> and is based on the intuitive notion that water use in one part of a common water basin will affect the water options in other parts of that basin (GWP 2000).

When natural water basins are connected through trans-basin tunnels or pipelines, the effective basin becomes correspondingly enlarged. And if we consider cross-basin as well as international trade of “virtual water” in the guise of agricultural commodities, the freshwater resources of the entire planet are, in this sense, interconnected. Land and water grabs, the purchase of vast tracks of agricultural lands along with rights to use the associated water, are a particularly dramatic example of connecting water basins in one country with hungry (and thirsty) consumers in another country (Mehta et al. 2012).

How should we decide the best use of agriculture, and agricultural water, within a watershed or river basin? Cost-benefit analysis is useful for comparing alternative economic strategies, but cannot adequately evaluate social or cultural impacts. The approach of IWRM provides a broad framework for decision-making, and prescribes some basic principles (discussed in Chapter 6), but questions about the relative priority that should be accorded to ecosystem functions, protection of biodiversity, or social justice tend to be approached through an economic lens rather than as ethical issues (Aldaya et al. 2017).

### *Start with values*

The danger of making decisions about agricultural water use without first identifying the values we want, is that we will inevitably favor the default values already in place. One of Yogi Berra’s best known quotes is, “If you don’t know where you’re going you’ll end up someplace else.” While famous for quotes that are funny for not making any sense, this quote does make sense, when taken literally: Unless we decide ahead of time what values we want to uphold, we will end up expressing values that may run counter to what our higher selves would espouse. In other words, we will end up not in the future we want, but in a default and perhaps dystopian future that we have stumbled into.

Agricultural values are particularly challenging to sort out ahead of time because of the multifunctional nature of growing crops and producing food. Access to food and “to feed oneself with dignity” is recognized by the United Nations as a basic human right.<sup>4</sup> But there are many, many different options for implementing this right, with both the production of food (the focus of agricultural policies) and its consumption (food policies) enmeshed in cultural, social, economic and environmental complexities. And since water is involved in just about every aspect of food from cultivation to cooking, the ethics of

agriculture are intertwined with the ethics of water, and agricultural decisions become inherently water decisions as well.

The premise for analyzing the water ethics of agriculture is not only that water and agricultural decisions are intertwined. That simple fact provides a basic justification for water professionals to take an interest in agricultural decisions, but the real motivation for embarking on the task of sorting out the inter-connections of water and agriculture is a belief that the current arrangements can be improved upon; that through examining the interactions between water and agriculture we will be able to identify new ways to add value to the process. But what are the values that we want to add? We want to ensure not only that agriculture is “doing things right” (i.e., the production process is efficient and effective), but we also want agriculture to be “doing the right things”. Are we producing food that meets the nutritional as well as social and cultural needs of everyone, including the poor and marginalized segments of the population?

### *Agriculture at a crossroads*

Ethics requires at least a toehold of dissatisfaction with the status quo, in order to prompt a re-examination and reflection on what might be, what values we want to pursue, and why. The unfolding climate crisis and mounting concerns about the sustainability of current agricultural policies provide that toehold very nicely, offering multiple opportunities to re-examine what kind of agriculture we want. Agriculture is at a real crossroads. It can continue to be a major part of the climate and resource problem, or it can instead become a central strategy in finding climate and resource solutions. What agriculture cannot be, is neutral! Like the elephant in the room, it is going to have an impact (see Box 3.1).

#### **Box 3.1 Agriculture at a crossroads**

The report *Agriculture at a Crossroads* was released in 2009 by the “International Assessment of Agricultural Knowledge, Science and Technology for Development” (IAASTD 2009), a who’s who of UN agencies and international agriculture and development interests. The purpose of involving some 800 experts over a period of four years was to assess the effectiveness of the prevailing agriculture strategy for “reducing hunger and poverty, improving rural livelihoods and facilitating environmentally, socially and economically sustainable development”. The report’s basic finding was that the scientifically developed agriculture being touted by the world’s best and brightest experts is not sustainable and needs to be transformed. Here are some key excerpts:

- *The general model [of Agricultural Knowledge, Science and Technology, AKST] has been to continuously innovate, reduce farm gate prices and externalize costs. This model drove the phenomenal achievements of AKST in industrial countries after World War II and the spread of the*

*Green Revolution beginning in the 1960s. But, given the new challenges we confront today, there is increasing recognition within formal S&T organizations that the current AKST model requires revision. Business as usual is no longer an option (p. 3).*

- *Successfully meeting development and sustainability goals...would require a fundamental shift in [agricultural] science, technology, policies, institutions, capacity development and investment....and give increased importance to the multifunctionality of agriculture, accounting for the complexity of agricultural systems within diverse social and ecological contexts (p. 4).*
- *[Agricultural] actors and organizations are not sufficiently able to deal with the challenges ahead because of the focus on too narrow a set of output goals. The current knowledge infrastructure, which is oriented toward these goals, historically has largely excluded ecological, environmental, local and traditional knowledges and the social sciences (p. 25).*

In spite of the careful research that went into the IAASTD report (Box 3.1) and the broad spectrum of institutional sponsors, the report's initial impact was muted after it was released with great fanfare in 2009. According to Hans Herren, co-chair of the IAASTD research team, speaking in a 2016 interview, the report's conclusions encountered strong pushback from vested interests, especially "agro-industry and large foundations," but in spite of the resistance, the report's messages "are now slowly moving into mainstream" (Foundation on Future Farming 2016). Herren summarizes those messages as

The need for a radical reset towards sustainability in all three dimensions, environmental, social and economic.... Agriculture must transform from being a contributor to a solver of problems such as climate change, public health, environmental degradation, loss of farmers and rural to urban migration.

There is a "tremendous opportunity to create synergies, given that agriculture and food are so closely linked to all sectors and sustainable development dimensions," but we also need to "keep watching the politics that undermine the urgently needed transformation of agriculture."

How did agriculture arrive at this crossroads where it can play the role of villain or hero not only in feeding the world, but even helping to save the planet through sequestering carbon in agricultural soils? Agriculture can save us from mass starvation and an out-of-balance climate, or it can seal the fate of our species by exacerbating the climate disaster. And agricultural strategies are intricately linked to water and water ethics.

## The ethics of irrigation development

All agriculture depends on water in some form, whether as precipitation from the sky or human-directed delivery of water to crops, i.e. irrigation. Even this seemingly clear distinction has exceptions, as in the case of flood recession farming, which involves the deliberate planting of crops in a river's floodplain, moistened naturally by the receding river. An irrigation "system" refers to the infrastructure – a well, canal, a sprinkler, etc. – which is used to control the water, plus the human management system which operates the infrastructure. The choice of technology, the way it is applied to the particular setting, and the management arrangements by which the system is operated and maintained, reflect the ethical principles of the people involved in its design and management.

The co-evolution of ethics and irrigation systems, and the agricultural systems supported by that irrigation, is more readily visible in historical hindsight than in contemporary context. For our purposes in tracing the ethics underlying irrigated agriculture, history can be divided into two periods: before the Green Revolution, and after. Our focus will be on the latter period because, as the term "revolution" implies, there were some very big changes that took place in how agriculture, and agricultural water management, were perceived.

The first murmurings of the Green Revolution in the 1960s had to do with the reframing of agriculture from a predominantly subsistence activity to an engine for economic growth that would drive the underdeveloped world out of poverty and the recurring danger of famine. The technologies which the Green Revolution popularized – high yielding seeds, fertilizers, pesticides, and irrigation – followed in the wake of a re-imagining of what agriculture is at two levels, the farm and the national economy. At the farm level, the farmer was told that he is operating a business. In the words of Arthur Mosher in his book, *Getting Agriculture Moving* (Mosher 1966: 51), farming "is a business because each farmer's purpose is economic: to produce products either for sale or for use by his family." He goes on to acknowledge that farming is also a way of life, but ultimately it is about economics. "Even in a largely subsistence agriculture the better farmers think like other businessmen and learning to think in this way is a part of development" (Mosher 1966: 52).

At the level of the national economy, agriculture was given the primary responsibility for serving as the engine of growth, and specifically industrial growth. Economic theories developed in the 1950s by Arthur Lewis and elaborated by John Fei and Gustav Ranis, among others, viewed productivity increases in agriculture as essential for creating the surplus labor needed for emerging industries (Todaro and Smith 2003: 116–127). Agricultural development was the answer to economic growth, but what was the key ingredient to agricultural development? More than any other single factor, it was irrigation (Mellor 1966: 272).

Investments in irrigation canals, dams, pumps, and pipelines were justified not merely on the humanitarian grounds of alleviating poverty and hunger, but on economic grounds of stimulating broad-based industrial growth. The most

ethical use of water, within this paradigm, was in modern, efficient agricultural production to make this economic growth cycle possible. Escobar (1995: 158) quotes Norman Borlaug, the Nobel Peace Prize laureate and father of the Green Revolution as follows:

in provoking rapid economic and social changes ... [the Green Revolution] was generating enthusiasm and new hope for a better life ... displacing an attitude of despair and apathy that permeated the entire social fabric of these countries only a few years ago.

The notion that traditional cultures suffer from attitudes of fatalism which need to be transformed into entrepreneurship was central to the discourse of agricultural modernization. The research findings of social scientists that traditional farmers were actively and continuously engaged in experimenting with new seeds and cultivation practices emerged only gradually as the Green Revolution was already under way (see Richards 1987). The most virulent critics, such as Vandana Shiva's *Violence of the Green Revolution* (Shiva 1991) could be readily labeled as alarmist, while detailed analyses of how traditional agriculture is actually conducted took time to develop into an alternative paradigm which could challenge conventional agricultural development strategies (see Netting 1993 and Scott 1998).

Detailed understanding about the role of farmers and local communities in the adoption of modern irrigation technologies also evolved to challenge the earlier confidence that traditional farmers had nothing to lose and everything to gain from irrigation schemes. This more nuanced view recognized the value of traditional technologies and social systems for both economic production as well as for community governance and empowerment (e.g., Coward 1980; IIMI 1987; Diemer and Slabbers 1992). Irrigation systems were seen as integral components of the local society and culture, comprising complex "socio-technical" systems (Uphoff 1986), which development experts need to understand before suggesting improvements.

Building on the work of Edmund Leach (1961) and other anthropologists, archaeologists, and historians (notably Wittfogel 1957), Hunt and Hunt (1976) developed a theoretical framework for the interactions between the physical features and dynamics of irrigation systems and the socio-cultural systems that construct and manage them. Along with other contemporary anthropologists working directly or indirectly on irrigation systems in cultural context (e.g. Clifford Geertz, William Kelly, and William Mitchell), the socio-cultural analysis of irrigation systems became established as a recognized theme within both anthropology and among agricultural research institutes and development agencies (Orlove and Caton 2010). Practical guidance for enhancing the effectiveness of irrigation development during the 1980s and 1990s emphasized the importance of participatory planning, design, and management to ensure that the physical system (canals, pipes, etc.) made sense socially, and could be managed sustainably by local farmers and/or local agency staff (IIMI 1987; Chambers et al. 1989).

Social scientists working on irrigation development during the 1990s could feel hopeful that the forces of international development finance, notably the World Bank, were committed to the notion of designing irrigation systems to accommodate the existing socio-cultural circumstances. While the dominant conception of irrigation within the World Bank and other development agencies continued to focus on the economic benefits, the potential social benefits of participatory irrigation management were also acknowledged.<sup>5</sup>

Whether the World Bank regarded the organized participation of farmers in helping to manage the irrigation canals as a means to more effective and less costly operational management of very expensive irrigation infrastructure, or whether participation could be considered a social end in itself, was a moot question when both goals could be achieved simultaneously. Under the participatory approach to irrigation management (discussed in more detail in Chapter 6), farmers were to be given training so they could manage the new irrigation systems themselves, with minimal technical and financial backstopping from government agencies. Moreover, those new irrigation systems would be designed to fit the social facts on the ground, taking into account clan or village boundaries. In his preface to the book, *Putting People First*, World Bank senior social advisor, Michael Cernea (1991: xiv), noted that

“Putting People First” is more than an ideological appeal. It means making social organization the explicit concern of development policies and programs and constructing development projects around the mode of production, cultural patterns, needs, and potential of the populations in the project area.

The ethical principles underlying irrigation projects at the tail end of the Green Revolution, during the 1980s and 1990s, revolved around the dual goals of economic efficiency and social equity (but not environmental sustainability, which was slow to gain traction within the production-oriented irrigation community). The concept of social equity was generally interpreted to include the meaningful participation of stakeholders, and particularly women, in both the design and management of new irrigation infrastructure. Economic efficiency was interpreted as greater agricultural productivity per unit of water. Cultural rights or sovereignty was implied by the principle of building upon existing social institutions as well as preexisting physical infrastructure (Groenfeldt 1991), but in practice, cultural concerns were rarely considered explicitly.

The ethics of community-oriented equity gave way to an ethics of individualistic “opportunity” following the World Bank’s reassessment of poverty as having three important dimensions in addition to income: opportunity, empowerment, and security (World Bank 2000). The practical interpretation of this new definition, however, has shifted the emphasis from providing technologies intended to fit into the existing social structure, to more intrusive interventions legitimized as providing new opportunities and/or empowerment,

typically involving entrepreneurship and the private sector. The ethics of water development become more complex when the aim is explicitly to transform traditional farmers into entrepreneurs with an emphasis on the commercial potential of irrigated agriculture.

The entry of investment firms into rural development programs, and new alliances of business interests and charitable foundations (e.g. the Rockefeller Foundation) has also introduced a profit-making goal to development assistance. Indeed, the profit motive is described not only as a means to an end (raising investment capital to promote rural economic development) but also as a cultural end in itself, to inculcate an ethic of capitalism:

Social enterprise and impact investing, by definition, proactively intend to create positive impact as well as generate profits. ... [S]ocial enterprise development offers an attractive way to accelerate the creation of shared value. Inclusive and sustainable growth promotes economic and social development and subsequently creates a more enabling business environment in which both investors and corporations may prosper.

(UN Global Compact and Rockefeller Foundation 2012: 4–6)

Culture is viewed not as a collective good to be supported by agricultural strategies that fit into the cultural setting. Instead, local cultural systems are seen as necessary, but not necessarily desirable, contexts for generating economic growth. What is clearly desirable, and where there is a recognized ethic of how things should be, is economic growth and cultural attitudes that encourage growth.<sup>6</sup>

### *Ethics of sustainability*

Conventional agriculture went into a defensive mode when the concept of “sustainable agriculture” entered the development agenda during the 1990s. The idea of sustainability was popularized by the 1987 “Brundtland Report,” *Our Common Future* (World Commission on Environment and Development 1987), as “development which meets the needs of current generations without compromising the ability of future generations to meet their own needs.” When applied to agriculture, this concept raises the question of whether the agricultural practices of today can be sustained into the indefinite future. The answers to this question are highly controversial, with the basic dividing line between the forces of conventional agriculture on one hand (from agro-chemical companies to the agricultural universities) and an informal alliance of economic, environmental, and social critics on the other, who are convinced there are better ways to put food on our tables. While the specifics of chemical inputs, soil erosion, water pollution, and even GMOs can be argued from diverse perspectives (e.g. chemical residues are bad but will dissipate, etc.), other issues, such as groundwater mining offer greater scope for alliances. Who would defend the policy of depleting the Ogallala Aquifer that serves as the

basis for agriculture on the Great Plains? Yet nearly all the farmers with land overlying that aquifer are contributing to its early demise (Gibson and Gray 2016). At current levels of pumping, the aquifer is forecast to be effectively dry in some spots as early as 2030.

Current levels of pumping will not be maintained, of course, because as the aquifer gets closer to depletion, farmers will be forced by economics, if not ethics, to use less; it will become prohibitively expensive to pump the last drops. Hopefully that specter of the near-term future will motivate farmers (and the towns and industries that also pump from the aquifer) to adopt a different approach while there is still some water left. That would be the prediction from economics, but there are politics and ideology intervening. Based on their interviews with Kansas irrigators, Gibson and Gray (2016: 28) paint a gloomy picture of the aquifer's future:

Regulations cannot induce the kind of agroecological and economic transformations needed to make life on the arid plains possible in the long term. Instead, regulation allows farmers and communities to adjust to declining wells, price fluctuations, and diminishing populations within the same economic arrangements that rewarded the large-scale industrial, irrigation agriculture that will deprive future generations of the water they will need.

Can agriculture that depends on water pumped up from the soon-to-be-dry Ogallala aquifer be considered sustainable? More to the point, on what ethical principles can the use of water from the Ogallala aquifer be justified? Elinor Ostrom, who won the Nobel Prize in economics in 2009, showed in her PhD research that California farmers could, under the right conditions, manage their groundwater sustainably (Ostrom 1965). Great Plains farmers can do the same thing, but they need the help of "rules of the game" which they can then follow and enforce themselves. In the case of Ogallala farmers, it is the existing rules, the state water laws already in place, which are a major part of the problem. The law gives individual farmers a right to pump, effectively encouraging them to place their individual welfare above the group welfare.

Ogallala farmers have two big obstacles standing in the way of sustainable groundwater management. First is the natural challenge of being dependent on a common resource and needing a clear set of rules that they can all follow; the second is having to contend with existing laws derived from outmoded, unsustainable ethical principles. By treating groundwater as an individual property right, rather than a common property right, the legal cards are stacked against local sustainable management solutions.

Agricultural policies impact water ecosystems in many other ways besides encouraging the mining of groundwater. Agriculture as a sector is the biggest polluter of both surface and groundwater in the United States, mostly from nitrates leaching from fertilizer and animal wastes. That pollution is effectively unregulated because of the political manipulations of agricultural lobbyists who have been successful in blocking federal regulations. Thus, while there is a

federal environmental standard establishing safe levels of nitrates in drinking water, the federal government does not regulate “nonpoint” sources of nitrate pollution coming from agricultural operations (Williams 2002). This loophole in the federal Clean Water Act, is effectively a subsidy to agriculture, and more specifically to industrial agriculture, since nitrate runoff is far less an issue in small-scale farming. Allowing water users to pollute without payment for clean-up is a common type of water “use” subsidy which is also found in coal mining, discussed in Chapter 5.

When water is viewed as private property and a factor of agricultural production, the “meaning” of that water lacks an environmental, social, and cultural context (see Strang 2004). As disembodied water, it becomes an abstraction and we forget where the water came from (a natural ecosystem somewhere) or where it’s going (back to nature, eventually). Though economics offers the concept of “opportunity cost” for water, when it has become a mere abstraction (e.g. as the forgotten receptacle for agricultural runoff), the many opportunities that are being lost from our management choices are too easily overlooked.

A water ethic that recognizes a moral duty to protect against pollution provides an incentive to look for economically viable ways to accomplish that moral imperative. Concentrated chicken farms, for example, create massive quantities of waste that are deadly to aquatic life when it drains into nearby streams, yet that same waste can also be tapped as a source of methane gas to produce electricity. Without any legal obligation to protect nearby streams, and without an overriding interest to go into the energy business, a chicken producer may be happy to continue polluting the streams. An ethic that values the health of the streams, however, either on the part of the chicken producer, or on the part of other water stakeholders (e.g. local residents or recreational fishermen) might be enough to leverage peer pressure and incentivize a different approach. Without the ethical leverage, however, the transaction costs of investing in methane capture and electricity production might easily outweigh the opportunity cost of not making that investment. Ethics, in this example, can make the sensible course of action desirable in a way that economics alone cannot.<sup>7</sup>

### **Multifunctional agriculture**

The fundamental role that food plays in our lives renders agriculture a deep and powerful force in shaping, and expressing, our cultural values. The concept of multifunctional agriculture provides a framework to incorporate these cultural, social, and environmental dimensions as integral to agricultural activities (e.g., farming) and agricultural and food policies. Farmers make decisions within a cultural framework about what crops to grow and what practices to use, and where and how to market the produce, etc. At the other end of the food supply chain, consumers also make choices based on social, cultural, and (increasingly) environmental considerations, and not only on simple economics. This is not to

deny the importance of economics; farmers invariably seek higher yields and bigger profits, but that is rarely their only consideration. By viewing agriculture as an opportunity to express social and cultural values, we can use agricultural policies, including irrigation policies, more deliberately as leverage for shaping the kind of society that we want to create.

The European Union was forced by circumstances to address these issues in the late 1990s, in order to develop a Common Agricultural Policy acceptable to diverse European cultures and food traditions. The European Model of Agriculture resulting from these discussions formed the basis for the Common Agricultural Policy that took effect from 2000. It called for

a farming sector that serves rural communities, reflecting their rich tradition and diversity, and whose role is not only to produce food but also to guarantee the viability of the countryside as a place to live and work, and as an environment in itself.

(Cardwell 2008: 1)

The multiple functions of agriculture relevant to the policy include not only the economic services of food and fiber, but also ecosystem services (wildlife habitat, soil enhancement and water filtration, and aesthetic landscapes) and social and cultural services such as employment, social relations, heritage, and identity (Fleskens et al. 2009). Additional benefits from agriculture include health and nutrition, food security, and of ever-increasing importance, climate sequestration through soil management (Lal 2007).

### **Box 3.2 Multifunctional agriculture in Asia**

Countries in the monsoon region of Asia, from Bangladesh to Japan, have a long history of collective, small-scale paddy cultivation. A traditional rural landscape was paddy fields stretching as far as the eye could see, a tranquil appearance masking a great deal of hard labor often over centuries to construct terraces and irrigation canals. The unique social requirements of cooperative labor and synchronized cropping patterns (to share water and combat pests) have resulted in strong village-level political organizations and mechanisms for cooperation at larger levels within the watershed (Bray 1986). Japan's Basic Law on Food, Agriculture, and Rural Areas of 1999 notes that agricultural lands not only

function as places for food production, living and resting, they also fulfill a variety of other roles and multifunctionality. The lush forests and rice fields that spread throughout help to preserve our land and natural environment and offer us green and beautiful landscape.

What, precisely, are the functions that paddy agriculture provides?

- Social values: Paddy agriculture is uniquely communal. The strong cultural value of cooperation has evolved with paddy cultivation and has endured into modern life (Yamaoka et al. 2009).
- Cultural and spiritual values: Religious rituals and cultural identity are tied to the rice cycle. In Bali, the indigenous associations of rice irrigators sharing water from a common source (subak) serve as religious and social communities as well as a productive unit.
- Psychological value: Paddy landscapes provide a comforting influence on the mind, providing an emotional therapy.
- Landscape value: Many people, both urban and rural, enjoy the scenery of paddy fields. Korea has instituted direct payments to farmers for maintaining the agricultural landscape as both an aesthetic measure and to provide adequate floodwater storage.
- Cultural heritage: Significant components of cultural heritage may include the visual landscape, the architecture of rural buildings, the irrigation channels themselves, as well as particular varieties of rice which have cultural meaning.
- Social capital and decentralized governance: The skills and experience that farmers gain through the cooperative management of their irrigation system can be applied to other aspects of their lives, and also leads to psychological satisfaction.

The multifunctional perspective can be applied at the level of individual farm households, communities, or countries/regions (e.g., the EU). Moreover, the model can be used to analyze the static values underlying agricultural decisions (a snapshot), or dynamic changes in those values over time, analogous to a video documentary. For example, Wilson (2007) uses the concept to trace historical shifts from traditional subsistence-oriented agriculture exhibiting “strong multifunctionality” (i.e., favoring social and cultural values of prestige or religion over economic considerations) to a more productivist orientation as agricultural development ushers in a more capitalist, commercial approach. The legitimization of multifunctional agriculture in the Common Agricultural Policy of the EU, and in the IAASTD recommendations (see Box 3.1) represents a “post-productivist” transition in Wilson’s terminology, when agricultural policy choices take into account a broad set of values beyond purely economic profit.

While most visibly applied in the agricultural policies of the EU countries and Japan, the multifunctional perspective is not confined to rich countries, nor do all the rich countries embrace the thesis that agricultural policies should be strongly oriented towards social and environmental objectives. The United States, for example, has opted for production-oriented agricultural policies aimed at international trade, while keeping commodity prices low for

consumers. Environmental concerns such as soil conservation can also be addressed (since production would be affected in the long term) but issues such as landscape aesthetics or protecting “family farms” lie outside the scope of what is considered rightful concerns of US agricultural policy (Ikerd 2016). In this sense, US agricultural policy could be considered “mono-functional”.

From an historical and evolutionary perspective, we might think of American production-focused agriculture as the logical progression of *Homo economicus*, gradually learning to focus his attention on what really matters in agriculture: the production of food and fiber. But multifunctional agriculture complicates the simple view of evolutionary progress. It’s hard to argue against multifunctionalism in agriculture, or in anything else. Indeed, the concept of multifunctionalism is gaining popularity as a broadly-applicable strategy for getting more value out of anything, whether green infrastructure (European Commission 2012), or socially-responsible businesses concerned not only with what their product is, but how it is produced, and by whom (Netherlands Enterprise Agency 2016).

Subsistence-oriented agriculture as still practiced by many Indigenous and traditional communities, is inherently multifunctional. Though the products being grown are, of course, important, the process of cultivation and choice of farming practices, as well as the choice of product have as much to do with the art of living as with the art of agriculture. In a study of traditional farmers in Burkina Faso, Rasmussen and Reenberg (2015) document the social and prestige values that inform household decisions about livestock rearing and whether to cultivate or purchase certain foods. They conclude that the pre-existing multifunctionality of traditional agriculture is artificially narrowed in response to rural development initiatives promoted through national policies, which themselves are often designed to meet the conditionality of bilateral or multilateral aid packages. Meanwhile the agricultural policies in the countries providing the development assistance are in the midst of rediscovering the multifunctional values of their own agricultural traditions. The framework of multifunctionality provides a tool for rendering explicit the complex and often overlapping values at play in the seemingly simple activities of farming.

Two global level processes that highlight the importance of agriculture as inherently multifunctional are (1) climate change and (2) growing economic inequity. Both these undesirable trends can be addressed, if not completely solved, through strategic agricultural policies. Climate-smart agriculture, for example, is motivated by the need for agriculture to adapt to changing climatic conditions, but can also be applied to the goal of mitigating climate change by sequestering carbon through soil management and choice of crops (FAO 2017). Similarly, the economic gap between rich and poor can be addressed through agricultural livelihood strategies that produce not only food and income to the farmers, but also provide “decent work” and food security for rural communities (ILO 2011).

One of the inherent challenges of multifunctionality is in locating champions of the multiple benefits. Typically, interest groups form around a fairly narrow

set of identifiable interests. For example, Via Campesina is a global organization representing the economic interests of small farmers around the world. The membership was initially skeptical about multifunctional agriculture, which they viewed as a luxury for the wealthy North, but they later endorsed the approach:

We ... emphasize the need to recognize and foster the multifunctional role of agriculture in the Global South .... It is time to recognize that rural areas in Africa are the repositories of African culture. African farming and food production systems are integral to the cultural process. Therefore it is mandatory that the EU, alongside African governments, acknowledge, respect and protect the cultural nature of rural areas in their development plans.

(Via Campesina 2007)

The concept of multifunctionality covers a broad range of strategies. Wilson (2008) distinguishes between strong and weak multifunctionality, for example. And depending on the interests of the observer, emphasis might be given more to social and cultural aspects and less on environmental or economic aspects, etc. Huang et al. (2015) compare the framework of multifunctionality against that of ecosystem services, and suggest that while each approach carries the potential to be applied equally to social or physical analysis, in practice, social analysts are more likely to invoke a multifunctional framework, while natural scientists and economists tend to favor the framework of ecosystem services.

Whether we use the terminology of multifunctionality or ecosystem services, however, the essential point that renders both perspectives relevant to agriculture and to water ethics is the recognition of multiple types of benefits rippling out from the activities and policies of agriculture. It is this ripple effect that suggests why we should be concerned with agriculture if we are concerned with water, and why we should also be concerned with cultural heritage and social justice and carbon mitigation as these are also linked to agriculture (and water). If we wish to define ethical best practice for water, we need to trace the water as it flows (metaphorically speaking) along the agricultural value chain, to see what effects that water is having all the way into and beyond the farmers' fields to the consumers' plates.

Perhaps this seems overly complicated. How can we hope to assess whether water is being used in its most productive, socially equitable, and culturally meaningful way within the agricultural sector? Is this taking us too far away from our concern with water as a resource essential to life? Are there some straightforward approaches we can use to identify ethical best practice, or at least good practice?

### **Agroecology: Towards an ethical agriculture**

Agroecology, an approach based on both ecological and social principles, is finally coming of age as a solution to the multiple challenges of climate change, sustainability, and social justice. Though the approach was formalized in the 1970s (Altieri 1985) as a counterpoint to conventional agriculture, it remained

marginalized by vested interests committed to the high-input, industrial mode of growing food. Proponents of agroecology saw themselves as participants in a cultural transformation to bring society and nature back into alignment (Pretty 2002; de Schutter 2011). But the growing popularity of agroecology today probably owes more to the intractableness of the problems than to a proclivity towards cultural transformation. In this sense, it seems that climate change is our friend in convincing us that we need to find a new way of growing food that will be more effective in producing food, and more consistent with our values.

The current popularity of agroecology comes as a surprise to its longstanding proponents: “Today, the FAO has an agroecology office at its headquarters in Rome, agriculture ministers from around the world are drafting public policy on ‘agroecology,’ and universities are scrambling to offer agroecology curricula and initiate new research programs” (Rosset and Altieri 2017). Will the approach retain the edgy, socially critical posture that it has brandished as the underdog in international agricultural meetings, or will agroecology, like “sustainable agriculture” become co-opted by vested interests as a watered down version of its basic principles?

So far, the prognosis for agroecology to influence agricultural conventions, rather than the other way around, looks promising. FAO Director-General José Graziano da Silva, in his keynote address as host to the International Symposium on Agroecology in April 2018, noted that “agroecology transcends the farm, and provides many economic, social and environmental co-benefits.”<sup>8</sup> He was joined in opening the Symposium by French Member of Parliament and former Minister of Agriculture, Stéphane Le Foll, who was instrumental in placing agroecology as the centerpiece of France’s national agricultural policy. That policy addresses three challenges: (1) food and nutritional security, (2) climate change and resource conservation, and (3) “the social challenge of combating both poverty in the agricultural world and the rural exodus, and increasing the resilience of production systems.”<sup>9</sup>

The importance of the French government touting agroecology as mainstream policy has the larger significance that it is no longer only a policy for developing countries (which agroecology was in danger of becoming) but for all countries. This universality of application is also being advanced by FAO by linking agroecology to the implementation of the 2030 Sustainable Development Goals (SDGs). Through its Scaling up Agroecology Initiative, FAO is advancing “a vision to bring agroecology to scale and transform food and agricultural systems to achieve the SDGs” (FAO 2018: 1). Complementary initiatives are also being pursued by the International Fund for Agricultural Development (IFAD) and the Intergovernmental science-policy Platform on Biodiversity and Ecosystem Services (IBPES).

### *Why it took so long to embrace agroecology*

Why has it taken so long for agroecology to attain legitimacy as a practical approach to agriculture? Susanna Hecht (1995: 2) identified three reasons that

agroecology failed to influence mainstream agricultural development strategies up to that time, and all three reasons are rooted in cultural values:

- (1) the destruction of the means of encoding, regulating, and transmitting agricultural practices;
- (2) the dramatic transformation of many non-western indigenous societies and the production systems on which they were based as a result of demographic collapse, slaving, and colonial and market processes;
- and (3) the rise of positivist science.

In addition to these sweeping, historical processes which have effectively contained and co-opted indigenous agricultural knowledge there is a fourth process which has inoculated conventional agriculture against ideological challenges.

The development practitioner and critic, Robert Chambers (1986) introduced the term “normal professionalism” to refer to any professional culture that thwarts discussion, much less critical questions, about the normative beliefs of the discipline. Agriculture as a professional discipline fits his description perfectly:

normal professionalism ... is concerned not just with research, but with action; and its actors are not just in research institutes and universities, but also in international and national organisations, most of them in specialised departments of government (administration, agriculture, animal husbandry, community development, cooperation, education, finance, fisheries, forestry, health, irrigation, justice, planning, public works, water development, and so on). Normal professionalism is a worldwide phenomenon, and has built-in stability from its link with knowledge and power, its reverence for established method, its capacity to reproduce itself, and its defences against threat. It is sustained by the core-periphery structure of knowledge and knowledge generation, by education and training, by organisational hierarchy, and by rewards and career patterns

(Chambers 1986: 4)

In his own professional career, Chambers tried to counter the stranglehold of normal professionalism through the application of new methodologies of field inquiry, most notably “participatory learning and action” (Chambers 2007). By bringing agricultural policy-makers into direct contact with rural farmers, and especially the poor, female, and disenfranchised segments of the rural population, Chambers hoped to promote a new paradigm of rural development which incorporated local knowledge and solutions (Chambers et al. 1989).

### *Agroecology and agrodiversity*

One of the most important features of agroecology is diversity of crop species and multiple varieties of a single species, often growing together in the same

field. In contrast to the Green Revolution's emphasis on reducing the number of crop varieties and focusing on just a few high yielding improved varieties, agroecology depends on genetic diversity of many different crops and multiple varieties of the same crop as insurance against pests and vagaries of weather (Brookfield et al. 2003). Crop diversity is a form of risk management, providing a hedge against increasingly uncertain weather patterns due to climate change, while monocropping reflects a strategy of maximizing yields when all other conditions can be optimally controlled.

In the short-term, agrodiversity is part of the resilience strategy of individual farmers. If the rains come too late for one variety, it might be just right for another variety, or if an insect pest attacks one particular species, the loss can be readily compensated by the many other species that were not affected. But there is a similar dynamic over the long term and on a regional level. By maintaining locally viable populations of a great many species and varieties, the agricultural resilience of the whole region is enhanced. Particularly with the increasing swings of weather associated with climate change, the value of agrodiversity will become increasingly significant.

## Conclusions

The use of water to grow the food that society needs to ensure food security is a basic necessity which transcends questions of ethics, or rather, already constitutes an ethical obligation. Of course water must be allocated to agricultural production so people can have food to eat. But how much water and what kind of production, and who will make these decisions? The inextricable links between irrigation water and the crops which that water supports suggests the logic that decisions about agriculture are also decisions about water. Furthermore, as the concept of multifunctionality reminds us, that agricultural water is producing much more than raw products. It is also generating ecosystem services, as well as social and cultural benefits. If the agricultural system is not producing these additional benefits, then we need to analyze those opportunity costs, and consider those opportunity costs as choices that have been made, perhaps implicitly, about what not to value. There is no escape from ethics!

How can we know that we are getting our full value out of the water used in agriculture? First we have to know what aspects of the agricultural water system we consider most valuable and only then will we have a frame of reference for evaluating the total returns (economic, social, cultural, and environmental) from the agricultural water. This process entails an explicitly subjective assessment about the "why" of the agriculture that is using the major share of water which everyone agrees is scarce and getting scarcer. Imagine an agricultural visioning process for an entire region or watershed, with a cross-section of participants including farmers; food-related businesses; local government representatives; technical experts in agriculture, water, and natural resources management; religious leaders; Indigenous Peoples; NGOs; and the

public at large. Some questions for the group might be “What do we want our agriculture to look like 40 years from now? What do we want our agriculture to be contributing to our livelihoods, to our social welfare, to our cultural identity, and to our environment and landscape?”

These questions are already being answered by default, driven by market forces that reflect a narrow set of economic values and political pressures. For example, an aquifer contaminated by nitrates from concentrated animal feeding operations (CAFOs), is a water problem caused by agriculture (Martin et al. 2018). It is not directly a problem for agriculture; it is a problem for the water impacted by agriculture. But solving that water problem requires looking at the agricultural policies and behaviors that are impacting water outcomes. The familiar argument that agricultural producers can’t afford the cost of containing the nitrate runoff needs to be considered in the context of the environmental costs of not containing the runoff. This is where agricultural practices and water management are connected. It is also where the ethics about water are connected to ethics about agriculture. If society places a high value on clean water (including groundwater) that ethic can move upstream so to speak, into the agricultural sources of the pollution. Negotiations with farmers can proceed along ethical lines that identify shared ethical principles (“We all want to protect our groundwater”) that all parties can use as a starting point for exploring practical solutions.

Ethics can be applied to the exploration of new opportunities, as well as the solving of old problems. An ethical perspective can help identify synergies among different types of values, whether economic, environmental, social, cultural, or something else. For example, rural employment could be enhanced through conventional agriculture that emphasizes monocultures and chemical inputs. But if additional goals are added to the planning framework, e.g. a goal of protecting groundwater quality, or a goal of increasing crop genetic diversity, or the goal of enhancing habitat for beneficial birds and insects, or a goal of strengthening local cultural identity, then a different agricultural strategy might provide higher total value. Similarly, a goal of community empowerment would give priority to investing in farmer associations for their social capital benefits, and a goal of improved health and nutrition might favor agricultural solutions that minimize chemical contamination in the food and water supplies. Cultural goals of strengthening local identity and cultural heritage can easily be incorporated into agricultural planning since nearly every region has local heirloom crops which are valued for their cultural meaning. Agricultural heritage is also linked to architecture (barns) and traditional irrigation infrastructure such as traditional canals and qanats (English 1998).

The desired outcome, from a water perspective, is that the water used in agriculture should produce more total value. The outcomes that give “value,” however, depend on the person doing the valuation. Finding agricultural solutions that meet the value preferences of diverse stakeholders is a challenge that can best be met through a process of negotiation and

consensus building. Even top-down decision-making, while effective in the short-term, relies ultimately on finding a workable consensus. The key to sustainable water management (which I am assuming to be a generally shared goal), is to find a workable consensus among the stakeholders which is also a sustainable solution in terms of the physical resilience of the water ecosystem. Exploring the ethics underlying the conflicting views of competing stakeholders offers a way of clarifying their values and setting the stage for more fruitful negotiations.

### Discussion questions

- What do you consider to be the most important functions of agriculture, aside from growing food? Try to rank these functions in order of importance, and compare your rankings with your friends or colleagues.
- What does an ethical agriculture look like to you? What values do you personally wish for the agricultural sector to favor? What values matter to others in your community?

### Notes

- 1 See FAO's "AQUASTAT" website for details: [www.fao.org/nr/water/aquastat/didyouknow/index3.stm](http://www.fao.org/nr/water/aquastat/didyouknow/index3.stm)
- 2 [www.slowfood.com](http://www.slowfood.com)
- 3 The terms "basin" and "watershed" can be used interchangeably but in normal parlance, "basin" connotes a larger drainage area (e.g., the Danube River Basin) while "watershed" is commonly used to refer to smaller, sub-basins. A third term, "catchment" is more or less synonymous with "watershed".
- 4 The Human Right to Food is defined by General Comment No. 12 of the United Nations Committee on Economic, Social and Cultural Rights (the body in charge of monitoring the implementation of the International Covenant on Economic, Social and Cultural Rights). Source: Website of the UN High Commission on Human Rights: [www.ohchr.org/EN/Issues/Food/Pages/FoodIndex.aspx](http://www.ohchr.org/EN/Issues/Food/Pages/FoodIndex.aspx).
- 5 For insights into the Bank's interest in participatory approaches to development, including irrigation, see The World Bank Participation Sourcebook, 1996 [available on-line through the IRC-WASH library, [www.irc.nl/docsearch/title/112925](http://www.irc.nl/docsearch/title/112925)].
- 6 The question of the relative rigidity of cultural values in the face of economic opportunities is addressed in Rao and Walton (2004).
- 7 Economic logic does not lead to the desirable outcome in this case, because of a failure in environmental regulations which allows the chicken producer to impose the cost of pollution on society. In a perfect regulatory system perhaps we would not need ethics, but we would need ethics to establish effective regulations in the first place.
- 8 Opening Remarks at the Second International Symposium on Agroecology: Scaling up Agroecology to Achieve the SDGs. [Webcast, minutes 7:35-7:45]: [www.fao.org/webcast/home/en/item/4642/icode/](http://www.fao.org/webcast/home/en/item/4642/icode/)
- 9 Agroecology in France: Changing production models to combine economic and environmental performance: [agriculture.gouv.fr/telecharger/58144?token=84c0ffff0ca-f34ea89f434e9745865a2](http://agriculture.gouv.fr/telecharger/58144?token=84c0ffff0ca-f34ea89f434e9745865a2)

### **Further reading**

- Netherlands Enterprise Agency. 2016. *Reinventing Multifunctionality: Combining Goals, Sharing Means, Linking Interests*. Netherlands Enterprise Agency, The Hague. <https://english.rvo.nl/sites/default/files/2016/03/Reinventing%20Multifunctionality.pdf>
- Rosset, P.M. and Altieri, M.A. 2017. *Agroecology: Science and Politics*. Practical Action Publishing.
- Smith, J., Lang, T., Vorley, B., and Barling, D. 2016. Addressing policy challenges for more sustainable local–global food chains: Policy frameworks and possible food “futures”. *Sustainability*, 8(4): 299. [www.mdpi.com/2071-1050/8/4/299/htm](http://www.mdpi.com/2071-1050/8/4/299/htm)

## 4 Ethics in urban and domestic water use



Abu Dhabi, United Arab Emirates, December 2017

Human settlements, whether rural villages, small towns, or megacities, all face the same challenge of providing adequate supplies of water for their residents. When this basic function cannot be met, through drought or political breakdown, those communities fade into the dust of time. The Moghul capital city of Fatehpur Sikri in India, for example, was abandoned only 13 years after its elaborate construction, when it became clear that the local water sources would be insufficient to support the population (Revi 2008). Most other cities that have succumbed to water shortages, however, have done so more gradually and anonymously, waiting patiently to reveal their stories to future archaeologists.

Water supply, in other words, is not to be taken lightly. It can mean the difference between life and death both for individuals and their communities. This self-evident priority for water supply is the reason that the human right to drinking water has long been honored by cultural customs and national laws. In 2010 the right to water was incorporated as a UN recognized human right, and not only the right to water, but also the right to sanitation (see Box 4.1). While the life and death importance of water has been intuitively obvious since the dawn of humanity, the concept of sanitation as having equal importance developed from modern advances in medical understanding about waterborne diseases.

Just as withholding water from someone dying of thirst would be tantamount to murder, offering water contaminated with the cholera virus, or dysentery-inducing bacteria, or debilitating larger organisms such as Guinea worm, can also be seen as a type of murder. Of course, no one goes around offering water that is known to be contaminated. That would be clearly criminal (and yes, it sometimes does happen). But something very close to this was considered acceptable prior to the 2010 UN resolution: Letting people fend for themselves to find water that is safe to drink. And since the biggest cause of life-threatening water-borne disease is human feces, the provision of safe water depends very much on effective sanitation. The pertinent language of the UN resolution is the following:

[The United Nations General Assembly] *declares* the right to safe and clean drinking water and sanitation as a human right that is essential for the full enjoyment of life and all human rights; [and] Calls upon States and international organizations to provide financial resources, capacity-building and technology transfer, through international assistance and cooperation, in particular to developing countries, in order to scale up efforts to provide safe, clean, accessible and affordable drinking water and sanitation for all

...

(United Nations General Assembly 2010)

From an ethics perspective, the UN recognition of the right to safe water and sanitation shows that ethics can and do change. Specifically, it makes an explicit link between water and sanitation, expanding the category of “safe water” to include the mitigation of the single major threat to safe water, which is contamination from human feces. The UN Resolution underscores the linkage between access to safe water and human health and well-being as fundamental

human rights. The goal of safe water and sanitation has the purpose not only of survival, but also better health and “full enjoyment of life and all human rights” (United Nations General Assembly 2010).

#### **Box 4.1 Water as a human right**

The UN vote on July 28, 2010, which recognized access to clean water and sanitation as a human right, served to formalize what was already *de facto* international policy. Yet it was an important step to make that *de facto* right explicit and put into place a standard against which national governments could be held morally, if not legally, accountable. The success of the resolution surprised even its supporters. On the day of the vote, opposition had been anticipated, but in the end, did not materialize. Maude Barlow, who was at the UN General Assembly that day, lobbying for passage of the resolution, recounts how it happened:

Bolivian UN Ambassador Pablo Solon introduced the resolution by reminding the assembly that humans are about two-thirds made of water ... “Water is life,” he said. But then he laid out the tragic and growing numbers of people around the world dying from lack of access to clean water and quoted a new World Health Organization study on diarrhoea showing that every three-and-a-half seconds in the developing world, a child dies of water-borne disease. Ambassador Solon then quietly snapped his fingers three times and held his small finger up for half a second. The General Assembly of the United Nations fell silent. Moments later, it voted overwhelmingly to recognize the human right to water and sanitation. The floor erupted in cheers.

(Barlow 2012: xv)

The expansion of ethical standards from water provision to also providing sanitation and to upgrade these standards of expected behavior to the status of morally required behavior (i.e., a human right) is reminiscent of Aldo Leopold’s view that society can learn to “enlarge the boundaries” of what we consider our ethical community (see Chapter 1). Leopold had in mind that we would learn to embrace all of nature in our ethical sphere. While we haven’t gotten that far, our ethics are on an expansionary trajectory through the concept of fundamental human rights. It is hardly conceivable that a future UN General Assembly would vote to remove sanitation as a human right. But are we done with the ethics of water supply? Have we become adequately ethical? This is a rhetorical question. The realization of the right to water and sanitation is still in its infancy, and an estimated three-quarters of a billion people lack access to reliably safe water, and at least twice that many lack reliable sanitation. But even if we could wave a magic wand and provide those

missing services, we would barely scratch the surface of the ethical dimensions of water supply.

Let's return to the schematic in Chapter 1 (Table 1.1) showing our five categories of water ethics: economic, environmental, social, cultural, and governance. Where does the human right to water fit within this schema? The recognition of a human right can be considered a social ethic, since it applies to everyone equally (social equity) and is aimed at improving general health and well-being. At the same time, economic ethics come into play. Investing in clean water and sanitation can be dramatically cost-effective in developing countries, with benefit-cost ratios as high as 7:1 (OECD 2011). Chronically ill people are an expensive drag on the economy! On the environmental side, untreated sewage is the primary source of pollution in many rivers, such as the Yamuna River in northern India (Haberman 2006). Providing sanitation in such cases would give environmental, as well as health, benefits. Cultural ethics also figure prominently in the sanitation picture. As a holy river which Hindu adherents use for ritualistic bathing and drinking, the health of the Yamuna River is also a matter of religious respect to the river, as well as a health risk for devotees taking sips of the river water. In Alaska, the Yukon River Intertribal Watershed Council has adopted the simple goal "to be able to drink water directly from the Yukon River."<sup>1</sup> And governance ethics are also implicated in realizing the human right to water. The ethical integrity of governance systems from the local community level up to the national level are vital. But because governance capacity is sometimes lacking, the international level of governance is also critical. The UN Sustainable Development Goal 6, "ensure availability and sustainable management of water and sanitation for all," is a clear expression of governance ethics at the global level (Box 4.2). Just as sanitation is an essential aspect of safe water, governance arrangements are essential to ethical water.

#### **Box 4.2 The UN Sustainable Development Goal 6: "The water goal"**

The UN Millennium Development Goals (MDGs) were adopted by the UN General Assembly in September 2000, and comprised eight goals to be reached by 2015 in the sectors of health, gender equity, primary education, and sustainable development. In September 2015, the UN General Assembly endorsed a new and more comprehensive set of 17 Sustainable Development Goals (SDGs), covering the years 2015 to 2030. As the name implies, these goals are structured around the concept of sustainability. SDG 6 is divided into six sub-goals summarized in the following:

SDG 6. Ensure availability and sustainable management of water and sanitation for all

6.1 By 2030, achieve universal and equitable access to safe and affordable drinking water for all

- 6.2 By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations
- 6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally
- 6.4 By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity
- 6.5 By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate
- 6.6 By 2030, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes

(UN Water 2018b)

If water and sanitation services are so obviously important and cost effective, why haven't they been more of a priority? Why do so many children (especially) continue to die from water-borne illnesses? An ethics perspective suggests that one big reason for the persistent gap between rhetoric and effective action on the human right to water and sanitation is the failure to frame the problem as a moral and ethical issue in the first place. Indeed, the manner by which the UN General Assembly voted in favor of the "water as a human right" resolution illustrates the power of moral framing: Pablo Solon, the Bolivian ambassador to the UN who introduced the resolution invoked the compelling image of children dying from contaminated water to frame the issue as a fundamentally moral and ethical responsibility.

But not every issue lends itself so readily to an intuitive understandings of ethical responsibility. Just as there are many dimensions of water ethics (e.g., the five categories), different audiences will respond to one dimension (for example, biodiversity protection) more than another dimension (for example, governance arrangements). Yet they are all connected, and we need to make those connections. By considering the various categories of ethics and asking the question, "How could water supply and sanitation advance the values/ethics of [economic, environmental, social, cultural, governance] life within a particular river basin or city?", we can open a constructive Pandora's box of ideas and possibilities. The context can broaden from the core concern of supplying basic water service, to implementing conservation strategies for reducing the water footprint, and to creative strategies for obtaining more value from the water that is used. From riverfront development to daylighting urban streams to installing fountains and other water features, water can be "used" aesthetically

often at no additional cost in terms of water used. Rainwater harvesting technologies can significantly add to the total urban (and rural) water supply while irrigating gardens with overflow water (Lancaster 2008). One of the messages of “water sensitive urban design” (discussed later in this chapter) is that saving water, and obtaining additional value(s) from the water that is used, can be beautiful, creative, and fun.

This chapter is divided into two sections, reflecting a fundamental division in the water supply and sanitation sector: rural and urban. Rural water supply focuses on the provision of safe water and reliable sanitation to individual dispersed dwellings, hamlets, and villages. Urban water supply and sanitation focuses on towns and cities. These two domains have very different structural needs. Individual homes or hamlets are usually best served by shallow wells. Sanitation can be accomplished through pit toilets, so no water is needed, but the siting becomes important to avoid contamination of the wells. Villages typically shift from several village wells to a centralized treatment and piped distribution system which can be locally managed. Pit toilets are still a workable option. But in the larger towns and cities, indoor plumbing is the standard. This is not too difficult for water supply, but sewerage infrastructure lags far behind. Perhaps the worst of the megacities is Jakarta, where, as of 2016, only 4 percent of the city’s ten million people were served by sanitation sewers.<sup>2</sup>

### **Ethics of rural water**

The emotional messages that we routinely see in the media, and especially social media, about the need for water and sanitation come from the diverse NGOs that have adopted the mission of providing water and sanitation services to people whose rights are not being realized. “Donate now” is the message. Donate to our organization so that we can provide water services to communities in Africa where women spend hours each day in the search for water! Recently I received a fundraising letter from a university student, the daughter of a friend, asking for support so she could travel to Africa on a summer program to help install wells in rural communities in Ghana. Those communities, the letter told me, do not have safe drinking water now. With my support a group of American students will construct wells and those people will have drinking water. The letter made me uneasy.

Helping the world’s poorest people to realize their rights to water and sanitation seems very clearly the right thing to do, just as helping a starving person find something to eat is also the right thing to do. But the distinction between emergency aid as a stop-gap measure, and long-term development assistance to build local capacity is easily overlooked in the rush to meet water supply targets. After the American students build a well in that village in Ghana, who will have access to it, and who will repair the pump when it breaks? Where are the villagers getting their water now? Can those traditional sources be upgraded, or does it really make sense to drill new wells? Who will decide where the new wells should be constructed? Who will provide the labor?

The maxim “the road to hell is paved with good intentions” does not imply that there is anything wrong with good intentions, but rather that intentions alone are not enough (see Box 4.3). The injustice of children dying because the water their mother spent three hours collecting is contaminated with harmful bacteria is a natural motivation for ethically minded people to try to do something. And when the means for saving lives is so technically simple and cheap (e.g., drill a new well that taps into clean water), it opens the door for action. There are probably thousands of organizations based in the developed countries that are involved in the global effort to provide clean water and sanitation to the world’s poor. These organizations range from UN organizations like UNICEF to international development agencies like the World Bank to all the national aid agencies (for example, in the United States the Agency for International Development, USAID; in Japan, the Japan International Cooperation Agency, JICA, etc.) and the many more private organizations that rely on donations from literally millions of contributors around the world.

**Box 4.3 It’s complicated! Sustainability challenges for rural water and sanitation initiatives**

Evaluation studies of rural water services projects in West Africa show disheartening outcomes of pumps not working, in some cases after just one year. A review by Stockholm International Water Institute and UNICEF notes that

newly delivered WASH services too often fail to provide continuing benefits to their users. Data from 20 countries show that 35–40 percent of hand pumps in Sub-Saharan Africa are not functional. Analysis of large-scale Water Point Mapping Data in seven Sub-Saharan countries showed between 16 percent and 43 percent of non-functionality; in four countries where data was depicted over time, data shows that at after only one year functionality has dropped to 75 percent.

(Jiménez et al. 2017)

What factors are limiting the effectiveness of rural water and sanitation for health (WASH) services? It’s complicated.

Even if significant progress has been made in better understanding the importance of factors such as revenue collection, community demand, community participation, and gender considerations in keeping services flowing, there is no general agreement on which factors are more important for sustainability and how they relate to each other....Some authors identify as many as 25 factors affecting sustainability of rural water supply....[and] there is little systematic evidence of whether the demand driven community based approach is fully effective.

(Jiménez et al. 2017)

Water and sanitation for health (WASH) services have long been framed as urgent, unmet needs that must be addressed as quickly as possible. The International Drinking Water Supply and Sanitation Decade (IDWSSD), 1981–1990, emerged from the 1977 Mar del Plata, United Nations Water Conference... with the stated objective...to “provide all people with water of safe quality in adequate quantity and basic sanitation facilities by 1990” (O’Rourke 1992). Ten years later, the Millennium Development Goals (MDGs) endorsed by the UN General Assembly included a water target of halving the number of people lacking access to safe water and sanitation by 2015. The new goal (SDG 6) is to ensure safe water and sanitation to everyone by 2030. This is a clear expression of a social ethic, formalized in the 2010 UN Resolution declaring water and sanitation as constituting fundamental human rights. We can literally see the ethics protruding from the plans and implementation programs, and we can sense the urgency: There is no time to lose; children are dying from our lack of action!

Hundreds and perhaps thousands of NGOs have mobilized resources to address the plight of rural families struggling to find clean water. Parallel efforts continue to be made by overburdened health departments in developing countries, at local and national levels, and by international organizations and bilateral aid programs of the wealthier countries. Large NGOs such as Water Aid and Water for People straddle the categories of NGOs and international organizations (INGOs) brokering investments from donor governments. Other INGOs such as Water.Org attract private funds from corporations as well as foundations. What these diverse organizations and agencies have in common is a moral sense about their mission. They would probably all agree that their motivations stem from a desire to make a positive difference through the programs and activities of their organizations.

There are organizations that have been created out of ethical concern for providing water and sanitation to the poor, whose fund-raising campaigns also serve as awareness-raising for water and sanitation as a moral issue. There is activity on the ground in countless communities, sometimes coordinated through local and national health and water agencies, or through national or international NGO networks. There is even a name for these activities: “Hydrophilanthropy” (Kreamer 2010), the application of water (*hydro*) to *philanthropy*, defined by my dictionary as “good will to fellow members of the human race; especially: active effort to promote human welfare” (Merriam-Webster 2018). This definition combines intentionality with action. We want to help; we are willing and able (at least financially) to help. What should we do? The first thing to do from a water ethics perspective, is to reflect on the “why” of what you are thinking of doing: *Start with why* (Sinek 2009).

### *The ethics of why*

Is water supply and sanitation an end in itself, or a means to some other end? Within the context of meeting Sustainable Development Goal 6 (ensure availability and sustainable management of water and sanitation for all by 2030), it

is clearly an end (to meet that particular goal), but it is also part of a larger development agenda. The logic of having 17 different, but to some extent related, Sustainable Development Goals is that there are inherent synergies. Safe water and sanitation (SDG 6) is a necessary provision for realizing SDG 1 (end poverty in all its forms everywhere) and particularly SDG Target 1.4, “ensure that all men and women, in particular the poor and the vulnerable, have ... access to basic services ...”

The ideas of inter-linkages, synergies, and multiplier effects are built into the SDGs. Progress towards one target will help in meeting other targets and goals as well. There is a whole system of social structure, political economy, health, education, as well as finance and business, connected to seemingly simple decisions about what kind of water system to provide in any given location. Choices about how to provide water services, and what would be the “best” approach, can have powerful and far-reaching implications, which all start from the initial “why” question: Why provide clean water and sanitation? The ethical motivations combine concerns about (1) health, (2) social and gender equity, and of course, (3) economics.

### *1. Health*

The primary justification invoked in rural water supply and sanitation projects is human health. By providing clean water and sanitation, the health of the entire community can improve (and especially young children who are most vulnerable) by eliminating most water-borne diseases and breaking the cycle of anal-oral infections. These basic and well-documented health benefits are the main reason for including water and sanitation as one of the 17 SDGs.

### *2. Social and gender equity*

Since women have primary responsibility for obtaining domestic water in most societies, water supply schemes can benefit women directly. And since the poorest segments of society are the least able to access clean water and sanitation, whether in rural communities or urban megacities, new water supply initiatives offer an effective way of delivering benefits directly to those most in need. These social values are well recognized in rural development projects and typically are highlighted in the objectives of both rural and urban water supply projects. Ensuring that women and the poor of all classes, castes, and ethnicities will truly have access to the new water and sanitation facilities, however, requires careful analysis, design, implementation, monitoring, and follow-up.

### *3. Economics*

Investments to provide basic rural and urban water supply and sanitation services are highly profitable to society at large because of the health benefits and time savings. By staying healthy and not spending so much time collecting water every day, productivity increases. Children are more likely to attend

school, and their parents can spend more time working (or looking for work). Water supply and sanitation is not a panacea, but it is a critical enabling condition for economic productivity.

There is so little controversy about these objectives that it may be difficult to see how ethics might be involved beyond the general consensus that individual well-being of people is important and that health and social equity are inherent components of their well-being. Differences in ethical viewpoints start to emerge, however, when the question is raised of the relative importance of health and social equity vs. economic productivity. How much should the government, or outside development agencies, spend to provide clean water, and how much should the water users pay for that service? Are the development goals of health and equity limited to the point where society as a whole benefits economically from the improved health and social conditions? Should we worry about providing water and sanitation services to the poorest 5 percent of the population, even if the service would be very expensive and the economic returns very small?

There are two main sources of ethical guidance that influence water supply investments, and neither involves professional ethicists. The primary arbiters of water supply investment decisions are the policy-makers who normally look to economics as a reference. Their actual decisions may be made politically, of course, but largely within an economic framework. Is the proposed scheme to extend urban service into poor neighborhoods worth the cost, or could the funds be more usefully spent elsewhere? What will be the economic benefits of a rural sanitation program? The unstated corollary to these questions is: Is this use of funds a responsible (ethical) choice given the competing demands for those same funds in other areas? Since the adoption of the UN resolution on the human right to water and sanitation, however, there is a second source of ethical guidance. People have a fundamental right to water and sanitation services. In theory, it is no longer a question of whether it is a good use of funds. It logically becomes a first priority. Investments in water and sanitation no longer need to fit an economic agenda because they have become part of a moral agenda. The UN Resolution on the Human Right to Water is facilitating water and sanitation investments with the same tactic used by the Bolivian ambassador to the UN to get the resolution passed in the first place – reframing the issue as a moral and ethical issue. Both reasons are important and form a powerful synergy: (1) Water supply and sanitation is a development priority for all the usual social and economic reasons, and (2) it is also, and even more fundamentally, a moral issue because it is a human right. In the vocabulary used in this book, both these sets of reasons are seen as moral issues because water ethics is not only about human rights, it's about water.

### *The ethics of “how”*

The first step in approaching the ethics of water supply choices is to consider the development context and look for opportunities for synergies between the

need to provide water and sanitation and other development goals. As with agriculture, the water supply sector is also “multifunctional.” Water supply is intimately connected with other aspects of development, and the process, the “how” of providing water supply will influence the lives of people in ways far broader than just having water. It helps to imagine the water coming out of the tap as just one key linkage in a whole system of interconnected parts both upstream (the things that have to happen to get the water to the tap) and downstream (the social, economic, and environmental effects of the water after it comes out of the tap).

The opportunity for using water supply systems as leverage for other development agendas has long been recognized by both Christian missionaries and World Bank projects. According to the website of one Christian organization working in India, “Providing wells helps to show the love of Jesus Christ and promote the Gospel in villages.”<sup>3</sup> A World Bank project on Rural Water Supply and Sanitation in Kyrgyz Republic has the objective of “improving access to potable water for the participating communities; and ... improving hygiene, sanitation and water-related practices at individual, family and institutional levels in the rural areas.”<sup>4</sup> If you were to ask one of the project officials what larger purpose the project is contributing to, he or she might reference the link between public health and economic productivity, or they might respond that access to safe water and sanitation is a sufficient goal that has no need for further justification.

### **Multiplier effects**

Many development professionals, in contrast to missionaries, give little thought to the indirect and implicit agendas they are advancing. This is not to suggest that the water engineers designing water supply projects in African villages are unaware of the role of their specific job in contributing to a larger development effort. Just about every project report includes a statement of objectives which connects the ground-level effort of building wells and pipelines, to a larger set of development goals. Engineers working on rural water schemes are typically quite proud that they are contributing to the betterment of the communities served by the water systems they are designing. But those water systems have a broader range of impacts than their builders might imagine. Through the magic of multiplier effects rippling out from the water system, its impact extends to the spheres of governance, social equity, economics, environment, and cultural worldviews. A water ethics perspective helps reveal these interactions, thereby contributing to more effective planning and project design. It is not only “what” projects do, for example, drilling a new well that provides clean water, but “how” the project unfolds.

An Indian NGO, Gram Vikas, addresses caste and class divisions and fosters a stronger sense of village solidarity, through the introduction of village water supply services. Gram Vikas offers to help a village to finance and construct a community water system on the condition that the community will agree to

provide water to each and every household regardless of caste or economic standing. Typically this means that the wealthier (usually upper caste) families will be asked to pay more for their water connections in order to subsidize the connections for the poor and low caste sections of the village. If they refuse, Gram Vikas goes to the next village with their proposal for a comprehensive village-wide water scheme. This is an example of social ethics guiding choices about water development. Gram Vikas insists on this policy not only as a way of ensuring water service to the poorest members of the community, but to stimulate a new set of expectations about social equity and community responsibility.

By insisting that the wealthier families subsidize the water connections of the poor, a larger lesson is being taught which can raise the self-esteem of the poor and strengthen the whole community's sense of pride and solidarity. A Gram Vikas project report quotes a woman from Tamana village in Ganjam district of Odisha, one of the 1206 villages in four states of India where Gram Vikas has provided assistance since its establishment in 1979:

Our village is better than the town. We have 24/7 piped water supplies to all families, without exception. Every family has its own toilet and bathing room as well. When we seek marriage alliances [in other villages], our daughters ask us – ‘Would there be similar facilities there as well?’

(Gram Vikas 2016)

Gram Vikas approaches the provision of clean water not only as an end in itself, but also as a means to the social objective of community empowerment. This twinning of objectives has advantages from a sustainability perspective, since a cooperative community will be more likely to be able to fix broken water pipes or resolve disputes among neighbors. Strategies that incorporate additional development objectives into water supply projects reflect an ethic of economizing and squeezing more value out of the water supply investment. Indeed, there is an inherently powerful opportunity for community transformation that comes along with a water supply project. Because clean water is so essential to everyone in the village, the provision of an improved water service serves as a reward for the community which can be used strategically to induce new behaviors (e.g., social equity). Alternatively, if there is no social strategy attached, the water service will reward the community for its status quo behavior, thus reinforcing the existing social inequities. “Thanks for being inequitable; here’s your reward: A new village water system!”

Water supply and sanitation programs are, in this sense, too important to waste through simply offering the water infrastructure and going away. And in any case, a quick intervention and turnover to the local community is more likely to end in failure (for an example, see Box 4.3). Deciding what, if any, additional development goals to piggyback onto the water project becomes an important step that can contribute to the sustainability of the water system while also nudging the local community in a particular direction. The ethical questions then become what

direction and who decides? This is more than a water question; it becomes a development question and opens up all the ethical issues that development experts have been debating for decades. What is the vision of society that should guide a particular community, or region, and what input will that community have in defining and implementing its vision? From the outside perspective (which includes the donors and foreign NGOs that are promoting water supply projects), what values and political/economic agendas will be embedded in those projects?

### *Competing strategies*

By adopting the position that access to clean water and sanitation is a human right, the UN is effectively telling its member governments that they are responsible for doing something, but it is up to them – the governments on behalf of the societies they are responsible for representing – to decide how to go about meeting the water challenge. On what basis will they choose between the many alternative ways of ensuring access to water and sanitation? How can the process of providing clean water and sanitation bring communities closer to the world they would like to live in? Here are seven pertinent issues to think about:

1. *Community empowerment*: Development programs often include a focus on building institutional capacity at the community level. Some societies, notably the rice-based societies of Southeast Asia, place greater emphasis on the well-being of the community (see Bray 1986) than do Western cultures, but even in the individualistic West, the importance of the community and social capital is well recognized (see Putnam 2000). In the example of Gram Vikas cited previously, the requirement that the entire community agree that every household will be equally serviced is not only a way of leveraging social equity, but is also intended to strengthen the community's capacity to act on behalf of the common good.

2. *Decentralization*: Rural water programs, whether for supplying drinking water or sanitation, can be an opportunity for building institutional capacity at any chosen level, ranging from household-level organizations such as user management groups, to village-level government, to trans-village NGOs, district or provincial level government agencies, or national government. In the Ferghana Valley project in Uzbekistan, participation and local capacity-building was pursued at the village level for the very practical reason that local and regional government agencies lacked the capacity to provide rural water services, and local village-level management was the only viable option (SDC 2016). In this case, institutional capacity-building was done primarily for practical reasons of economic effectiveness, rather than as a path to social development goals. This distinction can sometimes make a practical difference in the level of commitment to participatory approaches. In Sri

Lanka the implementing agencies in a rural water program had an initial objective of working through community-based organizations but later backed away from this approach, and opted for an agency-run approach (James 2011).

3. *Self-supply*: In contrast to setting a goal of community empowerment, some water supply initiatives explicitly seek to foster individual entrepreneurial behavior in water supply projects. For example, local entrepreneurs (individuals, households, or small groups) finance water service for themselves, and then sell water service to their neighbors (Danert 2012:19). The aim might be to foster entrepreneurialism as a value in itself, with water supply as the means to this end, or the aim could be to provide water to under-served communities, with entrepreneurialism as a means to effective water service (Sutton 2017).

4. *Environmental justice*: Providing clean water in a situation of contaminated supplies (e.g., from oil production or mining operations) serves to substitute, however inadequately, for the loss of the customary water sources. Providing sanitation can have a conservation goal of keeping surface water clean for downstream users and/or aquatic life. Both water supply and sanitation infrastructure can also be targeted to relieve pressure on parks and protected areas, as in the case of the Ranon'ala water supply project in NE Madagascar (Bonnardeaux 2012).

5. *Cultural restitution*: Boreholes for water supply are helping the Kalahari Bushmen in Botswana to reclaim ancestral lands that are now cut off from traditional water sources due to land ownership patterns. In this case it was a national court decision that accorded the Bushmen with water rights, a ruling based largely on the precedent of the UN in recognizing the human right to water (Barlow 2012: xvi).

6. *New technologies*: Some water supply projects focus on a technical "fix" to supply water without trying to affect anything else. An unusual example of this is the LIFELINK project of Grundfos, a large Danish pump company, which is trying to make its pumps useful to pastoralist communities in Kenya. Under the project, the company drills a well and installs a solar-powered pump and water storage tank which is monitored through a satellite link. The system is designed to be nearly maintenance free, with a high initial cost but very low operating costs. Users get access through a smart card linked to their account, which they access through their mobile phones. Grundfos initially hoped that this arrangement would be self-financing but found that in the sparsely populated regions of Kenya where pastoralists predominate, the income from water sales was too low and the costs of maintenance too high for a commercial business model, yet it was

in these remote regions where the service is most needed. In response, the company shifted to a “donation model” in these areas, partnering with external donors (both government and NGOs) to subsidize the infrastructure in remote regions, while in large villages or towns, the commercial model was viable at least in covering operations and maintenance costs (Anderson 2018).

*7. Environmental ethics:* One of the motivations for constructing centralized water supply schemes is that local water sources may be contaminated by human or industrial waste. If environmental restoration is a clear ethical priority, however, cleaning up local water sources can support a decentralized water supply, while relieving stress on the non-local sources of supply that would otherwise need to be tapped. An example comes from my own city of Santa Fe, New Mexico. Shallow groundwater, the historical source of drinking water, is a renewable resource, recharged by the local river (when it is not impounded further upstream). However, the city’s shallow aquifer is potentially contaminated by past urban and industrial waste (e.g., leaking petrol storage tanks and chemicals from former factories). Rather than remediating the sources of pollution, the water utility taps into a deeper, cleaner, but non-renewable aquifer which is steadily declining as a result of pumping. The capacity to tap into new water supply sources is an understandable priority for an expanding city, but, in the absence of a countervailing environmental ethic, can lead to mismanagement of existing sources.

### *The ethics of what*

After the goals of a water supply or sanitation project are clarified (the “why”) along with the strategy for meeting those goals (the “how”) there remains the issue of deciding what that work will consist of. The weak links in this process, typically, are at the very beginning of project development, including strategy development and deciding what steps need to be taken in order to implement the strategy (Smith 1988). Rural water supply projects are particularly prone to cutting corners in thinking through the implications of good intentions to provide safe water. Water provision seems like such an obvious need that analysis of community ethnicity, social structure, and power relations can seem to be a needless distraction from actual project implementation: drilling wells, installing pumps, and training local people to use them. This was why I hesitated when I read the letter from my friend’s daughter who was going to Ghana for a summer program to help rural communities. Was the sponsoring organization committed to the preliminary analysis of understanding the problem, before launching the solution?

There are lots of things to consider. “Look before you leap” is advice meant to protect not only “you”, the person about to leap, but also the people whose

lives you are about to leap into. There is a well-established discipline of rural development that has attracted some of the best minds of social science over the past half century. The designers of new water supply projects need to do a lot of homework to avoid the mistakes and take advantage of the valuable lessons of development practice. In particular, the discipline of rural development has refined participatory approaches that strike a careful balance between respecting local socio-cultural traditions and self-determination, while offering new opportunities, for example, in the form of improved water and sanitation systems. That balance can be easily upset when new water supplies are controlled by government agencies rather than by the local communities themselves. Citing the case of a community in Soweto, South Africa that received water services accessible only through a prepaid meter, Clark proposes “taking a *water sovereignty* approach to *water security*” (2012: 186; emphasis in the original). Water is more secure, in this view, when it is controlled by the local community.

### *Water supply or sanitation?*

While the UN Human Right to Water recognizes both clean water and sanitation as co-equal priorities, there has been far more attention given to rural water supply than to rural sanitation. There is the simple logic that we die quickly without water, but we die slowly and less obviously through the lack of sanitation. But there are also two other reasons that rural sanitation has lagged behind water supply. One reason is the cultural reluctance to discuss excrement and the private behaviors around defecation. The other reason is gender. Women are disproportionately affected by lack of private sanitation options, while decision-making about sanitation programs has been dominated by men. The challenge of breaking through taboos and unacknowledged gender bias has led to some innovative sanitation initiatives that are motivated by ethical values (social equity) and also make use of values in devising solutions.

The concept of community-led total sanitation (CLTS) emerged in the early 2000s as a response to the entrenched cycle of open defecation in many developing countries, and particularly in Sub-Saharan Africa and India. The approach incorporates the concepts of “participatory learning and action” (Chambers 2007) to facilitate village-wide consensus about whatever actions are to be implemented (Kar and Chambers 2008). From an ethics perspective, the approach embraces multiple value principles including social equity and participation in planning, designing implementing, and managing the construction of toilets. Most critically, the approach spurs the establishment of new behavioral norms promoting toilet use and discouraging open defecation.

While open defecation continues to be widespread in India, the experiences in both Africa and other parts of South Asia are encouraging. Research suggests that toilet use in Ghana is being adopted as a result of CLTS interventions

(Crocker et al. 2017), while in Bangladesh, open defecation has effectively ended thanks to a multi-year CLTS program (Tagat and Kapoor 2018). And even in India, things might be changing. Infamous for high levels of open defecation in rural areas, traditional Hindu values about purity and pollution (with human excrement at the top of the pollution list), which is further reinforced by the caste system, have translated into the world's highest levels of open defecation. The CLTS approach which is clearly working in Africa has also had some success in India, but rates of open defecation remain stubbornly high. Even where toilets are provided, they are not necessarily used and fall into disrepair. What to do?

Transforming strong traditional values about sanitation requires strong values about something else, and for India, that “something else” is marriage. Every family wants their sons to marry a suitable girl, but in the most conservative regions there is a surplus of boys and a deficit of girls, as a result of ultrasound-assisted selective abortions. This has placed girls, and more specifically their families who make the marriage arrangements, in a strategic position to effect change by insisting on a working toilet in the home of the prospective husband. (The typical marriage pattern is that the girl marries a boy from a different village and moves in with him and his parents.) Campaigns of “No toilet, No bride” and “No loo, No I do” might do more to raise toilet awareness than years of conventional sanitation projects (Stopnitzky 2017). And perhaps even more importantly, Bollywood has gotten involved. Film director Shree Narayan Singh's 2017 blockbuster movie, *Toilet: A Love Story*,<sup>5</sup> recounts the tale of a young bride insisting that her husband provide a toilet in her new home. The movie is contributing to new social norm for India's 700,000 villages.

### *Ethics in urban water supply*

Urban water supply is more than just a bigger version of rural water supply. Whereas rural water supply and sanitation is almost exclusively about providing water and sanitation for households (whether scattered homesteads or clustered into villages), urban water supply places more emphasis on the city as a collective space. Water is used not only for a city's water *needs* – meeting domestic demands for drinking, cooking, flushing, and irrigating household landscapes, and urban business demands for offices, shops and factories, and perhaps some urban agriculture as well – but also for a city's water *wants* – to make the city a more enjoyable and fulfilling place to live. Waterfront development, fountains, and daylighting and restoring forgotten urban streams to create ribbon parks are some of the ways that water can contribute to the aesthetics and quality of urban life.

An ethics approach to urban water considers the community's value priorities about both water and about urban life to explore potential synergies across values. There is a lot of wiggle room in what we too easily label as our water “needs,” and critical examination can usually uncover new

potentials for using less or alternative ways of meeting the essential practical demands that will also provide environmental, cultural, or other benefits. The aim is not only water conservation (using less) but finding synergies across multiple values and functions to derive greater total value from the urban water system. If water is not serving multiple functions and contributing to multiple value priorities, there is something wrong with the strategy!

### *Sustainability of water supply*

Cities need to be concerned about the security and sustainability of their water sources, even if this strategy comes at the expense of the long-term sustainability of the resource. After all, cities need water every day, and if their immediate thirst can be quenched only through over-drawing their water sources, they have little choice. But there are limits to such an approach. Withdrawals from nature that exceed the sustainable yield of the water source cannot continue indefinitely. Either the rate of water withdrawal will need to be reduced, or a new source of supply will need to be found. Calculating the sustainable yield, however, is not only a matter of technical measurements, but also involves values. The amount of water available to divert from the river, or to extract from the aquifer, depends very much on how much water is to be left in nature. How healthy do we want our river to be? The concept of minimum environmental flow, as used in river management, offers a general approach to establishing a baseline (Arthington et al. 2018, and see discussion in Chapter 2). Even if we are clear about the values we are trying to manage for, the very concept of “sustainable yield” tempts us into trusting that we know what that level is and that we can actually manage against that target. In real world conditions, there are too many variables that we either don’t know, or that we can’t control. The practical result of trying to implement “sustainable yield” tends to be over-exploitation (Holt 2011).

On the other hand, over-exploitation, in the sense of using water resources at higher rate than can be sustained, can be part of a larger strategy that is deemed sustainable. For example, “managed aquifer depletion” (i.e., the deliberate mining of groundwater) is often defended as a viable strategy when integrated into a long-term water plan (Llamas 2004; Campana 2018). This seems acceptable because an aquifer is framed as a resource (water) unlike a river that is framed as an ecosystem (water plus biological organisms). But aquifers usually have an impact on associated ecosystems, such as streams, springs and wetlands. Do these not matter?

The International Water Association recently formed an interest group on “Basin Connected Cities” to identify best practices. Can cities become good neighbors within the context of their water basins, or will they inevitably pose an existential threat to the rivers that have the misfortune of flowing near them? My own city of Santa Fe, New Mexico, clearly would rank as a bad neighbor

to our local rivers. The small Santa Fe River that flows through the city is completely impounded for urban water supply with only a trickle released for aesthetics and a bit of aquifer recharge. The much larger Rio Grande, 20 kms away from Santa Fe, has recently become the city's primary water source, adding to the many demands on that beleaguered river.

The ethical choices that have dried up the Santa Fe River, and have partially dried up the Rio Grande, can be seen most starkly in the long-term water supply plan that our city of Santa Fe has drawn up. Where will our future water come from? We will always have enough, say the water planners, because we will eventually reuse our water either indirectly (by returning the city's treated effluent to the Rio Grande) or directly (toilet-to-tap treatment). But though we have the technical and financial capacity to do this already, we choose to sacrifice our rivers first, and only when those depleted rivers have no more water to give, are we willing to make the investment of serious conservation and full water recycling.

There are two sustainability principles that are being regularly violated in the conventional water paradigm of the American West. One is the precautionary principle: There is a lot that we don't know about the implications and ramifications of our water use, so we should error on the side of caution to avoid drastic unintended consequences. The second principle is a combination of respect and compassion towards the natural world. Feeling a concern for the welfare of nature in the same way that we feel concern about the welfare of people is "an evolutionary possibility and an ecological necessity" in the words of Aldo Leopold, cited in Chapter 1 (Leopold 1970: 167). Peter Brown and Jeremy Schmidt (2010: 265–266) call for "an ethic of compassionate retreat" that is mindful of two factors:

The first addresses scientific uncertainties about water's role in earth systems and the potentially detrimental effects of acting on inherently limited knowledge [precautionary principle]. The second enumerates humanity's duties of respect and reciprocity...as a responsible member of Earth's living communities.

(Brown and Schmidt 2010: 265–266)

When I lived in Tucson, Arizona, in the early 1980s, the city's water supply came from over-pumping local groundwater, and much of that water was used to irrigate lawns and gardens in this semi-arid climate (annual rainfall in Tucson is about 300mm or 12 inches). This strategy resulted in dramatic declines in the water table and the drying out of the city's only perennial river, the Santa Cruz (Lamberton 2011). But today Tucson's water supply no longer depends on its local aquifers. Thanks to the massive Central Arizona Project (CAP), the city imports 80 percent of its water from the Colorado River 336 miles (540km) to the west (where the river forms the border between Arizona and California), through an open canal that slices through the desert, and climbs (via pumps and pipes) some 2,400 feet (730m)<sup>6</sup> to the city of Tucson.

Along the way, the CAP also delivers water to Phoenix, providing about 30 percent of the urban water supply of the greater Phoenix area. The rest, about 70 percent of the CAP water goes to agriculture, mostly cotton.

Given that the Colorado River no longer reaches its once biologically diverse delta on the Sea of Cortez in Mexico, does the water flowing through the CAP canals render the water supplies of Phoenix and Tucson more sustainable or less so? Consider this question from the perspective of Tucson. The imported CAP water from the Colorado River is actually doing more than meeting 80 percent of Tucson's water "needs". Tucson's allocation of CAP water is more than the city can reasonably use, so the surplus water is being used to recharge the city's depleted aquifers. From the Tucson vantage point, the imported CAP water from the Colorado River 540kms away is an unmitigated blessing. It provides a new source of water while it lasts, and if and when the CAP falters (as climate forecasts envisage), Tucson can go back to its aquifers.

Tucson, in other words, has much more water than it needs, thanks to the generous supplies extracted from the dying Colorado River. Why not simply leave some of that unneeded water in the Colorado River where it most certainly is needed? In his recent book on the Colorado River, John Fleck (2016) points out that large cities in the basin can easily generate water surpluses as they implement water conservation measures, but they have little incentive to take less out of the river system because it would simply be used by the next city (or state) downstream. In this regard, both the Rio Grande and the Colorado River face a similar tragedy of the commons that would require national-level leadership and negotiations among the riparian states. And I would add that overcoming the tragedy would also require some attention to the ethics that allow this situation to persist, and some ethical imagining of possible solutions. The growing literature on transboundary water negotiations (Petersen-Perlman et al. 2017) could offer some ideas, including how an ethics perspective can facilitate mutual understanding among the negotiating parties (Grunwald 2016).

While the exploitation of the Colorado River seems unethical from an environmental and next-generation perspective, there have also been some social and cultural benefits. Farmers, who should anyway be adopting more water-saving farming practices, are able to continue in agriculture thanks to this new supply of water which has reversed the trend of cities purchasing farms to capture their groundwater rights. The intense competition over groundwater between farmers and cities (Molle and Berkoff 2009) has now been replaced by cooperation, as both sectors enjoy the luxury of ample water, at least temporarily. Similarly, the Gila River Indian Tribe whose customary irrigation sources had been usurped by the growing city of Phoenix nearly a century ago, have been able to return to farming. Though their revitalized agriculture bears little resemblance to their traditional practices, their renewed ability to pursue agriculture is revitalizing their cultural identity in important ways (Lewis and Hestand 2006).

When the source of urban supply is a distant river in failing health, can the city that is contributing to the demise of that river be considered sustainable? It has become expected behavior for western US cities to formulate long-range water plans that identify where all the water will come from over the coming 40 or 50 years, what are the values that are driving the strategy and what are the values that are being left out of the plan? When the numbers add up, the plan is considered “sustainable.” A key feature of such plans is to embrace the approach of “demand management” which has largely replaced the earlier focus on “supply management” which relied on finding new water sources for growing cities (Brooks 2006). An example of urban water demand management is the campaign to replace grass lawns with xeriscape gardens that need little or no irrigation, which many California cities adopted during the drought of 2013–2015.

While “demand management” could potentially lead to transformational changes in how water is used and for what purposes, in practice, the approach tends to focus on the low-hanging fruit, or the “soft path approach to water management” (Brooks et al. 2009). Green lawns are good targets because they offer considerable water savings if converted to xeriscape, while also providing an educational bonus for the neighbors. Most importantly, perhaps, since water conventions are only being tweaked and not challenged, it becomes easier to generate public and political will around the initiatives. Cities everywhere are investing in water conservation programs, but perhaps the most ironic poster child of water conservation initiatives is the world’s casino capitol, the city of Las Vegas, Nevada. Can this urban icon of materialism and greed become an inspiration for urban water conservation?

### *Ethics of water conservation*

The logic behind water conservation programs in arid cities like Las Vegas, Nevada, is straightforward. They do not wish to share the fate of Fatehpur Sikri in India (mentioned earlier in this chapter) and become an archaeological heritage site for future tourists! Conservation is just one of the strategies being used by Las Vegas to attain water security. A parallel strategy being explored is to purchase and retire agricultural groundwater rights 500kms to the north and construct a pipeline to deliver the water to Las Vegas, a proposal which has sparked considerable controversy (Welsh and Endter-Wada 2017). The ethical debate is an old one: Should water be used to support the economy of a far-away city (in this case, Las Vegas), or should that water be used to support local, rural ways of life, agricultural production, and associated ecosystem services? Water conservation programs in Las Vegas have lowered per capita water consumption by 36 percent from 2002–2015, thanks in part to removing 17 million square meters of grass lawns<sup>7</sup> and installing low flow faucets and appliances (see Box 4.4). Water conservation has bought some breathing room for Las Vegas to contemplate the next phase. But success in water conservation can also function as an obstacle to more profound transformation in the urban water sector (Sullivan et al. 2017).

#### **Box 4.4 Conspicuous water consumption in Las Vegas**

Visitors to the Las Vegas Strip, where the major casino resorts are clustered, might be surprised to learn that they are in a desert city... Or is that precisely the point? Consistent with the free flow of money in the slot machines and blackjack tables inside the Ballagio, Wynn, and other resorts, there are sky-high fountains outside. Wynn Resorts is planning to build a 20-acre artificial lake as the focus of the new Paradise Park Resort.

Is that ethical? That was the question a Las Vegas reporter asked me in a phone interview. As an expert on water ethics, what did I think about the plans for an artificial lake (which at the time of the interview was slated to be 38 acres, since reduced almost in half)? I surprised myself at being reluctant to condemn the lake concept. The lake would replace a golf course, and there might even be a small net savings in total water consumption. I didn't feel comfortable condemning the golf course, so why would I condemn the lake?

Since then I've formed a different view of the lake, and the golf courses, and the grandiose fountains in front of the big resorts. The conspicuous consumption of water in a desert is not a benign or neutral act (di Muzio 2015). It is a display of symbolic power (Bourdieu 1989) that sends a message – to the other wealthy clientele and to less wealthy admirers – that we are not bound by any environmental or social constraints. We, the powerful, call the shots, and right now we want to see water spurting into the air, or we want to play golf on rich green grass, and we want others to see us doing this! Water wastefulness is being celebrated, in a desert, for symbolic power. It is an interesting use of water, but perhaps we might be able to imagine some better uses!

In Tucson, the city promotes water harvesting and water reuse to reduce its overall water footprint, offering up to \$2,000 in rebates for water harvesting systems (Weiser 2018). Reducing a city's water footprint represents an economic ethic of minimizing waste, and a social ethic of contributing to the general welfare of society, but it does not necessarily address the question of how the water is being used, only how much water is used. Replacing a grass lawn with a xeriscape garden is a bigger step into new values about what constitutes a pleasing landscape and viewscape. This is the idea behind the concept of "water sensitive urban design" being developed in Australia (Grant 2016). The goal is to save water without sacrificing aesthetics. It involves working with communities to ensure the planning, design, construction and retrofitting of urbanized landscapes are more sensitive to the natural water cycle. The liberation of clever design is that quality of life can actually improve while saving water, through capturing urban storm water in urban lakes and water parks,

and at the household level, learning to appreciate the aesthetics of local native plants and reconceptualizing roofs as devices to capture water for household use and reuse.

### *Designing for a new urban water agenda*

The UN Habitat III conference held in October 2016 in Quito, Ecuador, launched a *New Urban Agenda*<sup>8</sup> aimed at sustainability, social justice, and citizen engagement in creating livable and desirable cities. Cities are more than tight clusters of lots and lots of people; they also present opportunities for creativity and innovation. The fact that an ever-increasing majority of the world's population lives in cities implies that "the world we want" is going to be predominantly an urban world. How can water contribute to urban life beyond the provision of basic water and sanitation to the urban population? Universal access to safe water and sanitation is an urgent priority, but it does not need to be the final goal; it can be the foundation for a New Urban Water Agenda.

The "big three" water responsibilities that cities have long recognized are flood protection, secure water supply, and safe wastewater management. Each of these is hugely expensive and highly technical, which has placed decisions very much in the hands of engineers who tend to address the design challenges from a largely technical perspective. But in addition to functioning as a basis for life, the ways in which water is used, particularly in an urban context, can add additional enjoyment, meaning, and positive value. This is what urban designers like to do. In the words of London-based global design firm Arup, "By placing a re-integrated water cycle at the heart of sustainable planning, design and delivery, we ensure actions taken to protect and enhance the water cycle can deliver multiple wider benefits" (Arup 2013). But design thinking is not just for designers; it is a perspective that anyone can use to help imagine new possibilities (Brown and Martin 2015).

Urban spaces, and the larger waterscape of cities in the context of its water basin, provide a canvas for creative thinking, imagining, and designing how best to incorporate water into our urban lives. What is it that we want to use water *for*? What synergies can we find among our diverse and sometimes competing values? For example, flood protection can be accomplished with hard engineering such as levees and dams to prevent water going where it would normally like to go. An alternative is to provide much more room for rivers to spill over their banks and to occupy large swaths of floodplain. Such an approach requires more land, but that land can also serve as recreational parks or wildlife areas. This is the concept behind the 4,000ha Trinity River Park that runs through the city of Dallas, Texas. The park is designed to fill with water during floods, and revert to a beautiful park when the floods recede (Anzilotto 2017).

Natural "green" infrastructure offers a range of alternative solutions to storm water management and water and wastewater treatment (UNEP 2014; WWAP 2018). The advantage of green infrastructure vs. conventional engineering approaches, in addition to potentially lower costs, is the ecosystem services that

are preserved or regenerated. But there may also be additional social, cultural, or governance reasons for opting for green solutions. The process of engaging with local stakeholders to develop consensus about a possible green infrastructure solution (such as Trinity River Park) can lead to a better decision about the technology to adopt and also encourages the stakeholders to become involved in the whole life-cycle of the project, providing accountability to the agencies involved, while providing valuable education to the stakeholders.

Making urban water more visible to urban stakeholders can take many forms, and serves many overlapping aims. In Seoul, South Korea, the Cheonggyecheon waterway restoration project saw the replacement of a large freeway with a restored river channel and the welcome return of waterway flora and fauna to the city (Revkin 2009). In Los Angeles, water ethics are taking visible expression through “daylighting” the Los Angeles river that had become buried by urban development. Highways, buildings, and parking lots had been constructed over the river, and the channel, where it existed at all, was lined in concrete. Over the past decade, the river has been slowly coming back to life, serving not only as a new, revived amenity for the city, but now playing a bigger role as a symbol of the city’s own New Urban Agenda (Klaver and Firth 2014). Here are the words of LA Mayor Eric Garcetti:

The Los Angeles River has sustained human life for centuries and attracted the settlements that founded our city.... Its concrete channelization, which began in 1938 and was completed in 1960 changed Angelenos’ relationship with the waterway, and led to the River’s neglect. Today, I am proud to say that our city has undergone an extraordinary transformation in how it understands and views the River. We now value it for its potential to reconnect neighborhoods, revitalize communities, and re-emerge as a cherished natural and cultural resource. The L.A. River and its watershed are central to making Los Angeles a sustainable city, and thousands of Angelenos have rallied to support its restoration.

(Garcetti 2018)

The story of how the Los Angeles River has been transformed from a massive concrete channel into a restored river involves roughly equal doses of art and imagination, classic newspaper reporting (a 20-part series on the river in 1985), organizing (the founding of Friends of the Los Angeles River in 1986), city planning (the 2007 Master Plan), academic research (an MIT Masters’ thesis and various books and articles), and cooperative federal agencies (the EPA and US Army Corps of Engineers). The energy that has driven this restoration forward and facilitated synergies rather than obstacles is identified by Klaver and Frith (2014) as “environmental imagination.” They note that not only is this type of imagination good for the environment, but also strengthens and vitalizes the culture by developing the “capacity to aspire” in the words of Arjun Appadurai (2004). River restoration offers a platform for imagination and aspiration, and it can serve an equally important role in renewing people’s

connection to nature. Indeed, urban renewal and “human-nature” renewal can be integrated and synergistic.

Nearly every city has one or more rivers, which is usually the reason the cities exist at all. Restoration of the urban riparian corridors inevitably involves restoring historic buildings and central spaces, along with repairing the ecology of the river itself. The result might be artificial, but with flowing water it can still feel natural. The “River Walk” in San Antonio, Texas, features a river running through the heart of the city which is fully regulated by pumps and pipelines, but the aesthetic feel is authentic enough to attract people, businesses, and especially cafes and restaurants. These new green open spaces are helping to drive local economic activity in the city (Binney et al. 2010: 18) and have many additional “multifunctional” benefits for city residents. Indeed, the economic benefits can be so attractive that other important values, such as social equity and participatory governance, are in danger of being crowded out. This is a concern being raised in Los Angeles as booming real estate prices along the restored Los Angeles River will require careful regulation, zoning restrictions, and probably special legislation to ensure public access to the restored river front (Kreitner 2016).

The impetus to invest in urban river restoration comes from ethics that place a value on the river itself, along with human enjoyment of the river. While economists look for quantifiable benefits the vision to pursue river restoration, whether in Los Angeles or Seoul, is motivated by intangibles, and the economics were made to fit through fundraising and political lobbying in the case of the Los Angeles River. In both cases there was a shared vision not only of what the river could look like in the future, but why it would be a good idea for that vision to become reality.

Growing awareness of the risks of climate change and the unsustainable models of... development offer new prospects for the regenerative city and the circular economy (see Box 4.5). This goes beyond the concepts of reusing and recycling to restoring, replenishing, and enjoying the water ecosystems that support urban life. “It allows for a different relationship between urban and rural areas and offers a new prospect for urban and peri-urban agriculture and the foundations for the truly ecological and resilient city” (World Urban Campaign 2016: 3).

#### **Box 4.5 IWA’s 17 principles for urban water management<sup>9</sup>**

##### *Level 1 – Regenerative Water Services*

- 1 Replenish water ecosystems
- 2 Reduce the amount of water used.
- 3 Reuse water
- 4 Integrated water with other urban services (e.g., waste and energy)
- 5 Increase resilience through modularity and redundancy.

*Level 2 – Water Sensitive Urban Design*

- 1 Design urban space to enable regenerative water services.
- 2 Reduce flood risks by creating safe flooding spaces sponge-like design features
- 3 Enhance liveability with visible water and green infrastructure;
- 4 Adapt urban materials to minimize water pollution;

*Level 3 – Basin Connected Cities*

- 1 Plan for drought mitigation strategies with other users in the basin;
- 2 Protect the quality of the water resource.
- 3 Prepare for extreme events

*Level 4 – Water-Wise Communities*

- 1 Involve citizens in sustainable urban water vision.
- 2 Develop synergies between water and urban planning,
- 3 Adopt a “one-water” approach for all city departments
- 4 Encourage water-wise policies and financing mechanisms
- 5 Build leadership capacity for a progressive water vision

## **Conclusions: Water and sanitation as ethical opportunities**

Water and sanitation are fundamental human needs and since 2010 have been globally recognized as fundamental human rights, but they are also much more than that. Whether in crowded urban environments or in remote rural hamlets, our relationship to water can, and deserves to be, both fundamental and culturally meaningful at the same time. The very fact that we use water in so many ways throughout the day, in activities blasé (brushing teeth), exciting (swimming), or both (showering) provides opportunities for designers and artists to tweak our daily experiences with creative impulses. We may not *need* to hear the sound of water gurgling in a fountain in the same way that we absolutely do need safe water to drink each day, yet both types of experience can add a subtle influence of meaning to our lives. And we may not need our toilet to be housed in a colorful, light and airy structure, but we do need hygienic sanitation, and why not render the necessity enjoyable and affirming? The concept of fundamental human rights includes the right to dignity,<sup>10</sup> but this does not mean that basic services are enough to support a dignified life. Our aims can be higher; we can look for creative, enlivening solutions to necessities such as water and sanitation with the aim of not only supporting but enhancing human dignity (Andorno 2014; Ki-Moon 2014).

When the provision of water and sanitation is viewed as “a social opportunity” (Davidson et al. 2015) and not simply as a social need, we open the door for ethical imagination to drive creative solutions. Our values, or rather, the values of the community, become design parameters for new solutions. This is where we need to disaggregate different types of ethics (social, cultural, economic, environmental, governance), and at the same time we need to look for value synergies and value conflicts. Ethics do not work inside the silos of our value categories but rather across the silos; the real world is messy.

The environmental priority of re-naturalizing a river channel – whether in Santa Fe, Seoul, or Los Angeles – does not exist in isolation from the related social motivation of the human enjoyment of the new river channel, or the economic interest of enhancing tourism appeal, or the promise of other intangible benefits such as educational learning, psychological solace, spiritual insights, or aesthetic inspiration. This is the reason that river restoration projects, such as dam removal, which are highly controversial at the time they are adopted, typically find new and enthusiastic converts after the fact, as the multiplier effects of interacting benefits are gradually realized and appreciated (Grossman 2002: 1–8).

There will always be competing values and ethical assumptions which will manifest as controversies. Should Las Vegas be allowed to dewater a rural valley 300 miles away in order to continue its runaway urban growth? The controversies around competing values can, I believe, also serve as a basis for building cooperation. The incessant thirst of large cities is frightening not only to their rural neighbors but also to the urban residents themselves. Where will their water come from when the next drought strikes? Perhaps cities can start trying to earn the respect of the farmers by adopting radical water conservation through state-of-the-art water sensitive designs for collecting rainwater, reusing gray water, and recycling at least some of the water back to drinking water, as Singapore has already institutionalized (Barnett 2011).

But even more important than making peace between the cities and the farmers is peace between people and the water ecosystems on which we – our cities as well as our food supplies – ultimately depend. We can’t live without nature, and if we could, we probably wouldn’t want to. Not only poets and artists, but also psychologists can attest that we are happiest when we feel connected to the natural world (Roszak 1992) and when our built environments, whether buildings or cities, incorporate “biophilic” design principles (Kellert 2012). While the world has had cities for more than 5,000 years, it is only in the past few years that city dwellers became a global majority. The water supply systems that service the needs of this urban majority can, with creative designs and clear ethical principles, help us to reconnect with the natural world and inspire our efforts to use nature’s water respectfully. Rural water supply systems offer much easier ways to integrate the functions of water and sanitation provision with an awareness of water ecosystems. With an awareness of the importance of keeping that connection alive (environmental and cultural values), we can meet our economic goals, honor our social values (the right to water and sanitation), and perhaps live happily ever after!

### Discussion questions

- What do you see as the most important values that rural drinking water provision can advance?
- If you were responsible for planning a rural sanitation program, how would you go about it? What would you need to know?
- What is the responsibility of cities to their surrounding water basins? How much water should cities be allowed to import, from how far away, and who should decide?

### Notes

- 1 <https://www.yritwc.org>
- 2 <https://govinsider.asia/inclusive-gov/96-of-jakarta-has-no-sewage-system/>
- 3 [www.gladtidingsindia.org/ministries/water-wells/](http://www.gladtidingsindia.org/ministries/water-wells/)
- 4 <http://projects.worldbank.org/P110267/second-rural-water-supply-sanitation?lang=en>
- 5 Toilet - Ek Prem Khata, <https://www.youtube.com/watch?v=xcEkUq4ilZY>
- 6 Data from the Central Arizona Project website, [www.cap-az.com/](http://www.cap-az.com/).
- 7 Southern Nevada Water Authority website, <https://www.snwa.com/drought-and-conservation/conservation-facts-and-achievements/index.html>
- 8 <http://habitat3.org/wp-content/uploads/NUA-English.pdf>
- 9 [www.iwa-network.org/wp-content/uploads/2016/08/IWA\\_Principles\\_Water\\_Wise\\_Cities.pdf](http://www.iwa-network.org/wp-content/uploads/2016/08/IWA_Principles_Water_Wise_Cities.pdf)
- 10 Article 1 of the Universal Declaration of Human Rights states, “All human beings are born free and equal in dignity and rights...”

### Further reading

- Grant, G. 2016. *The Water Sensitive City*. John Wiley & Sons.
- Jiménez, A., Jawara, D., LeDeunff, H., Naylor, K.A., and Scharp, C. 2017. Sustainability in practice: Experiences from rural water and sanitation services in West Africa. *Sustainability*, 9(3). <https://www.mdpi.com/2071-1050/9/3/403/htm>
- World Urban Campaign. 2016. *The City We Need 2.0: Towards a New Urban Paradigm*. UN Habitat. [https://unhabitat.org/wp-content/uploads/2016/03/The%20City%20We%20Need%20TCWN\\_2.0.pdf](https://unhabitat.org/wp-content/uploads/2016/03/The%20City%20We%20Need%20TCWN_2.0.pdf)

### Suggested viewing

- Shree Narayan Singh. 2017. *Toilet: A Love Story*. Trailer available at <https://www.youtube.com/watch?v=l3hdA3ZG5RM>

## 5 Water for industry: What is ethical use?



Wastewater treatment plant, Santa Fe, New Mexico, September 2017

Nearly every manufactured good or industrial process requires water for at least some phases of the production process: the extraction of the raw materials, processing of intermediate products (e.g., steel), manufacturing, transport, use and maintenance, and finally its disposal or reuse. The water ethics of companies, and particularly industrial businesses that manufacture water-intensive product like textiles or steel or electronic components, can be assessed at three basic levels: (1) The first level is the issue of responsible water use within the production process and opportunities for reducing direct water use (inside the factory fence) as well as indirect use throughout the company's value chain. These issues can be assessed through the concept of the "water footprint" which is discussed later. (2) The second level of industrial water ethics pertains to the water impacts (costs and benefits) to the people and ecosystems sharing the same water basin or aquifer. What is the company doing to, or for, the neighbors? (3) The third level, which is becoming increasingly important, is the company's role in promoting water-related norms and policies through its value chains or through policy dialogues with government, civil society, business associations, or other institutional mechanisms.

These three levels were described by Neville Isdell, a former CEO of the Coca-Cola Company, as three different types of imprints that corporations can have on the water sector. One is the company's water "footprint" and the technical challenges and opportunities all the way through the supply and delivery chains to find water-saving solutions. The second is the "handprint" of engaging with communities to enhance the sustainability of their common water supplies. And the third is the company's "blueprint" for influencing water policies beyond the company walls, from local to global (Isdell 2009).

For a water-using company, becoming involved in water is not optional. Every company has control over the way water is used internally (inside the company fence), and beyond that fence line, the company has influence either through engaging in water policies or by *not* engaging. Simply by inhabiting a particular "space" as a mining company, or a clothing company (both very water-intensive industries), a company already has an influence on the water commons. Our hypothetical company might be violating water regulations, thereby encouraging, by example, other companies to violate those regulations. Or the company might be complying with the regulations, thereby strengthening those regulations, again by example. We can never be neutral when it comes to water, and more to the point, we should not try to be neutral. Instead, we should embrace opportunities to influence water behaviors and norms and proactively seek out ways to make a positive difference to the world of water. Corporate water responsibility, in other words, is inherent; it comes as part of the territory of working in the water space.

Because water-using companies influence water policies one way or another, they incur a moral obligation to "own" their influence, to hold themselves accountable for applying their influence wisely and strategically, and then to be held accountable by other stakeholders sharing the same water commons. Here I am projecting the concept of "civic responsibility" onto corporate water

stakeholders. As a citizen, I have a certain responsibility to stay informed about local and national, and even international issues so I can develop an informed opinion about governance policies and, if necessary, raise objections, or offer ideas about those policies. A similar logic extends to companies that depend on water. They have a civic responsibility to become aware of their water use and to engage with other stakeholders in seeking solutions to the common challenge of water sustainability.

### *Why businesses care about water*

For most businesses, activism in finding cooperative water solutions is not an end, but only a means to enhance their own water security and minimize their water risk. With global water supplies already stressed, climate change adding new stress, and more and more water ecosystems on the verge of collapse from contamination and over-use, far-sighted CEOs are understandably concerned:

Water should be a priority in the boardroom of every company in the world. Managing water better is a key opportunity for business to create and develop competitive advantages, while securing their license to operate, reducing financial losses and altogether ensuring continuity of operations.

(WBCSD 2018: 5)

The water buzzword for the business community is “resilience,” which has a less environmental and social connotation than “sustainability,” as it has more to do with weathering disruptions. As a general rule, businesses favor consistency and predictability. Resilience is the goal, and the path to water resilience usually requires cooperation among diverse water stakeholders. Since water flows, water stakeholders are inevitably connected to each other. Businesses are never self-contained; they depend on networks of relationships constituting a “business ecosystem,” and for water-using businesses, a good part of that business ecosystem is tied to water:

“Businesses can’t evolve in a vacuum. They must attract resources of all sorts, drawing in capital, partners, suppliers, and customers to create cooperative networks.... I suggest that a company be viewed not as a member of a single industry but as part of a business ecosystem that crosses a variety of industries. In a business ecosystem, companies co-evolve capabilities around a new innovation: They work cooperatively and competitively to support new products, satisfy customer needs, and eventually incorporate the next round of innovations.”

(James Moore, writing in 1993, quoted in Sarni 2017)

The concept of business ecosystem, notes Sarni, results in a blurring of boundaries between stakeholders and roles. The business ecosystem concept is

important for understanding how pure economic motivations about water also overlap with values and norms about environment, society, culture, and governance. There is a “business case” for making decisions about water that also incorporate non-business values. The principles of water stewardship, and the full range of water ethics principles, can be good for business, but not just *any* business. What are the business models that support the value principles of water ethics?

***Level 1: The “water footprint” concept***

The concept of “water footprint” offers a shorthand way of thinking about, and measuring, the water used in making a product or in operating a factory. A factory’s water footprint refers to net water use, after subtracting water that is reused, recycled, or reclaimed during or after the manufacturing process (Hoekstra et al. 2011; Hoekstra 2013, 2015). While the water footprint is a tool that can be applied to a range of goals, the basic orientation of the footprint concept is economic and environmental. The tool helps companies, municipalities, organizations, or individual households to measure current water use (including indirect uses) and then to identify opportunities for reducing that use. The footprint can also be applied to the factory’s supply chain (e.g., the water used for growing the cotton which the factory processes into finished textiles).

A smaller water footprint is desirable because it implies higher water productivity (economic water ethic) and removes less water from nature (environmental water ethic). Society is better off because there is more water that can be used for other purposes, including the purpose of remaining in the river. Companies adopting the water footprint methodology do so because they want to identify how they can reduce their water use inside the factory or reduce their impact on water outside the factory. Why do they want to reduce their water use? Typically the motivation is couched as “sustainability” and water footprint assessments fall under the job description of the company sustainability officer. But a more accurate motivation is to minimize water risk and enhance water resilience. In the words of the World Business Council for Sustainable Development, “Water risks affect business profitability.... Companies face physical and non-physical risks driven by competition for water, pollution, regulation, and climate change” (WBCSD 2018).

Every company has a water footprint to some degree, but there is a great diversity of responses to those footprints. Most companies, of course, do nothing, many do something, and a very few have, for various reasons, made water a key element of their sustainability strategies. By investing time and resources into finding ways to use less water to produce the same products, and to return good quality water back to the environment, manufacturing industries are acting “responsibly” and ethically. For example, the Intel Corporation greatly reduced the water it previously used to manufacture computer chips, as a result of R&D efforts in the manufacturing process (Sarni 2011:201–204).

*Follow the footprint*

A company's water footprint provides a convenient starting point for embarking on a sustainable water agenda. More progressive companies interpret their footprint to also include the water footprints of their suppliers and sometimes even their customers. Unilever, for example, has reduced the amount of water used in manufacturing its products, but sees much greater potential for saving water through helping its customers, who use its soaps, laundry detergents and shampoos, to use less water in their activities of showering, washing clothes, and washing dishes. By designing product formulas that can be effectively rinsed with less water (thanks to anti-foaming agents), Unilever's customers are helping to reduce the company's overall water footprint.<sup>1</sup>

For companies more directly concerned about the risk of not having enough water to operate (a situation that is expected to become increasingly common as water scarcity tightens its grip), the first place to look for least-cost solutions for water conservation are within the factory fence. Particularly in the case of older factories designed without careful attention to water wastage, the returns to water conservation investments can be dramatic. An initiative to reduce water use in 35 textile factories (for weaving and dyeing) near Delhi, India, implemented 85 "low-hanging fruit" recommendations based on water audits. The results were staggering: Over a single year, the return on investment was 765 percent, with an average payback time of 11 days per project (SIWI 2014). The project reduced overall water consumption in the factories by 6.6 percent and at the same time also reduced electricity use by 3.4 percent, fuel use by 4 percent, and chemicals (for dyeing the fabric) by 14 percent. Overall production costs went down 1.7 percent.

While these dramatic numbers reflect the poor state of the textile factories prior to the project, and would certainly be less impressive in a second round of water conservation, there are three general lessons to draw from this case: (1) There are a lot of factories that could lower their water risk significantly by implementing fairly simple water-saving measures; (2) such efforts can often pay for themselves quickly enough to be financially attractive; and (3) there are often collateral benefits in saving energy and reducing water pollution that come along with reducing the amount of water used in the production process. In other words, there is often a strong business case for factories to invest in water conservation. So what is the need for ethics, if the economics already provide an incentive to save water?

Even when water conservation seems clearly in a company's financial interest, there are also transaction costs to consider, as well as risks. What if the new water-saving technologies don't work as advertised? Particularly if the anticipated cost savings are small, there may not be enough promise to outweigh the risks and uncertainties. This is where ethics can play a role: An ethics perspective can serve as a "nudge" to the manager, encouraging him or her to take action as much for the sake of the water as for the potential cost savings. Just as the prospect of financial profit is a motivating factor, the prospect of saving water can also be a motivation provided there is a corresponding ethic that places value on

saving that water. This water-saving ethic is not necessarily present; it may need to be inculcated through awareness-raising, peer pressure, or formal training.

*From my factory to yours*

The water conservation initiative in the Delhi textile factories was part of a pilot project of the Swedish Textile Water Initiative (STWI), a network of Swedish fashion brands working cooperatively to help their suppliers (in India, Bangladesh, China, Turkey, and Ethiopia) to adopt water-conserving measures (see Box 5.1). STWI grew out of the concern of the company, Indiska, to help its suppliers in India to treat the wastewater resulting from printing and dyeing cotton and silk textiles, which is big source of water pollution. Indiska, with technical support from Stockholm International Water Institute, developed a network of some 29 brands now reaching 277 suppliers, with plans to expand the network globally. The aim is no longer just improving the water footprint of the textile manufacturers in the supply chains, but transforming water use within the whole fashion industry:

The STWI guidelines are being promoted by brands that believe in acting responsibly and want to do so through suppliers that they have a direct relationship with.... [These] manufacturers have the power to influence water use and the release of chemicals from direct operations in their own factories. They in turn are expected to initiate a dialogue with their suppliers (of fabric and components), extend influence to their operations and improve the water situation further in the supply chain.... Compliance is a bare minimum requirement, and the aim is to drive water stewardship.

(STWI 2014:8)

**Box 5.1 Swedish Water Textile Initiative: The backstory**

Every year the city of Stockholm hosts “World Water Week,” which has become the premier venue for water policy-makers, researchers, NGOs, and businesses to simultaneously boast about their accomplishments and learn from their colleagues. During the 2010 conference, I attended a session on business ethics where one of the speakers was the sustainability officer from the Swedish clothing company Indiska. The company produces women’s clothing designed in Sweden, but made with fabric sourced primarily in India and Turkey. The speaker explained how Indiska was partnering with several other Swedish clothing companies, including H&M, in a new initiative to help their textile suppliers in Rajasthan, India, to drastically reduce water pollution from the dyeing process. Although local water regulations did not require it, Indiska was investing in water treatment equipment and training for the textile factories that produced its fabrics. As part of the contract with those suppliers, Indiska was setting up water quality standards that the factories had to meet, to

ensure that the textiles used in Indiska clothing was not contributing to water pollution in Rajasthan. The company's goal, she explained, was not only to protect, but to improve, local water quality by encouraging local governments to enforce the weak regulations that were already on the books and by providing training to local textile workers regardless of whether they worked for an Indiska supplier. This was an example, the speaker said proudly, of Indiska's commitment to making the world a better place.

In the Q&A that followed the presentation, an American business consultant in the audience asked why Indiska was doing something that obviously added an expense to the final product, which ultimately would be paid by the customer. Listening to my perplexed compatriot's question, I felt I already knew the answer. The Indiska speaker would explain that the environmentally sound manufacturing process used in Indiska clothing would add value to the final product, and customers would happily pay more for it. This is the standard philosophy behind green labeling: Give the customers the opportunity to support their environmental values through their purchase of the product. But that was not the logic the speaker used in her response. The reason Indiska is concerned about water pollution and sustainability, she explained, is simply that it's important; it's the right thing to do. When Indiska began in the 19th century, the textiles were made in Sweden and the pollution involved in manufacturing was also in Sweden. Today Indiska imports all its textiles from other countries, in order to keep costs manageable, but not in order to pollute those countries in the process. The company believes that Indiska should support the same environmental standards in other countries that it would need to comply with in Sweden. Since the company is family owned, it is free to set its own policies without regard to shareholders, but in this case, she added, there would probably not be any objection. In her view, what Indiska was doing was simply an acknowledgment of the company's responsibility to the people and communities supplying their textiles.

Indiska's pilot program has since grown into the Swedish Textile Water Initiative (STWI)<sup>2</sup> and includes more than 30 companies along with advisors from the Stockholm International Water Institute,<sup>3</sup> along with financial support from the Swedish International Development Agency.<sup>4</sup> The STWI initiative is

being promoted by [textile] brands that believe in acting responsibly and want to do so through suppliers that they have a direct relationship with.... [These] manufacturers have the power to influence water use and the release of chemicals from direct operations in their own factories. They in turn are expected to initiate a dialogue with their suppliers (of fabric and components), extend influence to their operations and improve the water situation further in the supply chain.

(STWI 2014)

## **Level 2: Business engagement within the watershed**

Manufacturing companies that are major users of water within their local watershed or river basin have an obvious interest in not antagonizing their neighbors, and protecting their “social license” to operate. Think of a steel plant, textile mill or the Intel computer chip plant located just 70km downstream from my home in Santa Fe, New Mexico. Or think of a Coca Cola bottling plant in India, or Africa, or Mexico. What does it mean to be a good neighbor to the other stakeholders in the watershed?

The neighbors’ concerns are most likely to revolve around how much water the factory is using, and the water quality impacts. The concerns of the factory, on the other hand, can be summarized in a single word: risk. From the business perspective, minimizing water risk means doing whatever it takes to ensure reliable access to water. There are three dimensions to mitigating water risk, beyond the obvious importance of complying with relevant legal and regulatory requirements: (1) invest in water conservation and efficiency measures within the production process to decrease the water demand; (2) enhance the sustainability of local water sources to ensure water availability, and (3) maintain good relations with local water stakeholders to ensure your social license to operate. It sounds complicated, but fortunately there is an integrated strategy that can address all three of these dimensions together: “water stewardship” (see Box 5.2).

### ***Water stewardship***

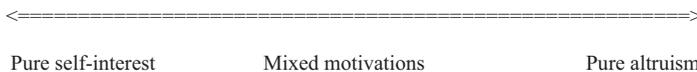
A company can become a good water steward by finding ways to reduce the factory’s internal water footprint, which then increases the effective water supply for the other local water stakeholders. By using less water, there is more for everyone else. This step can normally be justified through a standard business case of total costs being less than total benefits. When the company ventures beyond the factory fence to the larger water basin, however, it enters the territory of corporate social responsibility. It’s still possible to make a business case, but now it’s more complicated; there are more variables that the company cannot control directly. Water stewardship at the basin level is an indirect path to lowering the company’s water risk by investing in actions that will contribute to sustainable supplies of good quality water not only for the instigating company but for other companies and communities sharing the watershed. For example, the company could undertake or support watershed restoration programs, or negotiate a collective agreement to pay upstream polluters to change their behavior, so the downstream water becomes cleaner. Then, to reap the rewards of its good deeds, it can publicize those good deeds in self-serving advertising which also serves a broader educational purpose. When the next drought hits the watershed and the neighbors start to grumble about how much water the factory is using, it will be in a better position to ask for their cooperation and good will in developing a drought management plan that will be advantageous to the company.

Water conservation and management beyond the boundaries of companies' direct water use has become the next frontier of corporate concern, and not only as a complementary approach for managing water risk, but also at least potentially, as an altruistic project contributing to the welfare of the common watershed. Do intentions matter? Two companies might behave in identical ways for different reasons. Company A is concerned only with managing its own water risk, while Company B is concerned with the water welfare of everyone (including nature) within the watershed where Company B is located. Both companies engage with the whole watershed community to ensure the welfare of all, but Company A sees this as a strategy to ensure its social license to operate, even in times of water scarcity, whereas Company B's motivations in engaging with the watershed stakeholders stems from an earnest concern about the water welfare of all. Is Company B morally superior to Company A? Should we care?

We can visualize this question in terms of an ethical spectrum of good water deeds (see Fig. 5.1). On the left end are the good deeds that, while good for others, are clearly good for the company too (e.g., making water-saving improvements that will save money as well as saving water). On the right end are good water deeds that are clearly good for society, but bring no particular benefit to the company, even reputationally. An example might be a company donation made anonymously to help finance a Payment for Ecosystem Services (PES) arrangement within the river basin to protect endangered fish habitat. In the middle are the vast majority of actions a company can take that bring direct benefits to the water basin as well as indirect benefits to the company, in terms of polishing the company's reputation.

### *Stewardship of the water commons*

One of the few generally accepted ethical principles about water, which is embedded in the current draft of the Water Ethics Charter (Ziegler and Groenfeldt 2017), is that water should be recognized as a commons. The concept of a "water commons" has been the subject of intense scholarly interest and debate (Wagner 2012), but can be loosely glossed as "we're all in this together"; the manner in which an individual company uses a river, lake, or aquifer is likely to also affect the ability of other stakeholders to use that ecosystem.<sup>5</sup> The concept of a water commons also serves as a metaphor extending to the global community. Thus, small NGOs in the north support initiatives in developing countries to provide clean drinking water and



*Figure 5.1* Ethical Spectrum of Good Water Deeds

sanitation in rural villages. And multinational countries that have a presence in many developing countries become interested in projects to secure local water supplies for their actual and potential customers. For example, both Coca-Cola and PepsiCo underwrite rural development activities in Africa aimed at providing safe water and sanitation to underserved rural areas. Coca-Cola partners with the United States Agency for International Development (USAID) and the United Nations Development Programme; PepsiCo works through intermediary NGOs and Columbia University's Earth Institute, among others.

The reason that such actions bring public relations benefits is not because Coke and Pepsi are necessarily motivated by water ethics, but because their *customers* are motivated by ethics. Most people, or at least many people, feel a desire to help bring clean water to those who don't have it or to restore ecological health to polluted rivers, and given a choice, they will prefer to purchase from the companies that are contributing to these good efforts. Coke and Pepsi, and other corporations that donate funds for water initiatives, count on the good intentions – the water ethics – of their customers. The reason that companies engage in good deeds for the water commons is that their customers will reward them for it. If this perception is valid, it has important implications for how water ethics might be promoted. Rather than trying to educate capitalistic companies on the ethics of water, it might be more effective to educate their customers!

One of the most popular ways that businesses contribute to the water commons is through supporting local watershed or river basin non-profit organizations. Particularly in the United States, where the governance of rivers large and small is not normally considered a state function (as discussed in the next chapter on water governance), local businesses typically play a crucial role in supporting citizen initiatives on river conservation. Hundreds of local watershed associations and river councils depend on the financial support of local businesses that want their local customers to know they are supporting the community river, the local commons.<sup>6</sup> In developing countries where access to drinking water continues to be problematic, the water-oriented NGOs are more likely to address issues around providing safe water both in rural and urban areas, but the partnerships formed with local businesses are similar.

The potential motivations for a local company to engage with the larger community on water stewardship will be specific to the type of company, its culture, and the personal views of the company managers. With growing awareness about climate change and a sense of water insecurity, fear is likely to become an increasingly important motivation for companies to engage with other stakeholders in the watershed. When the glass is viewed as already half empty and in danger of becoming all the way empty, companies will be drawn to act. But positive values can also be strong motivators (thankfully!) and a sense of fairness can extend to the natural world more readily, perhaps, than we often think possible.

## **Box 5.2 Corporate water initiatives**

Several important business initiatives have emerged recently, each taking a different approach to the broadly shared vision of water sustainability:

**1. The World Business Council for Sustainable Development** emerged out of the original “Rio” sustainable development meetings in 1992, and now has more than 200 corporate members from all business sectors. Their collective purpose is to “share best practices on sustainable development issues and to develop innovative tools that change the status quo.”<sup>7</sup> The *CEO Guide to Water* developed by WBCSD (2018) makes the case that “building resilient business” is good for business and also good for the planet. “Water security is at the core of society’s sustainable future.... Businesses can be the inspiration and take the lead.” The report makes the following points:

- Water risks affect business profitability; Water risks can lead to growth constraints by increasing your business’ risk profile and ultimately its cost of capital
- Companies face physical and non-physical risks driven by competition for water, pollution, regulation, and climate change including
- Business disruption due to water scarcity or flooding
- fines or penalties for water pollution incidents
- Brand damage; loss in market share; loss of social license to operate
- Investing in sustainable water management offers opportunities to gain a competitive advantage (e.g., Businesses can implement and offer products and solutions to reuse water and recover resources out of used water).

**2. The CEO Water Mandate** takes corporate water management and water footprinting as a starting point for engaging in water policy and governance beyond the company walls. Companies that endorse the Mandate<sup>8</sup> agree to continuous improvement (and reporting to document the improvements) in six core areas of water stewardship:

- Direct Operations
- Supply Chain & Watershed Management
- Collective Action
- Public Policy
- Community Engagement
- Transparency

The CEOs who sign the mandate commit their companies to, among other things, “Build closer ties with civil society organizations, especially at the regional and local levels [and] work with national, regional and local

governments and public authorities to address water sustainability issues and policies ... [and to] exercise ‘business statesmanship’ by being advocates for water sustainability in global and local policy discussions” (Global Compact 2011:8–9).

**3. The Alliance for Water Stewardship** (a4ws.org), a partnership of companies, research institutes, and environmental organizations, has developed a Water Stewardship Standard (Global Compact 2012), which companies are invited to adopt. The Alliance oversees certification of compliance with the standard, trains and certifies the consultants, and handles outreach, capacity-building and fund-raising to grow the program. Promoting and overseeing the use of the Water Stewardship Standard is the core task of the Alliance, but its mission extends further to promote water stewardship among both the corporate sector and through government and NGO partners (Sym 2017). For example, the Alliance is working with Swiss Development Aid (SDC) to support water stewardship for cotton and rice farmers in Central and South Asia. Other agricultural stewardship initiatives include asparagus in Peru, citrus in Spain, and agricultural supply chains in Africa (AWS 2017).

### Level 3: Advocating for new water norms and policies

While water stewardship initiatives often combine local objectives (at the level of a watershed or river basin) with far-reaching policy objectives, policy-level engagement can also be pursued as stand-alone, focused campaigns. In this section we consider how water ethics are invoked in campaigns to influence industrial water policy norms (at any level of governance from local to global), whether those campaigns are undertaken by companies, business associations, or NGOs.

Corporate efforts to affect water policies are better known for seeking exemptions to environmental standards than promoting stricter ones. Coal companies in the United States have waged political battle against oversight by the Environmental Protection Agency, arguing that clean water standards should be drastically scaled back (see discussion in the following section about the water ethics of the mining sector). Water protection standards became politicized as a “War on Coal,” which served as a rallying cry for the Trump presidential campaign in 2016. The Obama-era policies that viewed water protection and climate mitigation as twin benefits of transitioning out of coal were cited as undermining the economy. Yet four years earlier, at the Rio+20 meetings, 20 CEOs issued a communique urging governments “to take decisive action ... on one of the world’s greatest challenges – water” (The Global Compact 2012). The communique goes on to say,

“We will not make meaningful progress towards global water security without much greater action by Governments to create an enabling

environment in the form of proactive funding and supportive policies in the coming years and decades ... [including] ... Integrating water policies with other key sustainable development issues, most notably energy, agriculture/food, and climate change. This should be done in order to bring freshwater withdrawals back in line with natural renewal.”<sup>9</sup>

One of the specific ways that companies can get involved in water policies, at least indirectly, is through developing carefully defined voluntary water stewardship standards. Under the auspices of the Alliance for Water Stewardship (see Box 5.2), standards of good practice are being developed for key industries. This has the potential to move an entire industry along the path to sustainable water practices, as the standards become institutionalized through certification of the water stewardship label. This approach is a form of policy engagement, but directed at the level of the company’s own operations, in other words, its water footprint. Can the business sector also contribute to more ethical policies at the river basin, state, national, or global levels?

Individual companies can pursue proactive water initiatives to reduce their water footprints, and to engage with intermediary NGOs and local communities to influence water management practices within a localized basin. But for effective policy leverage at an industry-wide level, even large companies need to pool their collective influence. This is the lesson I take from the experience of the Swedish Textile Water Initiative (STWI) discussed in Box 5.1. Though some very large companies (Ikea, H&M) are members, the policy clout of the initiative seems to owe its success to the network itself, more than to the individual companies.

While the STWI network has adopted a progressive water agenda oriented to establishing new norms consistent with environmentally sustainable outcomes, a more common motivation for industry engagement in water policies is to lobby for regulatory policies that are more favorable to particular business interests. For example, in response to the human rights standards proposed by the World Commission on Dams (WCD 2000), the International Hydropower Association, representing “organisations involved in policy, planning, permitting, financing, and regulation of hydropower, as well as corporations engaged as developers, designers, suppliers, owners and operators,”<sup>10</sup> embarked on a lengthy process to develop their own detailed “Hydropower Sustainability Assessment Protocol” (IHA 2018). Not only has the Hydropower Association been able to solidify the support of the industry, but major environmental NGOs, most notably WWF and The Nature Conservancy, have also endorsed the protocol.

A different type of policy initiative is the Detox Fashion campaign launched by Greenpeace in 2011. In a hard-hitting expose of chemical pollutants linked to clothing production of some well-known brands, notably H&M, the Greenpeace report highlighted the fashion/textile industry as the number two pollution culprit, after the oil industry (Greenpeace 2018). The opening salvo of the campaign was a 2011 report focusing on China, *Dirty Laundry: Unravelling the*

*Corporate Connections to Toxic Water Pollution in China*, which was quickly followed by another report, *Dirty Laundry 2 - Hung up to Dry*, painting a broader, global picture of systemic carelessness within the fashion industry (Grappi et al. 2017).

From an ethics perspective, the most important feature of the Fashion Detox campaign was brushing over the issue of legal compliance of national pollution regulations and aiming the message of accountability squarely on the textile companies themselves to clean up their industry. Legal compliance means nothing when the most harmful chemicals are not regulated. However, the black-listed chemicals were named on non-binding global “Do Not Use” lists, such as the Stockholm Convention on Persistent Organic Pollutants<sup>11</sup> and the EU Water Framework Directive list of priority hazardous substances (NMA 2013). Greenpeace consolidated these and other lists that already had scientific credibility and issued their own blacklist of hazardous chemicals used in the manufacturing of clothing, with timelines for phase-out, towards a 2020 goal of elimination of all the chemicals on the list.

The Greenpeace strategy of bluster and drama fit the culture of the fashion industry perfectly, and to the credit of some of the major brands that were attacked, the industry listened. Rather than trying to defend their past behaviors, major brands responded with specific plans for complying with much of what Greenpeace was asking for (Grappi et al. 2017). The science was sound, and the marketing intelligence was clear: Consumers were concerned, not only for their own health, but for the health of the planet. Here we see a perfect storm of ethics, and primarily water ethics, coming together and finding solutions. Fashion can be profitable without the use of enzyme disrupters and other toxic chemicals, but it took the disruptive force of the Greenpeace campaign to energize the latent ethical principles of both customers and companies.

### **Extractive industries and water ethics**

Mining is inherently impactful. Gouging holes into Mother Earth is the geological equivalent of making an omelet: Eggs must be broken to realize the desired outcome. But just as too many omelets can be injurious to personal health, too much gouging will harm the planet’s health. How much impact is too much? What is the connection between the means (mining) and the ends (raw materials needed for the technologies we depend upon)? Do the ends justify the means? Since water is nearly always a major part of mining’s impacts, and since mining – for copper, nickel, iron, gold, and so many other minerals – remains fundamental to modern life, how can we employ the perspective of water ethics to navigate the options?

While mining for metals is ethically complex, nearly everyone would probably agree that mining for metals is *prima facie* necessary. The ethical issues concern not whether but how the mining should be conducted, where, and by whom, as well as the issues of conservation and recycling of metals to reduce the demand for new mining. But there are two other categories of extraction

that meet with far less consensus regarding their necessity both in the near-term and long-term: (1) fossil fuel extraction (oil, gas and coal, including tar sands and oil shale), and (2) uranium mining. Fossil fuels, of course, should be on the energy chopping block for exacerbating climate change. Companies in the fossil energy sector that are intent on persevering with their conventional business strategies in the face of overwhelming scientific warnings seem unlikely partners for constructive strategizing about water stewardship or social justice. Yet because fossil fuel extraction continues to be a major threat to water resources, how can we ignore it? A similar logic pertains to uranium mining. While the number of uranium mines is a tiny fraction of the extraction infrastructure of the fossil fuel industries, uranium mines have outsized water impacts from mine waste, and at the end of the value chain, disposal of the radioactive waste, while in the middle of that value chain is the raw material for nuclear weapons, as well as other, more peaceful pursuits (e.g., cancer treatments and energy production).

What could be the contribution of water ethics in these contexts? As with any industry, the concepts of “water stewardship” and “corporate social responsibility” can be applied, and indeed, the larger companies have corporate sustainability plans in place. For example, Barrick, the gold and copper mining company, was singled out (in the online news of the US National Mining Association) for

raising the bar on water management and environmental stewardship.... Barrick recognizes that water is a shared, vital and, in many places, scarce resource. It’s why the company strives to use only what it needs and reduce its impact on other water users in the communities in which Barrick operates.<sup>12</sup>

Such claims need to be independently verified, of course, and that is gradually becoming possible when companies adopt a third-party standard, such as the standard developed by Alliance for Water Stewardship, or when they adopt an industry-specific standard, as the International Hydropower Association (IHA) has done for large hydropower dams (discussed earlier in this chapter). In the IHA case, there was a multi-year process of developing the standards with involvement of international development and NGOs, as well as industry experts.

A particular ethical issue confronting the extractive industries is environmental justice. Mines and land-extensive oil and gas development are located disproportionately on lands occupied or traditionally claimed by Indigenous Peoples who are also politically marginalized and ill-equipped to defend their own interests vis-à-vis sophisticated global energy companies (Horowitz et al. 2018). The worst mining disaster in Brazil’s history, when the tailings dam from the Samarco iron mine collapsed, sent toxic mud several hundred kilometers down the Doce River and into the Atlantic Ocean, destroyed Indigenous communities along the river banks (Garcia et al. 2017). Uranium mining in the southwest United States is concentrated on Indigenous lands, usually against the will of the local communities (Voyles 2015). How

can the perspective of water ethics help us to respond to the dramatic social and cultural injustices that continue to characterize the extractive industries?

### *Mountain top coal removal*

In a packed auditorium at the University of Charleston, West Virginia, Bobby Kennedy, Jr., founder of the NGO Waterkeepers, and nephew of America's former president, faced off in a debate with Don Blankenship, CEO of Massey Energy, the largest coal employer in central Appalachia. The date was January 21, 2010, and the topic was "Mountaintop Removal." Should companies like Massey be allowed to blast away the tops of mountains to expose the coal deep inside, and contaminate the streams and downstream rivers in the process? Massey had pioneered this new mining method, which was far cheaper than conventional underground mining, as it employed only a fraction of the former workforce. Other companies quickly adopted the method, with the result that huge swaths of the Appalachian Mountains were being pulverized into toxic dust. Small villages were abandoned and families who had worked in the coal mines for generations were without work, even as coal production increased.

In mining through mountaintop removal, instead of removing the coal from the mountains, the mountains are removed from the coal. It is far more destructive than underground mining, and it is even more destructive than conventional strip-mining.

"Instead of excavating the contour of a ridge side, as in conventional strip mining, now entire mountaintops are blasted off, and almost everything that isn't coal is pushed down into the valleys below. As a result, the Environmental Protection Agency (EPA) estimates that at least seven hundred miles of healthy streams have been buried by mountaintop removal ... and hundreds more have been damaged ... Creeks run orange with sulfuric acid and heavy metals. Wildlife populations have been summarily dispersed. Entire ecosystems have been dismantled."

(Reece 2005:5)

While he was CEO of Massey Energy, Don Blankenship became the leading spokesman for the Appalachian coal industry and was insistent, at least publicly, that there was no plausible alternative to coal-based energy. The environmental costs were painted as "not meaningful" partly because the pollution impacts were denied and partly because the health impacts were deemed acceptable, given the economic benefits. This is part of the rhetorical strategy adopted by the US coal industry about the role of coal as an energy source into the future and defending current mining practices, including mountaintop removal. According to the American Coal Council,<sup>13</sup> the methods the coal industry is following are both environmentally and socially responsible (Ledford 2012).

Regarding the claims of coal apologists as a type of marketing rhetoric (Schneider et al. 2016), rather than as mistaken facts or willful disbelief, avoids

having to assign some category of ethics to behaviors that could not easily be countenanced by normal social norms. Deliberately dumping mine waste into streams that are used for drinking water supplies is not necessarily illegal (due to loose regulations), and as Bobby Kennedy experienced during his debate with Mr. Blankenship, even the audience avoided any finger pointing; it's just the way life is, and there is resistance to calling out even obvious wrongs.

Bobby Kennedy accused Blankenship of "literally liquidating this state for cash, using these giant machines and detonating 2500 tons of ammonium nitrate every day – the equivalent of a Hiroshima bomb every week – to cut down the Appalachian mountains" for coal (Perks 2010). He denounced out-of-state coal companies for "destroying the environment, leaving barren landscapes, poisoning the water and permanently impoverishing communities" (Perks 2010). Blankenship cited the contribution of the coal industry in the regional and national economy:

The health and well-being of people greatly depends on the quality of life they're able to have; that quality of life is greatly dependent on electricity – affordable electricity. Affordable electricity in this world is greatly dependent on cheap and abundant electricity, which in turn depends on coal. There's no country that mines coal more safely and more environmentally soundly or consciously than this country does, and no company within this country that does that better than Massey. Again, when you criticize what we do as an industry, Massey or the coal industry, you're criticizing the people that are teaching your Sunday schools, that are coaching your Little League, the people that are in the communities of West Virginia, and to characterize those people as ... wanting to destroy their own environment makes no sense at all. The idea that you're going to stop all surface mining in West Virginia over water like this [shows a bottle of apparently clear water which violates EPA standards] ... while you're competing with Chinese slave labor and people that don't even have to get a permit, is atrocious; it's just not going to happen.<sup>14</sup>  
(Perks 2010)

While the environmental and social ethics of Bobby Kennedy and Don Blankenship could not be further apart, similar moral dilemmas abound, albeit in more nuanced ways, throughout the industrial sector. Water ecosystems are routinely sacrificed for economic progress. Dams, mines, and industrial pollution impact rivers and lakes in ways that are clearly harmful to those water bodies. But in the case of mountaintop removal, it is not only nature that is being harmed; it is the welfare of the local people. Why have they not fought back? Why do they support the very mines that are making their children sick? The answer from the coal industry would be that the local residents don't complain because they are actually benefiting from coal and the human and environmental impacts which seem so outrageous to outsiders are actually not so bad. The other possibility is that the local residents are traumatized by their political powerlessness and are unable to imagine a different and better life, so they defend the status quo.

In either case, the ethical assumptions people hold about their social and environmental responsibilities make a difference. If they are indeed happy with the way things are, it would be due in part to values that see nature as a resource to exploit. While local residents would still feel the physical effects of air and water pollution in this scenario, they would not feel psychological trauma at witnessing the destruction of their mountains and rivers. On the other hand, if they are indeed grieving at the loss of nature around them (as would be predicted by the theory of biophilia; see Kellert and Wilson 1995), then they would presumably experience a double impact of physical and emotional loss, and might be more likely to take action.

### *Water-friendly mining?*

Since mining will inevitably impact water availability and quality, the initial predictions about those impacts become critical to the local communities, whose water sources are directly at risk. A recent study on actual levels of water pollution from 25 mines around the world suggests that project plans generally underestimate the magnitude of water impacts (Brown 2010). In some cases, the estimates are four times too low, and in none of the cases was the actual impact lower than anticipated. While part of the problem lies in unreliable data, a bigger part of the problem can be attributed to “bias in mine water quality predictions made by organizations paid for by the mine operator” (Brown 2010:88).

Some impacts are inevitable but other impacts could be avoided through better land use policies and adopting state-of-the-art mining practices. Unraveling the inevitable from the avoidable is a highly controversial process which highlights dramatically conflicting value positions about the rights of indigenous communities, economic development, and social and environmental values. Ethical assumptions about water and water ecosystems are embedded in these broader interconnected controversies. Nonetheless, it may be helpful to try to isolate the ethical assumptions and trace how perceptions about water may reflect the larger controversy in a more manageable form. If we can make progress on understanding how different sides of a mining controversy look at the water implications of the mine, we may find unexpected common ground on some of the non-water issues as well.

### **Conclusions**

The basic premise of the sustainable business concept is that it is possible to make a profit in a socially just and environmentally responsible way. This is the triple bottom line mantra. In this book we are expanding the mantra to include five dimensions: economic, environmental, social, cultural, and governance. The justification for making the model more complicated is that water is more complicated and more important than most business. Water is a common good that everyone depends upon, so governance of water becomes everybody’s concern; we are all stakeholders in some way. This is the justification for adding “governance” to the list of core ethics dimensions. And the reason that

“culture” is included as a distinct category beyond “social” is that water has meaning and value in many intangible but vitally important ways. We use water for recreation (swimming), ceremonies (e.g., puja to the River Ganges), irrigating our lawns and gardens, installation art (fountains), contemplation (walks along the river), ambiance (the sound of trickling water), and education and play (children playing along a stream or in a puddle). Cultural meaning is also intertwined with economic water uses such as fishing, gathering medicinal plants in the river, irrigating crops, etc.

How can industries make their products, whether that is copper, gold, carrots, or textiles, in ways that do not interfere with other important uses of water or, if possible, might add value to the water use of others? How can companies embody the principles of water ethics and still make a profit? What should we, the consumers who the companies ultimately depend upon, be asking of the companies we support through our consumption? And what should we, the stakeholders, expect or demand from our governments in terms of regulating and enforcing rules to protect everyone’s water interests? All three sectors – civil society, government, and the private sector – need to work together, not only for effective Integrated Water Resources Management (which is discussed in the next chapter), but for effectively managing the role of the private sector itself. Businesses cannot self-regulate. The world learned that in the financial crisis of 2008. Businesses seek to make a profit; they should not be trusted to do the right thing without a profit motive to incentivize them. Government has the job of regulating. And what do the rest of us do? We establish healthy expectations to hold both business and government accountable. This is where and how water ethics comes into play. We citizens need to pressure government to establish and enforce ethical water policies, and we need to convince businesses that we will reward their good water behaviors and penalize them for bad water behavior.

Yet businesses also have an important proactive role to play. They can create their own standards and move the needle of water norms towards social justice and environmental sustainability. They can lobby governments for better (not just looser) regulations; they can use their marketing clout to sway public expectations about watershed protection, or about the moral imperative of ensuring everyone has access to safe water. Water ethics offers a moral map of the needs, rights, and responsibilities (e.g., human right to water; the right of Indigenous communities to stay where they are and not be forcibly removed to make way for a dam, etc.). And innovative ideas and campaigns can emerge from within business (e.g., the way Indiska catalyzed the Sweden Textile Water Initiative), and within civil society (Greenpeace Fashion Detox campaign). Innovations can even come from governments (The city of Paris helped spark the trend of remunicipalizing urban water utilities).

The most intuitively obvious connection between water ethics and industry is in conserving the amount of water used both in direct operations and through the supply chain. The water footprint concept offers a systematic way of accounting for this water use and helping identify where water savings can be

most effective. The water footprint, however, does not come with built-in ethics. These are added, consciously or unconsciously, by whoever is using the footprint methodology. What is the company's goal in reducing its water use? Are the goals only economic, lowering upfront costs and long-term risk? Is the company concerned about its social license to operate if the neighbors feel its water use is too high? Does the company have an explicit goal of reducing pollution to safeguard water ecosystems? What about social and cultural goals? In the case of Indiska's involvement with textile suppliers in India, the company's concern with reducing the water pollution of those suppliers reflects both environmental and social ethics. Investing in training and equipment to avoid pollution to surface water and groundwater used by countless people downstream for domestic water supply is social ethics in action.

A very different set of ethics is reflected in the case of Massey Energy's mountaintop removal mining. Environmental ethics were very deliberately discounted and even lobbied against in an active campaign to discredit the logic of having environmental regulations at all. Social and cultural ethics were treated similarly. The company's claim that the welfare of local residents was improved because of the (dwindling) employment opportunities in the mining operations reflects a social position which cannot meaningfully be termed an "ethic." Cultural ethics refers to the value placed on the traditional culture of the region. The Big Coal River Valley, where Massey Energy's operations were focused, had also been the focus of a seven-year (1992–1999) Coal River Folklife Project,<sup>15</sup> as part of the US Library of Congress "American Memory" program documenting the American experience. The obliteration of the folk culture of the Big Coal River Valley through the contamination of the air, land, and water, and the eviction of the majority of residents, was a reflection, *inter alia*, of the non-recognition of any cultural ethic other than the culture of coal mining.

Both the Indiska case and the Massey Energy case outlined here have described only the industrial processes leading to the final product: clothes and coal respectively. The water ethics identified were in relation to the process of producing those products (textiles and coal). But what about the use of the products thus produced? What is that "ethical utility?" What ultimate benefits, or harms, will these products provide to society? This question is implicit in prioritizing water allocations across sectors (e.g., agriculture vs. energy vs. manufacturing). The question can also be addressed at the level of specific products. Should agriculture produce food or biofuels? Will the corn grown with precious irrigation water be converted into high fructose corn syrup and ingested as a soft drink contributing to diabetes and expensive health care? Will the coal produced through so much environmental, social, and cultural suffering be used in a power plant and contribute to global warming while producing electricity to run air conditioners in poorly designed homes which should not require cooling at all?

There is no end to the potential ripple effects emanating from the manufacturing process, and it is probably outside the useful parameters of water

ethics to attempt to analyze third- and fourth-order consequences. Where ethics analysis is most useful is at the start of those causal chains, at the time of planning to blow-up the mountains of coal that contaminate the streams below, or in the Indian textile factories where the cloth is dyed and the residue flows into local watercourses. These initial stages of production offer opportunities for establishing the values whose impact will be multiplied through successive stages of production.

Why are ethics about water so important for companies to address? Why not just observe the relevant laws and let the government set the standards? The accumulating evidence of degraded water ecosystems suggests that governmental regulations will not save us from ourselves. The regulations are often inadequate, or become the subject of disputes between different government agencies responding to different interest groups, or are simply not enforced. Companies that merely operate within the law (e.g., investing in the minimum level of pollution controls) are part of the problem almost as much as renegade companies that very deliberately subvert the law (e.g., Massey Energy's practice of accumulating thousands of infringements knowing they would never be fined significantly).

The industrial sector is playing a critical role in the water crisis, as both villain and hero. In the role of villain, some industries deliberately and gratuitously pollute streams and aquifers (e.g., through surface coal mining and uranium mining) knowing they are causing irreparable damage to human and ecosystem health. The more common villain behavior, on the other hand, is passive aggression through "sins of omission": Not taking steps to curtail pollution or to avoid dewatering rivers or to adopt water-saving equipment. From an ethics perspective, operating inside the law is not sufficient. Ethics is about setting standards (or taking the time to uncover tacit ethical standards) and making reasonable efforts to meet those standards. The Alliance for Water Stewardship is doing exactly this in a systematic and inclusive way, inviting representatives of different industries to suggest what might constitute realistic standards for their particular businesses. This approach offers real hope, but it is a slow process. A complementary approach is being pursued through the CEO Water Mandate, through appealing to industry leaders to raise the alarm about the water crisis and lobby the industries they represent, engage with local and national policy-makers, and participate in global efforts through the United Nations and the World Economic Forum, among others.

Solving the water crisis requires active involvement of industry. How industry thinks about and "frames" water management becomes critical to any lasting solutions. Fortunately, business schools have been teaching ethics for a long time, and the concept of ethics as something deeper and more important than merely complying with legal requirements has already been inculcated into the minds, if not the souls, of corporate managers. While the application of ethics as taught in business schools is generally confined to financial transactions and human resources management, the same basic concepts could be extended to natural resources management as well. What

is preventing more businesses from adopting an ethical approach to water management? A major obstacle, in my view, is the way the corporate world, encouraged by the mainstream water profession, has framed corporate water management as being largely about “risk management.” Within this frame, your only real responsibility is to continue making a profit, and the environmental restoration you do in the watershed or the donation you give to your town’s water conservation initiative has the purpose of securing your financial bottom line.

Corporate Social Responsibility (CSR) and green business models have challenged this money-is-everything view of business for the past 30 years, yet the water profession seems reluctant to hold industry to these higher social and environmental standards. The CEO Water Mandate discussed previously is a reminder that at least some large corporations are committing to address the water crisis beyond their corporate boundaries, albeit for the limited purpose of managing corporate water risk.

Industry is both the greatest threat to sustainable water management, and its greatest hope. The business community has invested significantly in coming to terms with sustainability principles and applying these principles to water use. Most importantly, business leaders are already familiar with the concept of values and ethics. The notion that business decisions can legitimately be based on social, cultural, or environmental ethics is not shocking to the CEOs who have signed the CEO Water Mandate. They understand that business decisions are always based on values, albeit usually economic ones. Greater clarity about the ethics that industry wishes to advance, along with public accountability for those ethical positions, will help spark new thinking about water options. Businesses that have achieved success through innovation are sorely needed to apply their creativity in meeting not only business goals but ethics goals as well.

### **Discussion questions**

- What values motivate a company to engage in water stewardship?
- What does “ethical mining” mean to you?
- What does water ethics have to do with the fashion industry?

### **Notes**

- 1 [www.unilever.com/sustainable-living/reducing-environmental-impact/water-use/our-water-footprint/](http://www.unilever.com/sustainable-living/reducing-environmental-impact/water-use/our-water-footprint/)
- 2 [www.STWI.se](http://www.STWI.se).
- 3 [www.sivi.org](http://www.sivi.org)
- 4 <https://www.sida.se>
- 5 For much more about the concept of the Commons, see the website of the International Association for the Study of the Commons, [www.iasc-commons.org](http://www.iasc-commons.org).

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- 6 See the “Business & Water” page on River Network’s website, [www.rivernetwork.org/business-water/](http://www.rivernetwork.org/business-water/).
- 7 [www.wbcds.org/about/overview.aspx](http://www.wbcds.org/about/overview.aspx).
- 8 The full text of the mandate is available at: [https://ceowatermandate.org/files/CEO\\_Water\\_Mandate.pdf](https://ceowatermandate.org/files/CEO_Water_Mandate.pdf)
- 9 CEO Water Mandate Communique, June 2012. [www.circleofblue.org/wp-content/uploads/2012/07/CEO-Water-Mandate-Communiqué-Business-Leaders-to-Heads-of-Governments-Attending-Rio+20-Summit-Make-Water-Sustainability-A-Priority.pdf](http://www.circleofblue.org/wp-content/uploads/2012/07/CEO-Water-Mandate-Communiqué-Business-Leaders-to-Heads-of-Governments-Attending-Rio+20-Summit-Make-Water-Sustainability-A-Priority.pdf).
- 10 [www.hydropower.org/membership-directory](http://www.hydropower.org/membership-directory)
- 11 <http://chm.pops.int>
- 12 <https://nma.org/2017/10/10/barrick-raising-bar-water-management-environmental-stewardship/>
- 13 [www.americancoalcouncil.org](http://www.americancoalcouncil.org)
- 14 Just four months later, one of Massey’s coal mines exploded killing 29 workers, precipitating criminal proceedings against Massey for negligence. The company was unable to recover from the fines and criminal charges resulting from the explosion and was bought by one of its competitors, Alpha Natural Resources. Blankenship was convicted of conspiring to violate mine safety regulations and served one year in prison.
- 15 See the website, *Tending the Commons: Folklife and Landscape in Southern West Virginia*, <http://memory.loc.gov/ammem/collections/tending/>.

## Further reading

- Newborne, P. and Dalton, J. 2016. *Water Management and Stewardship: Taking Stock of Corporate Water Behaviour*. IUCN, Gland, Switzerland and ODI, London, UK. <https://portals.iucn.org/library/sites/library/files/documents/2016-069.pdf>
- Thomas, S. 2017. *Fashion Ethics*. Routledge, London.
- UNDP. 2018. *Extracting Good Practices: A Guide for Governments and Partners to Integrate Environment and Human Rights into the Governance of the Mining Sector*. [www.undp.org/content/dam/undp/library/Sustainable%20Development/Environmental-Governance-Project/Extracting\\_Good\\_Practices\\_Report.pdf](http://www.undp.org/content/dam/undp/library/Sustainable%20Development/Environmental-Governance-Project/Extracting_Good_Practices_Report.pdf)

## 6 The ethics of water governance



Bolivian President Evo Morales addressing the annual meeting of the UN Permanent Forum on Indigenous Issues, 16 April 2018

The term “governance” is sprinkled liberally amidst water policy discourse to a degree not found in other topics. We do not hear so much, for example, about agricultural governance, or health governance, or educational governance. Why water governance? What is different about water that we feel a need to refer not only to the way it is managed, but to how it is governed?

Management has to do with directing, controlling, and guiding. The word derives from the Latin *manus*, meaning hand. We humans have been controlling things with our hands for a very long time, and it is our hands, as much as our brains, that define us as a biological species. Governance is one step up from management. The word derives from the Latin *gubernare*, “to direct or steer,” in other words, to direct the managers. The implication is that management needs direction. If left to their own devices, managers might do an excellent job of managing their particular domain, but, in a way, that harms the greater good. This is why governance is so critical to the water sector. The water profession is full of very capable managers working inside their particular domains of water management – of city water supplies or irrigation systems or building flood control levees – but too often working at cross-purposes to the interests of the water sector as a whole. The reason the world is facing a water crisis is not because of bad management, so much as bad governance.

But who “governs” the water sector? Now we come to a deeper and more systemic problem. Generally, there is no single person or agency or even coalition of agencies responsible for water governance, or even for advising on water governance in a particular basin. That’s why we have such a hazy concept of what water governance means; it *is* a hazy concept! The confused status of water governance is not because the topic has been ignored. Some very smart people have devoted their careers to unraveling water governance.

The 2009 Nobel laureate in economics, Elinor Ostrom studied groundwater governance in California for her dissertation work (Ostrom 1965), and the development of her later theories on how people make decisions about shared resources was very much oriented around water governance issues (Ostrom 1990, 1992). The focus of Ostrom and other political scientists and institutional economists who studied water governance emphasized the institutional rules and organizational arrangements for responsive and sustainable governance systems. The role of values and ethics, in their models, was seen as affecting benefits and costs, and thereby affecting actual behavior indirectly. But the role of values and ethics in establishing the governance paradigm in the first place, of setting not just the “rules of the game” but choosing what game to play and how to think about the game, is not well elaborated in institutional economics.

The issue of ethics comes into play at the initial stage of conceptualizing water governance and identifying its boundaries. The fact that there is no specific institution responsible for water, or that a country has no overall management plan (or conversely, that it does) is evidence of how water is

conceptualized. When the European Union introduced the Water Framework Directive, which covers a broad range of topics from environmental flow to pollution standards to river basin councils, in 2000, it was responding to a shared understanding about the integrated qualities of water (Steyaert and Ollivier 2007). In the United States there has been an ongoing discussion as to whether a national water strategy would be a good idea to try to develop, and so far the answer has been that it's not! (Gleick and Christian-Smith 2012). The United States has issued a global water strategy for the world (US Government 2017) but not a national water strategy for itself.

One of the reasons that Americans are not much concerned about not having a national water policy, and one of the reasons that the Europeans are proud that they *do* have one (in the form of the Water Framework Directive which applies to all the EU countries) is that both American and European water professionals, and nearly every other self-identifying water professional on the planet, subscribe to the paradigm of Integrated Water Resources Management (IWRM). This is defined as “a process which promotes the coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems” (GWP 2000). Integration refers to four water sectors: (1) water for people, (2) water for food, (3) water for nature, and (4) water for industry and other uses, with “cross-sectoral integration” provided through (a) the enabling environment, (b) institutional roles and (c) management instruments.

### **Integrated water resources management (IWRM)**

The concept of IWRM has served as a default water policy at the global, national, and local levels. It implies, without being too specific, some basic values of social welfare and environmental sustainability, and fits well with economic cost-benefit analysis. From its initial development at the UN conference on water, held in Mar del Plata, Argentina, in 1977, it was further refined at the Dublin conference of 1992 (see Box 6.1) and became a professional standard for the water sector, incorporating a holistic view of water that can be applied equally to ecosystem contexts (watersheds, river basins, lakes, aquifers) as well as to political entities (states, provinces, cities).

#### **Box 6.1 Dublin principles**

The International Conference on Water and the Environment was held in Dublin in January 1992 as a preparatory meeting for the UN Conference on Sustainable Development held in Rio later that same year. The Dublin delegates agreed to the following four “guiding principles” in order “to reverse the present trends of overconsumption, pollution, and rising threats from drought and floods.”

Principle No. 1 – Fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment. Since water sustains life, effective management of water resources demands a holistic approach, linking social and economic development with protection of natural ecosystems. Effective management links land and water uses across the whole of a catchment area or groundwater aquifer.

Principle No. 2 – Water development and management should be based on a participatory approach, involving users, planners, and policy-makers at all levels. The participatory approach involves raising awareness of the importance of water among policy-makers and the general public. It means that decisions are taken at the lowest appropriate level, with full public consultation and involvement of users in the planning and implementation of water projects.

Principle No. 3 – Women play a central part in the provision, management, and safeguarding of water. This pivotal role of women as providers and users of water and guardians of the living environment has seldom been reflected in institutional arrangements for the development and management of water resources. Acceptance and implementation of this principle requires positive policies to address women's specific needs and to equip and empower women to participate at all levels in water resources programs, including decision-making and implementation, in ways defined by them.

Principle No. 4 – Water has an economic value in all its competing uses and should be recognized as an economic good. Within this principle, it is vital to recognize first the basic right of all human beings to have access to clean water and sanitation at an affordable price. Past failure to recognize the economic value of water has led to wasteful and environmentally damaging uses of the resource. Managing water as an economic good is an important way of achieving efficient and equitable use, and of encouraging conservation and protection of water resources.

(Dublin Statement 1992)

IWRM grew in popularity as the interaction among water specialists blossomed in the 1990s spurring a new water industry replete with specialized institutes, think tanks, and consultant pools (Conca 2006). Institutionalized networks developed to service this new thought-industry, including the Global Water Partnership<sup>1</sup> and World Water Council,<sup>2</sup> and a profusion of

UN-affiliated institutes focusing on particular aspects of water development<sup>3</sup> (Varady et al. 2009). These global networks fueled an interest in global water governance, constructed around IWRM concepts, which steadily evolved through discussion and refinement at international meetings, through reports and pilot projects, as well as through formal training programs. The aggregate result has been a hegemonic rise of IWRM as the only water governance paradigm worth considering (Allouche 2016). Too nebulous to be overturned, yet too vague to inform specific water policies, IWRM has been very successful in stimulating dialogue and bridging diverse and even conflicting values.

The distinctive feature of IWRM as being stimulating for dialogue even if too broad for policies was perfectly suited to the development of the World Water Vision, which was an input to the 2000 World Water Forum in The Hague. The preparatory visioning process was orchestrated by a high-level World Water Commission, chaired by Ismail Serageldin, then a senior vice president at the World Bank. The World Water Vision the Commission produced consisted of a main statement (the Water Vision) as well as three thematic vision reports on the key domains of water for Nature, Water for Food, and Water for People. Each of these three sub-vision reports reflected inputs from a series of stakeholder meetings around the world, to ensure the inclusion of representative views. At the World Water Forum in March 2000, the World Water Vision was formally adopted by a ministerial conference established for this purpose,<sup>4</sup> and through this process, IWRM became even more firmly enconced as the over-arching paradigm of the water world.

The *World Water Vision* released in 2000 (Box 6.2), along with the *Dams and Development* report of the World Commission on Dams (WCD 2000) later that same year (discussed in Chapter 2), marked a new chapter in the evolution of a global consensus about water governance. The loose definition of IWRM allowed for a big tent for global water interests to interact even when they disagreed. For example, activists from International Rivers, an organization wholly dedicated to blocking dam projects, could rub shoulders, however uncomfortably, with the organizations financing, designing and constructing large dams. This dynamic of coming together, expressing diverse views, but agreeing to disagree, established a global water culture of consensus which masked important unresolved conflicts about fundamental values.

Even when the ethical dimensions of IWRM were acknowledged (Aldaya et al. 2017), they rarely became topics of exploration, much less debate. For example, the “polluter pays” principle is perceived in the IWRM discourse as a useful financial mechanism to generate revenue and incentivize environmental compliance (Mattheiss et al. 2010), while in the context of traditional cultural groups, the notion of an oil company paying a fine for contaminating the community’s drinking water source is perceived as a gross injustice (Metcalf 2003) which should be treated as a criminal act rather than a simple cost of doing business.

**Box 6.2 The World Water Vision 2000 (excerpts)**

Our Vision is a world in which all people have access to safe and sufficient water resources to meet their needs, including food, in ways that maintain the integrity of freshwater ecosystems ... The world's freshwater resources will be managed in an integrated manner at all levels, from the individual to the international, to serve the interests of humankind and planet earth – effectively, efficiently, and equitably. The three primary objectives of integrated water resource management are to:

- Empower women, men, and communities to decide on their level of access to safe water and hygienic living conditions and on the types of water-using economic activities they desire – and to organise to achieve them.
- Produce more food and create more sustainable livelihoods per unit of water applied (more crops and jobs per drop), and ensure access for all to the food required for healthy and productive lives.
- Manage human water use to conserve the quantity and quality of freshwater and terrestrial ecosystems that provide services to humans and all living things.

(Cosgrove and Rijsberman 2000:1–2)

The divisions within global water governance can be discerned at the gatherings of the World Water Forum, organized every three years by the World Water Council.<sup>5</sup> By far the largest and most important global water event, the forums serve as a useful barometer of the state of global water. While a unique theme is announced for each forum (the 2018 forum theme was “Sharing Water” and the 2015 theme was “Water for Our Future”), the real theme is essentially sharing best practices within the paradigm of IWRM. Corporations, large and small NGOs, UN agencies, government aid agencies, and major water institutes participate actively, organizing sessions and giving presentations. Inside the World Water Forum conference area, heavily secured by police and sometimes the army as well, there are not many heated debates about water policies because the people and organizations having radically different views from the IWRM mainstream are not there.

Activist groups such as France Libertés,<sup>6</sup> and the Council of Canadians,<sup>7</sup> with their messages opposing water privatization and in support of Indigenous Peoples’ water sovereignty movements, don’t even try to be heard within the main “corporate” Water Forum. In 2018, the World Water Forum was held in Brasilia, the capitol of Brazil. Rather than paying the €700 registration fee for the official forum, however, many activist groups opted instead to join the “Alternative World Water Forum”<sup>8</sup> held just two

kilometers away, where registration fees were low and free attendance was also welcomed. Some of the water activist groups had earlier joined the World Social Forum, held in 2018 during the week prior to the Water Forum, coincidentally also in Brazil, in the city of Salvador, in Bahia. Between these two events – the World Social Forum and the Alternative Water Forum – social, environmental, and cultural justice issues were exhaustively explored. However, the people most in need of hearing that discussion, the global water establishment, were busy talking to each other in the main World Water Forum. All three fora were discussing aspects of water governance, but like blind men describing an elephant, the perspectives were rather different. Box 6.3 contains the main water outcome from the World Social Forum, on the theme of “water as public good”. The final statements of the Alternative World Water Forum and the official World Water Forum can be found on their respective websites.<sup>9,10</sup>

### **Box 6.3 World Social Forum 2018 Declaration**

#### **Access to water as public good**

As parliamentarians and representatives of progressive and internationalist forces involved in the struggles for the rights to quality water and against its commodification from across the world, gathered in the World Social Forum, we reiterate that the human right to water is indispensable for leading a life in human peace and dignity. It is a prerequisite for the realization of other human rights. United in a global understanding of water, we consider that:

- 1 Water is a common good of the living and access to it is a fundamental, inalienable human right. Water belongs to the living and is managed by communities, peoples and humanity and therefore is not a commodity;
- 2 Management and control of water needs to be in a sphere that is public, social, participative and not based on profit;
- 3 Solidarity must be assured for present and future generations and between continents, countries, regions, communities and peoples.

We reject:

- all forms of privatisation, including Public-Private Partnerships, as they systematically lead to rate hikes, cut-offs to customers who can't pay, reduced water quality, huge profits for corporate investors, secret contracts, bribery and corruption.
- all models of water development that are consumerist.
- demands of multinationals and corporations for lost profits and compensation for investments as illegitimate.

We support:

- sharing experiences of establishing solidarity funds for financing models of public, participative, community and social management (e.g. remunicipalisations);
- all struggles, movements and governments actively involved in the realisation of the 6th UN's Sustainable Development Goal (Ensure access to water and sanitation for all);
- the elaboration and implementation of an International legally binding instrument on transnational corporations, in particular in the water sector;
- the effort of several International, European and Brazilian organisations in the promotion of the Alternative Water Forum that is happening in Brasilia from 17th until 22nd March.

We call authorities attending World Water Forum to take account of this Declaration as well as the Alternative Water Forum's conclusions.

(World Social Forum 2018)

## Values in water governance

Values and ethics pervade water governance both through (a) values about the governance regime itself (values about governance in general which are applied to water governance as well as other forms of governance), and through (b) values about how water should be used (values about water). Both these dimensions have huge implications about *how* water decisions (about investments, uses, allocations, quality standards, etc.) ought to be made and then *what* values should be reflected in those water decisions, including questions of contradictory, overlapping or incompatible values.

An example of a governance value that is often applied to water governance is “democracy” or “participation by water users.” Notions of democratic governance are central tenets of modern Western political systems, and it is hardly surprising that these same notions are often applied to the governance of water. Stakeholder engagement in water governance is accepted best practice in water governance (OECD 2016). When one looks critically at how democratic ideals are being expressed in actual water governance practice, however, there are glaring disconnects between the governance values of most water stakeholders and the way that water governance is carried out. For example, in the United States, known historically as a bastion of democratic governance, the institution of watershed or river basin councils is the exception, whereas it is a legally mandated norm in the EU under the Water Framework Directive (Jager et al. 2016).

Since the outcome of water decisions, such as whether and where to build a hydroelectric dam, is very much a function of who is making the decision and

how minority views are incorporated into the decision-making process, governance values about water decision-making are vital to the eventual outcomes. A skewed decision-making process will reflect the interests of the powerful groups, which is rarely coincident with the interests of social justice or environmental sustainability. Getting the decision-making process right sets the stage for outcomes that can lead to the “world we want”, where “we” comprises all water stakeholders, in other words, everybody. The first priority for ethical water governance is to ensure that water decisions reflect everybody’s values in a workable way, combining idealism with pragmatism.

But in the real world, even the most carefully structured participatory process is no guarantee of ethical outcomes. This is why the governance function cannot stop with the establishment of good, participatory decision-making institutions. Following the maxim of “trust but verify,” good governance needs to monitor the outcomes. These “outcome ethics” are central to the governance function, and the success (or failure) of water governance needs to be assessed in terms of the water values that are ultimately expressed (Groenfeldt and Schmidt 2013). When economic values are the dominant consideration, we should not be surprised to find water laws favoring economic applications of water at the expense of ecosystem health or social justice. When a broader set of interests is represented within water governance institutions, the governance goals for water are more likely to reflect those broad interests. In the case of coal-dependent communities whose local streams are getting buried by mine tailings, the mining companies effectively control not only the mines, but the mechanisms of water governance. If a stakeholder council were established with community involvement, protecting the water quality of the streams would be more likely to be incorporated as a governance goal.

It is at this macro domain of water governance where ethics can make a very profound difference. Do we want to manage water to satisfy direct human demands, or do we see the environmental needs of nature as having a higher priority? Do we want our water governance system to favor individual rights or community rights? The economic demands of today, or the needs of future generations? Do we want the decisions about water to be made by outside technical experts, or local citizens? These types of questions do not lend themselves to rational choice theory. Rational, reasonable people could opt for either position; the selection of one alternative over another is ultimately an expression of the values and ethics which the decision-makers carry inside themselves.

### *Working with values*

What aspects of water management need special attention from the governance function? The short answer is all of them. If it’s worth managing, then it’s also worth investing in guiding the management to reduce the risk of unpleasant surprises. But the longer answer to the question of which management elements need to be included in the system of governance depends on what values you are concerned about. Do you care about the biodiversity trends in your river?

Then you will want to include the headwaters of the river and upstream-downstream connectivity in your framework of water governance. You might want to include monitoring of fish and mollusk migration. And just as industrial water ethics extends through the supply chain, a city's water ethics could include ripple effects such as restrictions on plastic bags to minimize plastic in the waste stream that might otherwise end up in the ocean.

Thinking about the values you and all the other water stakeholders are concerned about helps to frame the parameters of water governance. What about drinking water safety? Are you testing for heavy metals? Enzyme disrupters? The five domains of water values/ethics presented in Chapter 1, and reproduced in Table 6.1 – environmental, economic, social, cultural, and governance – provide a starting point for framing a water governance system. In particular, water governance should consider not only the water removed from nature, but also the water ecosystems from which the water is abstracted. Each of these two domains of water (ecosystems and abstracted water) can potentially provide a range of benefits depicted in Table 6.1 as categories of water values.

Crosscutting these value categories are additional value principles which inform water governance priorities. Together the principles structuring each of the five value categories, as well as these crosscutting principles, constitute the water ethics which establish boundary parameters for water governance:

- *Water as a commons.* All people, including future generations, have a vested interest in the water, and from a moral perspective, we can consider everyone as joint owners of water resources. What this really means is that we share a mutual responsibility in caring for the water commons. This principle can also be extended to non-human life forms (e.g., fish and other riparian life) and to the physical health of water ecosystems (e.g., river channel morphology) and the ecology of the overall water basin.
- *Precautionary principle.* Given the high stakes of tampering with water ecosystems, directly or indirectly, we have an ethical responsibility to take pre-cautions.
- *Resilience.* The capacity to rebound after a disturbance is increasingly important for both rivers as well as human systems (e.g., cities along the rivers) as storms and droughts become more powerful due to climate

Table 6.1 Domains of freshwater governance (left) and categories of values/ethics (top).

	<i>Environ. values</i>	<i>Economic values</i>	<i>Social values</i>	<i>Cultural values</i>	<i>Govern- ance values</i>
<i>Governance of Freshwater Eco-systems</i>					
<i>Governance of Freshwater</i>					

change. Favoring approaches that enhance resilience becomes an important ethical consideration.

- *Multifunctionality.* Synergies among different values and functions can give more total aggregate value of all types (Netherlands Enterprise Agency 2016). The concept is essentially that “the whole can be greater than the sum of the parts.” Our aim should be, for example, to enhance ecological resilience while also serving important social and cultural functions, contributing to local economies, and strengthening political engagement (governance value).

Looking at water governance goals through the lens of ethics offers a way of understanding, and in a sense, explaining, why things are the way they are – why a particular sort of governance regime, or particular management actions – have come about. This is not to say, however, that it’s all about ethics and nothing else is important. Indeed, one reason that the subject of ethics has been so seldom applied in explaining water behavior is that there are competing explanations about why water policies are the way they are. Political power is the most popular of these competing explanations. According to this model, vested interests exert power to bend water policies in their favor. Sound familiar? This is what is often accepted as a sufficient, if cynical, explanation of how things work: power, money, and politics. But this simplistic explanation ignores the complicit conspirators in this picture: Us, the silent stakeholders who allow other people’s ethics to set our own agenda.

One of my favorite bumper stickers says, “If you’re not outraged, you’re not paying attention!” The same applies to water governance, but I would add a phrase: You’re not paying attention to the ethics. When we leave water governance to the experts, we often fail to realize that their expertise is how to manage water and rivers, but not in the “why” of managing water. The “why” questions need to be asked, debated, and resolved by civil society, all of us together. We (stakeholders) are the experts when it comes to ethics. We as citizens should be careful about delegating our governance functions to others who might not share our sense of ethics. We should “pay attention” and be outraged when egregious breaches of ethical standards are committed. But first we have to know what our ethical standards are, and for that we need to do some ethical inquiry.

Looking for the ethics does not have to mean that we ignore the politics. In the case of coal mining and water governance in the Appalachian Mountains discussed in the previous chapter, a political power analysis would focus on how the coal company, Massey Energy, manipulated local and national governance institutions. Through a combination of campaign contributions, bribery, threats, legal suits against the EPA, and other measures, the coal company maintained its ability to blow up mountains despite causing huge environmental and health costs locally. This certainly seems to be a case of political (and economic) power at work. But the prevailing ethics among the impacted communities, that accorded greater value to private property rights than to the

rights of nature, provided the enabling conditions for Massey's political and economic pressure to be so effective. A strongly held water ethic about protecting the sacred mountain streams might have resulted in stronger resistance to those pressures, and perhaps a different outcome.

### **Global water governance**

One of the complications of water, aside from the fact that it flows, infiltrates and evaporates, is that there are overlapping and partly nested rules and policies that "govern" how water is to be used. This institutional complexity is described in the literature as "polycentric" governance, an absence of one central authority that dominates all of the others, and at the same time, "providing spaces for integrating expert and lay knowledge...and creating room for manoeuvre for a broader range of non-state actors" (Neef 2009). Water governance has a readily identified global dimension of "soft laws" through declarations and agreements that establish global norms (such as the human right to water) but without any real enforcement authority. The global level is where the action is for water governance, in spite of the fact that pronouncements at the global level are precisely that: pronouncements with no teeth, no means of enforcement. But that lack of enforcement capacity also provides the freedom to dream, to imagine what could be, without worrying about the pesky details. We might want to call this "aspirational water governance." It is important as a breeding ground for policies that can be adopted at national and local levels, where they actually can be enforced. And because there is no expectation of enforcement at the global level, there is sometimes greater willingness to consider a broader range of values and ethics.

The 2010 UN resolution on the human right to safe water and sanitation is a good illustration of aspirational water governance that can also have practical impact. The resolution passed by the UN General Assembly which declared safe and clean drinking water and sanitation to be a human right (see Box 4.1) established a clear international norm. Never mind that there are no UN troops that will back up that right, because it is up to individual countries to implement. But what the UN can and does do is monitor progress on the ground, and publicize the findings. Meanwhile, civil society organizations and news media make their contributions to public awareness. Without the UN-sanctioned right-to-water, however, those news stories would not be as compelling. It is only news if it rises above (or below) whatever is viewed as normal.

### *Sustainable development goals*

The UN Sustainable Development Goals (SDGs) serve as a global strategy for attaining sustainable development (Shah 2016) between the years 2015 to 2030, hence the goals are also referred to as the "2030 Agenda." There are 17 goals, subdivided into a total of 169 targets. SDG 6 is known as "the water goal" because it is exclusively about water, but many of the other SDGs also have one

or more targets that relate directly to water (see Box 6.4). Progress in meeting the SDGs is monitored and supported from across the United Nations system, including the UN agencies that deal with water, health, food, development, vulnerable people, the environment, disasters, and human peace and security. For example, the WHO/UNICEF Joint Monitoring Programme (JMP) tracks progress on drinking water, sanitation, and hygiene (SDG targets 6.1 and 6.2).

### **Box 6.4 Sustainable Development Goals related to water<sup>11</sup>**

**SDG 6 – “The Water Goal”** (ensure availability and sustainable management of water and sanitation for all) and key targets:

- 6.1 equitable access to safe and affordable drinking water for all
- 6.2 sanitation and hygiene for all
- 6.3 improve water quality by reducing pollution and halving the proportion of untreated wastewater
- 6.4 increase water-use efficiency (domestic, agricultural, industrial) and ensure sustainable withdrawals
- 6.5 implement integrated water resources management at all levels
- 6.6 protect and restore water-related ecosystems

Other water-related SDG targets:

- 1.4 ensure that all men and women have access to basic services; including water and sanitation
- 2.4 implement resilient agricultural practices
- 3.3 end diseases, including water-borne diseases
- 3.4 reduce the number of deaths and illnesses due to water, air and soil pollution and contamination
- 12.4 achieve the environmentally sound management of chemicals and all wastes and significantly reduce their release into water, air and soil
- 14.1 reduce marine pollution of all kinds, in particular from land-based activities (through rivers)
- 15.1 ensure the conservation of terrestrial and inland freshwater ecosystems

### *Basic principles about water governance*

International water conferences often issue a set of recommendations, or a declaration or manifesto as the official output of the gathering. For example, the Dublin Principles for Integrated Water Management (see Box 6.1) originated as a conference statement in 1992, and the Kyoto Indigenous Peoples Statement on Water (see Box 7.4 in the next chapter) was drafted at the 2003 World Water Forum in Kyoto. If and when such statements gain traction as widely referenced and broadly accepted principles that establish or influence water governance norms, they can be said to constitute global principles of

water governance. The more common origin of global water principles, however, is through an organized initiative having the explicit aim of establishing particular water governance norms. In this section we consider the (1) OECD Principles on Water Governance, (2) the UN High Level Panel on Water “Bellagio Principles” on water values, and (3) the ongoing Global Water Ethics Charter initiative.

### *1. OECD principles on water governance*

The Organization for Economic Cooperation and Development (OECD) developed over a period of 4 years, and with the intensive work of many consultants and partners, a set of 12 principles on water governance (OECD 2015; Akhmouch and Correia 2016). As befits an economic organization, the principles focus on economic principles, specifically the dimensions of effectiveness (principles 1–4), efficiency (principles 5–8), and trust/engagement (principles 9–12). What I find interesting about these principles is not what they contain, but what they leave out: Value principles about social justice, intergenerational equity, cultural autonomy, or environmental sustainability. Instead, the principles incorporate the concepts of integrity and transparency (principle 9) and stakeholder engagement (principle 10). When all 12 principles are followed, the expected outcome is good water governance (see Box 6.5).

#### **Box 6.5 OECD principles on water governance**

Principle 1. Clearly allocate and distinguish roles and responsibilities for water policymaking, policy implementation, operational management and regulation, and foster co-ordination across these responsible authorities.

Principle 2. Manage water at the appropriate scale(s) within integrated basin governance systems to reflect local conditions, and foster co-ordination between the different scales.

Principle 3. Encourage policy coherence through effective cross-sectoral co-ordination, especially between policies for water and the environment, health, energy, agriculture, industry, spatial planning and land use

Principle 4. Adapt the level of capacity of responsible authorities to the complexity of water challenges to be met, and to the set of competencies required to carry out their duties

Principle 5. Produce, update, and share timely, consistent, comparable and policy-relevant water and water-related data and information, and use it to guide, assess and improve water policy

Principle 6. Ensure that governance arrangements help mobilise water finance and allocate financial resources in an efficient, transparent and timely manner

Principle 7. Ensure that sound water management regulatory frameworks are effectively implemented and enforced in pursuit of the public interest

Principle 8. Promote the adoption and implementation of innovative water governance practices across responsible authorities, levels of government and relevant stakeholders

Principle 9. Mainstream integrity and transparency practices across water policies, water institutions and water governance frameworks for greater accountability and trust in decision-making

Principle 10. Promote stakeholder engagement for informed and outcome-oriented contributions to water policy design and implementation

Principle 11. Encourage water governance frameworks that help manage trade-offs across water users, rural and urban areas, and generations

Principle 12. Promote regular monitoring and evaluation of water policy and governance where appropriate, share the results with the public and make adjustments when needed

(OECD 2015)

## *2. Bellagio principles on valuing water*

The UN High Level Panel on Water, comprising 11 sitting heads of state, was challenged to identify ways to ensure “the sustainable management of water and sanitation for all” from 2016–2018 (HLPW 2018). The panel quickly identified the valuation of water as a key sticking point, and developed recommendations in the form of the Bellagio Principles on Valuing Water (Box 6.6):

Societies need to value the water they have – in all its social, cultural, economic, and environmental dimensions – to educate their citizens, reduce wastage and pollution, ensure water is available for societies’ priorities, reduce risk, and to make water services more sustainable.

(HLPW 2018)

Without trying to specify what the values should be, the Panel focused on defining the process principles that would facilitate better valuation (Garrick et al. 2017).

### **Box 6.6 Bellagio principles on valuing water**

Principle 1. Consider the multiple values to different stakeholders in all decisions affecting water...[including] human needs, economic well-being, spirituality and the viability of freshwater ecosystems.

Principle 2. Conduct all processes to reconcile values in ways that are equitable, transparent, and inclusive of multiple values.

Principle 3. Value and protect all sources of water, including watersheds, rivers, aquifers and associated ecosystems for current and future generations.

Principle 4. Promote education and public awareness about the essential role of water and its intrinsic value.

Principle 5. Increase investment in institutions, infrastructure, information and innovation to realize the full potential and values of water.

(HLPW 2017)

### *3. Global Water Ethics Charter initiative*

The need for a Water Ethics Charter spelling out the basic principles of ethical water governance was a recommendation of the 2012 World Water Forum in Marseille (IFC Secretariat 2012:111–112). Under the auspices of UNESCO's Water Program, the Water Ethics Network,<sup>12</sup> and several other organizations, a draft charter of water ethics principles was developed, which was presented at the 2015 World Water Forum in Daegu, South Korea (World Water Council 2015:49). Though the charter, even in draft form, has attracted academic interest and is the subject of a scholarly book (Ziegler and Groenfeldt 2017), further development of the charter has been curtailed for lack of funds. In the meantime, the draft charter is freely available on the Water Ethics Network website, and work can be resumed if and when funding becomes available. [Disclosure: I serve as Director of Water-Culture Institute,<sup>13</sup> which is the organizational sponsor of the Water Ethics Network.] The principles outlined in the draft 2.0 Water Ethics Charter are structured around the same five domains of water ethics that are used in this book: (1) Environmental, (2) Economic, (3) Social, (4) Cultural and (5) Governance. Within each of these five domains, general value principles as well as more practical operational principles are specified (Box 6.7).

#### **Box 6.7 Water Ethics Charter: Draft 2.0<sup>14</sup>**

##### Part 1. Introduction

This Charter establishes the moral and ethical foundations to guide decision-making around the use of water and the protection of water resources and water-reliant ecosystems. The following General Principles should guide decision-making: (1) *Precautionary Principle*, (2) *Water as a commons*, and (3) *Intergenerational Justice*.

## Part 2. Environmental Issues

We need an environmental ethic which will safeguard the integrity of water ecosystems in the face of unprecedented human pressures and climate change.

*General Concepts:* Water ecosystems have inherent rights, and intrinsic value.

*Operational Principles:* (1) maintain or improve the health of natural water ecosystems; (2) no net loss from current conditions.

## Part 3. Economic Issues

Water has an inherent economic dimension, but transcends monetary value.

*General Concepts:* Water use should be reasonable and frugal, emphasizing reuse; Existing water stocks should be maintained; private ownership of water must be balanced with accountability to the larger society.

*Operational Principles:* Water for basic human needs should be effectively free, whereas water used in economic activities should have a market cost.

## Part 4. Social Principles

*General Concepts:* Water should be explicitly recognized as a commons and central feature of life for individuals and the larger society. Everyone has a right to safe water and a healthy environment.

*Operational Principles:* Promote universal access to safe water and sanitation; ensure water justice for all and especially future generations.

## Part 5. Cultural and Spiritual Principles

Water and water ecosystems provide important cultural and spiritual meaning

*General Concepts:* Rights of indigenous and traditional peoples to live according to their cultural traditions including economic livelihood strategies and religious ceremonies.

*Operational Principles.* Water infrastructure should accommodate customary cultural uses as a matter of priority and subject to “free prior and informed consent”.

## Part 6. Water Governance

*General Concepts:* Incorporate whole watersheds; reflect the interests of all stakeholders; manage at the lowest practical level; priority to social and environmental responsibilities.

*Operational Principles:* Transparency, accountability, and stakeholder participation are central to good water governance.

## Domains of water governance

Governance is one abstraction removed from what we might call the “practical” operational level of management. Managers do things; “governors” direct the

managers to do the right things, a discernment that entails choices based, in part, on ethics. The governor needs to make judgments about outcomes (the goals) and how to get there (the process). Yet the functions of policy-level governance and project-level management are very much linked and mutually reinforcing. When a village water supply project is developed in consultation with the village elite rather than following a more complex participatory process with the whole community, the new project is likely to reinforce the prevailing socio-economic inequities (van Koppen et al. 2012). Water projects that are designed very deliberately to serve disadvantaged segments of the community (as in the case of the Indian NGO, Gram Vikas, discussed in Chapter 4) seek to promote an ethic of social equity and fairness both locally and at higher levels of water governance. Avoiding elite capture of project benefits depends on supportive ethics built into project design. If equity is an ethic, it needs to start at the very initial step of identifying the problem(s) that the project will try to address (Smith 1988).

In this section we consider three domains of water governance where goals and process are inextricably linked: (1) irrigation, (2) water supply, and (3) managing watersheds and river basins. The goals of these domains are straightforward: crop production, public health, and environmental sustainability. The challenge for water governance pertains to the best governance process for achieving these goals. In all three domains, two issues stand out. First is setting the boundaries or frame for water governance. Does the irrigation governance system start from the irrigated fields, or from where the canal takes off from the river, or does it also include the watershed upstream? The second issue is stakeholder participation. How should the various stakeholders participate in decisions about water allocations, pollution standards, etc?

### *Irrigation governance*

Governance has been an important part of irrigation since the dawn of irrigation-based civilizations (Wittfogel 1957) and has remained just as important in the modern era. The early despotic regimes – from prehistory through colonial times – were more interested in food production and collecting taxes than inculcating community-based social capital, and their governance regimes reflected ethics that might be termed “state-centric.” The ethical principle undergirding irrigation governance was to strengthen the economic power of the state, reflecting a state-centric ethic first described in the third century BCE by Kautilya, India’s forerunner to Machiavelli (Set 2015).

During the Green Revolution of the 1960s to 1980s, the prevailing ethics of irrigation governance was to strengthen national economies and enhance food security. Engineering infrastructure (dams, canals, pumps and pipes) and agronomic innovations (new seeds and fertilizers) were the main tools, but gradually the need to apply management science was also recognized. Irrigation infrastructure was absorbing a huge portion of national budgets in many Asian countries, and the whole sector had become soft in favoring expensive new construction over maintenance of existing canals. Construction kickbacks

and various forms of corruption compounded the management challenges (Wade 1982).

The governance model that accompanied irrigation development during the Green Revolution continued the pattern of top-down control established during the colonial era. But as the newly (and often hastily) built irrigation infrastructure started to age in the 1980 and '90s, even as new systems continued to be built throughout Asia, the costs of maintenance mushroomed. Economic analysis demonstrated the wisdom of encouraging farmers to play a more direct role in managing the irrigation infrastructure, particularly at very local levels. Village-level communal irrigation canals could be managed more effectively and efficiently by the farmers themselves, plus there was a social capital benefit. Through the experience of self-management, the farmers gained social and economic skills that could be applied not only to their farming, but to other economic, or even political pursuits (Murray 1988). After all, development wasn't just about growing more food, but in developing a better life, wasn't it?

### *Developing a social water ethic in the Philippines*

The poster child for farmer organizations replacing the functions of government was the Philippines. Spurred by the need to cut costs, the country's National Irrigation Administration (NIA) decided to divest itself of management responsibility for the many village-level canal irrigation systems under its control. A careful transition process was developed, based on (1) training community organizers, (2) a package of physical upgrades to the irrigation system to be determined by the community, (3) establishing formal water users associations to manage the upgraded irrigation system, and (4) administrative training for the farmers involved in the water user association. Within the National Irrigation Administration there was another set of training for NIA staff to develop constructive working relationships with the new farmer associations (Korten and Siy 1989).

From an ethics perspective, the new decentralized management structure was not particularly revolutionary in itself, but it launched a process that truly was a paradigm shift. The approach was re-cast as a combination of cost savings plus community capacity-building. The view of participatory farmer-controlled irrigation management as having dual goals, economic and institutional, diffused to other countries in South and Southeast Asia through the medium of donor-financed irrigation projects. Within a decade of the Philippine model taking shape, new irrigation projects routinely included a "participation" component aimed at strengthening the capacity of water user organizations at the bottom tier of canal networks. When groups of 20 to 50 farmers took control over the maintenance of shared canals and the allocation of water among themselves, they would perform valuable functions at little or no cost to the irrigation agency.

The Philippines became the international "go-to" destination for study tours about decentralizing irrigation management to farmer organizations. But the

critical importance of “reorienting” the culture of the irrigation agency and the key role played by trained and motivated community organizers, tended to be under-appreciated by most study tour visitors. Their focus was on the short-term results more than the long-term process (Raby 2000). A review of irrigation management transfer experience worldwide identified five “expectations” motivating management transfer (Garces-Restrepo et al. 2007): (1) cost savings to the irrigation agency, (2) increased agricultural productivity, (3) farmers will be more willing to pay irrigation fees, (4) more efficient irrigation management with fewer complaints, and (5) expedited collective action in marketing of agricultural inputs and produce. What is interesting in this list is what is *not* mentioned: the sense of collective pride and identity, an enhanced ability to organize collective representation for the community’s welfare, or improved water security.

The intangible benefits of locally managed participatory governance are important to make explicit in the face of growing pressure from private sector involvement in providing irrigated agriculture services. Proprietary drip irrigation technologies, hybrid seeds, and exclusive marketing channels for exporting high value crops are some of the perks being offered to water user associations. In the absence of other suitable farmer organizations, irrigation groups are attractive partners for private agribusiness, and these partnerships are being encouraged by donors such as the World Bank, Asian Development Bank, and others. While it is in one sense gratifying that water user associations are being courted by agribusinesses, it is important for all parties to be fully aware of their own interests and ethics.

When changes are made to irrigation governance arrangements, and even when changes are not made, ethics are being expressed, knowingly or not. Are water user associations being promoted as a means of cost savings for the government irrigation agency, or as a means of social development, or to enhance the resilience of the system, or because the direct management control by farmers will lead to more effective water deliveries, or better monitoring for leaks, or lower overall water use? There are many possible advantages to participatory management arrangements, and clarifying what they are can help guide investments in organizational capacity-building.

### *Governance ethics in urban water supply*

The challenge of connecting people to water in urban settings, especially in the booming cities of the developing world that have become magnets for the rural poor, is daunting in many ways. There is the challenge of finding adequate water supplies, of course, but then there are the further challenges of building the infrastructure to connect rapidly growing but often unplanned, informal neighborhoods. Next add the challenge of finding the investments to cover those expenses, recovering water fees from millions of water users to pay for operating and maintenance costs, and it’s a wonder that so many urban dwellers actually do have access to even irregular supplies of water. Water is typically

purchased from a water utility, if there is one, or from neighborhood water collectives, if these exist, or from private water sellers, who fill the gaps, but at a high price. How (and whether) private firms or public agencies operate water distribution networks is a fundamental governance issue. How best to serve the burgeoning population of urban poor, who can ill-afford, or in many cases cannot at all afford, to pay for water has become a flashpoint in water planning and, indeed, in urban planning and management more generally.

*Private or public water services?*

Is it better to rely on corrupt, inefficient public sector water utilities to deliver services that everyone needs for their survival? Or should the private sector be invited in to take over these functions in the hope that the profit motive will stimulate more effective water service? The infamous case of failed privatization in Cochabamba, Bolivia, in 2000, provides an enduring example of what can go wrong, and proves not that privatization is always bad, but that there are no simple solutions (Box 6.8).

**Box 6.8 Learning from Cochabamba<sup>15</sup>**

A city of 200,000 in 1976, Cochabamba's population soared to more than half a million by 2001 and the city was running out of water. The aquifer surrounding the city was drastically overtapped for irrigation and community wells serving the expanding peri-urban neighborhoods. The public water company, SEMAPA (Servicio Municipal de Agua Potable y Alcantarillado) was run through political patronage and catered to the wealthier neighborhoods. In the poor barrios, fewer than half the households had water hookups and indoor plumbing. Independent private water companies filled some of this gap and contributed to the declining aquifer, competing with SEMAPA, which also relied on more and deeper wells as its primary water source.

In 1998, the city launched a major (\$300 million) project to construct a dam and pipeline (including a 12-mile tunnel) to import water to the city from the Misicuni River. At the same time, a major structural adjustment loan to Bolivia included a World Bank-inspired condition that SEMAPA be privatized, along with the Misicuni Dam and pipeline project. The sole bidder for this huge contract was a subsidiary of Bechtel, the giant US-based engineering and construction firm. The terms gave Bechtel an exclusive 40-year lease on all water within the region of Cochabamba, including not only the aquifer, but even the rainwater. Private water companies were forced to close or to pay Bechtel for the water they pumped; homeowners were not permitted to harvest water that fell on their own roofs. (Note of perspective: Many cities in the western United States, including Denver, had almost identical provisions at the time.)

When the Bechtel subsidiary started raising water rates by some 50 per cent, a consumer revolt began to simmer. It started with the farmers outside the city who lost ownership of their irrigation water, and it spread quickly to the poor whose water bills were rivaling their monthly food budgets. Ultimately the popular protests and the tragic killing of one of the protesters resulted in enough pressure that Bechtel executives were forced out of the city as the mayor revoked the contract and re-instated SEMAPA. In an ironic twist, the protests in Cochabamba paralleled anti-privatization protests going on in the streets of Washington, DC, during exactly the same time, to coincide with the annual meetings of the World Bank and the IMF. The main leader of the Cochabamba protests, Oscar Olivera, was able to fly to Washington to join those protests, and to deliver his anti-privatization message directly to the World Bank.

The story of Cochabamba's unhappy experience with water privatization has entered the water policy history books as a clear failure for privatization, and a clear win for the people (e.g., see the account by Barlow and Clarke 2002). The story is also a clash of values and ethics. The municipal government of Cochabamba had adopted the World Bank's ideological view of privatization as a way to improve water governance by unleashing the power of the private sector. From a business perspective, that might have made sense, but from a social perspective, it was disastrous, causing extreme economic and physical hardship to the poor.

The moral of the Cochabamba story is that sorting out everyone's values about water is a pre-requisite for good water governance. Some values should be patently obvious (e.g., "people before profits") but some values will be more subtle, or even controversial, but still they need to be addressed. Corruption grows when values are ignored. The sorting out of values needs to be done before the contracts are signed and before there are demonstrators in the streets. Cochabamba blew up because the people responsible for water governance failed in their water governance mission. Perhaps there were no laws broken; the contract may have been legal, but water governance is not just a matter of not breaking laws. Water governance needs to be more than merely doing a job; it needs to be viewed as a moral responsibility.

Privatization of municipal water services is inherently problematic because it mixes the profit motive with a public service, but even that is not a reason to preclude it as an option. No, the lesson of Cochabamba is about not jumping into a solution before the problem has been thoroughly delineated and options explored. Like a sharp knife, privatization might have a role, but it must be embedded in a larger context, for example, as a way of addressing corruption in the public sector or instating more effective management controls. The choice "should not be seen as a polarization of private versus central state delivery, but

rather as an opportunity to rethink how we define successful water services” (Barlow 2014).

Whether the privatization trend reflects the interests of donor countries to send more business to their compatriots, or whether their promotion of the private sector stems from good intentions for expanding water access for the poor, has become a matter of contention (Bakker 2010). There is a fairly strong consensus, however, that the policies favoring private takeovers of large urban water systems were very much overdone by the World Bank and the regional international development banks in the 1990s. Indeed, the pendulum has been swinging away from urban water privatization to urban water remunicipalization (Lobina 2017). Inspired by the example of Cochabamba, the citizens of Berlin voted in 2013 to buy back the city water utility which had been privatized by a previous city administration in the 1990s (Härlein 2017). As the new owners of the city’s water utility, the citizens embarked on a community-wide planning initiative to devise a Berlin Water Charter<sup>16</sup> stipulating four sets of fundamental value principles to structure the new era of citizen-led water governance (see Box 6.9).

The case of Berlin is one of the more dramatic water governance reforms, but it is not unique. The city of Paris took back its water utility in 2010 simply by not renewing the long-standing contract with Veolia and Suez, and creating a new public entity, Eau de Paris (Le Strat 2010). Indeed, there is an unmistakable global trend to re-municipalization even as new privatization continues in a growing number of cities. Will the experience with public control be more positive than the disappointing results of private sector management? The specific context might matter more than the type of ownership, and particularly the regulatory framework, level of corruption, and the competence of the institutions involved, whether public or private (Bakker et al. 2008:1893–1894). The fear of privatization of water popularized by Maude Barlow and the Council of Canadians (Barlow and Clarke 2002; Barlow 2014) has helped to place the private water companies on notice that their actions are being watched.

### **Box 6.9 Berlin Water Charter**

#### **1 General Principles**

- Access to water is a human right
- Water must be affordable for all
- The water utility shall be a public corporation with no privatisation
- Governance will be transparent with close coordination of stakeholders

#### **2 Social and Economic Principles**

- water charges will be for actual costs, but not for profit
- Pricing model will take burden away from small consumers
- No private companies may be integrated into the water utility
- Drinking water quality must be maintained sustainably with no degradation

### 3 Environmental Principles

- Drinking water sources will be local groundwater and Spree and Havel Rivers
- Natural environment of drinking water sources will be maintained in good status;
- Organic agriculture is encouraged to reduce water pollution
- Surface waters and water protection areas will be developed in harmony with nature;
- Fracking and oil/gas extraction is banned in and around Berlin

### 4 Legal Principles

- This Water Charter is the basis for interpreting existing or new laws or provisions.

(Berliner Wassertisch 2015)

The arena of public vs private water services is complicated. In a review of remunicipalization efforts, McDonald (2018) observes that

disappointment with the costs of privatization conceals a much more diverse set of remunicipalization ideologies. Saving money and improving services might be central to most remunicipalization initiatives, but this seemingly common agenda hides a complex set of philosophical starting points, rendering any simplified interpretation of remunicipalization impossible.

McDonald (2018:49)

Central to those “philosophical starting points” are conflicting values and ethics. McDonald (2018:50) identifies three recurring value positions among advocates for remunicipalization: “Expand democratic control, improve equity, [and] improve environmental sustainability.” Privatization advocates, on the other hand, favor values which “improve water service performance and reliability, reduce costs to the state [and] ensure market-friendly practices in water.”

An ethics perspective adds value (and “values”) to the discussion of public vs. private governance of urban water supply and sanitation through clarifying the governance goals. Are cost savings the exclusive goal? If so, it should be straightforward to assess the cost proposals from alternative bidders and compare these with the public sector option. Is the goal to expand service to poor neighborhoods? Is there also a social goal of community development and capacity-building? Now the choice might be to invest human resources in mobilizing local neighborhoods to create community water and sanitation groups. The specific context can suggest whether the conditions are favorable to effective private sector involvement (e.g., a strong regulatory framework) or to the formation of local organizations, but

the ethics need to be clarified first to determine what types of governance arrangements are desired.

*Framing the boundaries of urban water*

The term, “urban water supply,” implies a boundary between the water that is relevant to the governance of a city’s water supply and the water that is not the city’s concern. But how should that distinction be made? Water needs to be acquired from somewhere, through groundwater wells or river diversions, and then treated to drinking water standards, distributed through a network of pipes to individual homes or public water points, and then recaptured (as wastewater) through sewers, treated to some acceptable effluent standards, and released back to nature or otherwise reused (e.g., for irrigation), or further treating to drinking water standards and cycled back through the system.

Where should we draw the boundary for urban water governance? Will our concern extend to the actual sources of the water that our city will be using, perhaps in mountain springs hundreds of kilometers away? Or should we start at the point where the water enters the canal or pipeline destined for the city water treatment plant? Are we concerned about the impact of our city’s water use on downstream stakeholders, whether farmers or other cities, or does our ethical responsibility end where our effluent water leaves the wastewater treatment plant, or where our storm drains enter the river? And what should we expect from the water supply swirling through the city-scape? What ethics of “urban water stewardship” should we adopt? How concerned should we be with leaking pipes and water wastage; is this a moral issue? And how interested should we be in bringing the water out of the pipes into public view – as fountains, canals, or other water features – to enhance the aesthetic experience of urban residents? This is not normally considered in the purview of urban water supply governance, but perhaps it should be.

There has been a steady movement in water circles to push management boundaries further upstream and downstream and sideways as well. Integrated Water Resources Management (IWRM) has been all about getting a larger perspective of water use and considering the interactions among competing uses as well as potentials for growing the pie. One sector’s waste water can become another sector’s supply, as when urban effluent is reused for agriculture, or (as will become increasingly common) for drinking water.

Integrated Urban Water Resources Management (IUWM) was invented to deal with the problem that whatever boundaries we try to create between, say, urban water supply and irrigation, or drinking water and wastewater, those boundaries are easily crossed. An IUWM perspective is essentially the same as the IWA principles for water-sensitive cities discussed in Chapter 4 and Box 4.5. According to Bahri (2012), the IUWM perspective:

- recognizes alternative water sources;
- differentiates the qualities and potential uses of water sources;

- views water storage, distribution, treatment, recycling, and disposal as part of the same resource management cycle;
- seeks to protect, conserve, and exploit water at its source;
- accounts for non-urban users that are dependent on the same water source;
- aligns formal institutions (organizations, legislation, and policies) and informal practices (norms and conventions) that govern water in and for cities;
- recognizes the relationships among water resources, land use, and energy;
- simultaneously pursues economic efficiency, social equity, and environmental sustainability;
- encourages participation by all stakeholders.

From the perspective of managing a city water utility, IUWM provides a guide to urban water *management*, but from the perspective of water policies and more broadly urban policies, IUWM has important implications for water *governance*. Integrated planning and management needs to be supported by a broader understanding of integrated water, or “one water” (the term that is vying with “IUWM” for general acceptance [Kirshen et al. 2018]). For example, urban hardscape (streets, roofs, parking lots) renders stormwater a huge challenge (floods) but also opportunity. Properly managed, storm water can irrigate urban landscapes and bring ecologically beneficial floods to small streams and rivers. Part of the integration that IUWM can stimulate could be between the engineers responsible for street drainage, and the parks division that plans parks and open space. Locating parks where they can serve as flood water absorption areas is a relatively easy concept that can yield important synergies (cf. Trinity River Park in Texas, p. 102).

Diverse ethical motivations can be invoked for adopting an IUWM approach, ranging from economic efficiency to social justice or better environmental management. It is the potential for environmental benefits, however, that stands out. In the conventional framework of water supply, the two major ethical themes are economic efficiency (control costs) and social welfare (try to provide water to everyone). Under an IUWM paradigm, economics and safe drinking water remain priorities, but not the only priorities. Economic thinking (flood management) can coexist with an environmental ethic (ecologically healthy floodplain) as well as a cultural ethic: Water can, and should, be a source of enjoyment within the cityscape.

### *Ethical governance of water ecosystems*

“Integrating” the environment into the goals of water governance does not guarantee that the environmental dimensions will receive priority, but only that they will be considered. How can the interests of the environment find expression in governance, when nature has no voice (at least within the paradigm of Western science)? One answer is that some human interests overlap in important ways with the interests of silent nature, and those humans can articulate

those interests. Ecosystem services is a term that refers to this overlap. However, the concept of ecosystem services is normally limited to those services that people benefit from. To value nature for itself, over and above the value to people, requires a larger concept.

Brown and Schmidt (2010) propose “an ethic of compassionate retreat” as the concept that we can use to protect nature from ourselves. The governance frame that we need for accommodating the interests of rivers must be large enough to include the behavioral pressures that society exerts on those rivers: “If the good of achieving material wealth for humans requires increased water supplies, the problems that arise as a consequence of increased water use rarely cause managers to question the overarching goal of increasing human wealth” (Brown and Schmidt 2010:273). That’s because this is asking too much from managers. They are just doing their job of managing. It is at the larger level of water governance that the ethic of caring for nature needs to be addressed, for example, by involving people in the governance process who already possess an environmental ethic so the interests of nature can be reflected by proxy (Postel and Richter 2003; Jones et al. 2006).

Critics of IWRM, however, note the problem of unequal power, which leads to unequal participation of different stakeholders (Saravanan et al. 2009; Berry and Mollard 2010). A second problem is the communicative competence of those stakeholders not only for reasons of power, but also education, culture, etc. A third issue concerns the institutions governing IWRM which often lack critical capacities of leadership, staffing, information, or political legitimacy, and a fourth problem is the enabling environment of policies and programs, particularly at the national level. While these obstacles can perhaps be overcome, it requires a strong commitment to participation as an ethical principle.

### *Watershed governance*

John Wesley Powell, the American explorer and student of Western landscapes, proposed that governance of this semi-arid land should be on the basis of watershed boundaries, rather than abstract survey lines (deBuys 2001). His reasoning was that water, and not land, would be the limiting resource in the Western states, so the administrative units of local government should be aligned with the boundaries of watersheds. Powell’s advice was ignored completely. Not only do we have state and country borders that have nothing to do with drainage lines, but the governance of the rivers themselves is driven by those administrative boundaries, rather than vice-versa.

The lack of correspondence between the administrative units for governing people, land, and water, and the natural drainage basins (watersheds) poses challenges for water governance everywhere, but particularly so in the western United States. A few states, including Washington, Oregon, and California, have tried to retrofit state-sponsored watershed-level organizations onto the existing arrangements. In most other states, voluntary organizations have

emerged. There are many hundreds of river or watershed organizations, at varying levels of sophistication (Sabatier et al. 2005). These groups have no official standing in government, but in the absence of any other watershed-wide entity, the watershed organizations help fill a governance void. Their effectiveness depends on the receptivity of local governance actors, including the public sector (e.g., municipal and county water agencies) and among private landowners, water rights holders, and businesses. It is the art of persuasion rather than the exercise of power.

IWRM places emphasis on the importance of watershed or river basins as comprising the most natural units for water governance, though in practice the correspondence between administrative boundaries and hydrological ones is very often lacking (Cohen and Davidson 2011). Even in the context of the European Water Framework Directive, the river basin councils, which in theory are to be set up for each major river, are often divided into sub-councils to remain within national or state boundaries (Jager et al. 2016). One basic reason that the intuitive concept of watershed boundaries is more readily formalized into organizations at the level of small rivers but only rarely at the larger level of river basins, is that smaller watersheds can be more easily seen and appreciated by the stakeholders. It is far easier to build meaningful metaphors for water, for example, when there is a physical reality that anchors the mental image. The IUWRM synonym of “one water” for example, has a more visceral connotation among citizens living in the same physical watershed. The tag line of my local Santa Fe Watershed Association, “Our river, our water, our future,” implies a shared river and watershed.

In the context of watershed restoration, the first step is for stakeholders to simply see the degraded lands with new eyes, and to promote a community sense of interdependence at the watershed level. An example is the Arvari River Parliament in Rajasthan, India which has an ambitious agenda of social, cultural, environmental, and economic goals within a watershed framework. Restoring the severely degraded Arvari Watershed served as the mobilizing idea for both physical and governance measures (Box 6.10).

#### **Box 6.10 Revitalizing the Arvari River watershed (India)**

In the semi-arid Arwali Hills of Central Rajasthan, villages had long resigned themselves to uncertain rainfed farming supplemented by deep wells tapping unreliable groundwater. In 1985, a local NGO, Tarun Bharat Sangh (TBS), initiated a program to address the region’s poverty through the use of traditional water harvesting. The founder of TBS, Rajendra Singh, was an Ayurvedic doctor who felt that the same principles of instilling health through rebalancing the body could be applied to the land itself (Padre 2000). TBS encouraged local villages to construct water retention structures (*johad*) in suitable locations to capture rainwater runoff from the local hills and

recharge the aquifer.<sup>17</sup> While TBS would provide the equipment and construction materials, the labor had to be provided by the village. Discussing the terms and deciding on the location and design of the structures required multiple meetings of the *gram sabha* (village council), a process which served to revitalize these flagging institutions.

In the first ten years of the program nearly 2,500 johads were constructed across some 500 villages (Agarwal and Narain 1999). Villagers noticed that the Arvari River, the primary river in the region, no longer dried up so soon after the summer monsoon rains. By 1995, the river flow continued year-round, and it has been flowing ever since. This became known as the Arvari Miracle, but it also prompted new problems. In 1996 the state fisheries department issued a license to an outside contractor to catch the fish that now swam in the river, prompting the villagers to protest that the fish belonged to them and not to the government. Their protest resulted in a cancelled contract, and the realization that the river they had worked so hard to bring back to life now needed to be governed by them as well. At a meeting called by TBS for the 72 gram sabhas of the Arvari River catchment, the Arvari River Parliament was created (in January 1999), comprising 110 representatives from the 72 villages. The new organization adopted a set of rules that would be morally (but not legally) binding on the member villages (Glendenning 2009).

The rules included a ban on water-intensive crops (e.g., rice, cotton, and sugarcane), control over water withdrawals from storage ponds, bans on deep wells (tube wells), commercial fishing, and rock quarrying, and regulations for forest protection. The rules are revisited and adjusted at biannual meetings. Rajendra Singh's organization, TBS, has established a national network, Jal Biradari, to apply the lessons of the Arvari River villages to other Indian rivers. Reviving the physical ecology of the watershed, through managing the rainfall runoff, is the first step in the approach, but it is not the goal. The goal is social, with the recognition that the health of nature and local communities is intertwined. "A river is not just water. It is the people who live on its banks, the flora and fauna in and around it," said Vikrant Sharma, an activist working with Rajendra Singh.<sup>18</sup> The governance goal of the Arvari River Parliament, or of future river parliaments elsewhere, is to guide the practical management of water within the catchment to contribute to the health of the land, the people, and the river. Rajendra Singh's vision sees watershed restoration as a path to broader human and spiritual development. In his acceptance speech for the 2015 Stockholm World Water Prize, he observed,

When we started our work, we were only looking at the drinking water crisis and how to solve that. Today our aim is higher. This is the 21st century. This is the century of exploitation, pollution and encroachment. To stop all this, to convert the war on water into peace, that is my life's goal.<sup>19</sup>

*River basin institutions*

The same logic of stakeholder participation that applies to small rivers and watersheds also applies to large rivers and river basins. The challenging organizational logistics of interacting along a river basin extending hundreds of kilometers and involving millions of stakeholders, requires a different level of effort and often governmental involvement. There are many good models for formal stakeholder arrangements that can represent the diverse interests of basin residents (GWP and INBO 2009). These range from river basin commissions such as the Rhine River Commission or Australia's Murray Darling River Commission, to basin councils having little or no executive authority, but serving the functions of convening stakeholders.

There is general consensus that water does need to be governed at the natural scale of a river basin, whether through a single, unitary organization or overlapping entities (Molle et al. 2007). The primary ethical issue is that of voice and representation. Whose voices are heard and how are the interests of disadvantaged groups (social ethics) and nature (environmental ethics) represented? In particular, who speaks for nature? How is the organization structured to invite the participation of the various stakeholder groups? How does the basin-level organization relate to sub-groups at the watershed or tributary level, and how does it relate to the local governments within its boundaries?

Without a deliberate ethical approach, governance of large river basins can easily fall into a default mode of top-down expert-driven decisions, precisely because there are so many technical issues to deal with. To counter this natural tendency, the concept of a "negotiated approach" seeks to build-in support for local decision-making.

Local, micro-watershed levels should be a priority for decision-making. Only where absolutely necessary should decisions be taken at higher and higher administrative levels. This allows local actors to develop context-specific basin management strategies and to influence regional and national decisions, with the ultimate end of developing a bottom-up process of policy development and management.

(Both ENDS and Gomukh 2005:4)

The difficulties of organizing at the scale of a river basin adds to the importance of strong value-based commitment to participatory governance in the first place. It will always be easier to avoid the sometimes bothersome challenges of placating divergent interests and engaging in detailed discussions among stakeholders. The same type of temptation applies to the inclusion of environmental voices in the mix of stakeholders. A commitment to the process of hearing from social and environmental advocates is itself an ethical choice. Basin management, like democracy, is a messy process.

## Conclusions

In this chapter we have examined three distinct domains of water governance, irrigation, urban water supply, and water basins. In each of these domains the process of governance is as important as the end result. Participation of irrigation users in managing the water and infrastructure of their system is important for social as well as economic reasons. Users' management involvement can also play a role in urban water supply, but the bigger issue is the accountability and responsiveness of utility managers to social justice (providing water and sanitation to everyone) and to the environment (extending the governance frame to include environmental goals). Governance of water basins, whether small watersheds or large river basins, has ready-made boundaries within which integrated water management can unfold. The Arvari River case demonstrates how tightly integrated are the ethics of environment, society, culture, and economics into a quadruple bottom line.

If water basins are the natural unit for integrating what could otherwise become competing goals (e.g., economy vs. environment), then governance is the natural function for creating harmonious solutions. It is at the governance level that the "big picture" of water management policies and practices can be ordered to align with the goals of society. This presumes that the goals of society, at least with regard to water, are fairly clear, and if they are not clear, the first priority of governance has to be to determine what the goals are, what the values and ethics are which governance should aspire to advance (Groenfeldt and Schmidt 2013). Governance needs a broad framework, clear goals (ethics) and a bounded geography (e.g., a river basin, though it could also be a project, or a city, state, or nation).

The importance of goals grounded in clear ethics is seen in every case discussed in this chapter, and I would suggest, in every case not discussed as well. Is participatory governance of irrigation systems a top priority for a World Bank-funded project, or a weak priority? What about agroecology as an alternative to industrial farming? A whole stream of investment decisions depends on the answers, but what determines what the answer will be? Ethics. Not in the sense of good ethics or bad ethics, but in the sense of identifying what values the project will try to support. Social values through supporting the organizational capacity of the farmers? Cultural values by promoting heritage food crops? Environmental values by encouraging organic and agro-ecological cultivation practices? Economic values are not even a question for the World Bank, but how will the economic goals/ethics interact with the social and environmental and cultural goals/ethics?

These detailed decisions about the design of an irrigation development project can best be answered at a higher level of governance, where the organizational entity (e.g., the World Bank) sets goals for its operations. Similarly, a decision about whether to use permeable paving in constructing a city parking lot should not be made by the construction manager, but by the city agency "governing" water. If there is no such agency, the governance function will need

to be created, and if it is not created, the need for the function does not disappear; it becomes an unmet need, and a potential employment opportunity for someone in the future!

A perspective of water ethics can shine a light into the dark corners of the assumptions underlying water governance. Is the river basin suffering from “scarcity” or from over-use? Why is so much water going to one particular use (e.g., golf courses) rather than another use (e.g., environmental flow)? Analyzing the ethics of water governance goals will call into question the current definition of the governance “problem” of maintaining quality of life in the face of increasingly scarce water. Evaluating the underlying assumptions and following the ethics to their logical implications can reveal new options for coexistence with the natural world, and with each other.

Finally, what can we say about the role of the water governance system in transforming the relations between people and water? How can governance play a leading role not only in facilitating the practical expression of society’s values about water, but in transforming those values. Why should governance be called on to change values? Isn’t it the job of governance to do the bidding of society? I would suggest that the role of water governance should be to challenge society’s assumptions about how water should be managed, and what behaviors should be encouraged or discouraged. On what basis can the governance system be expected to call attention to this or that behavior that might or might not be advisable? After all, the governance system is neither a person nor an institution, but an amalgam of influences which in aggregate function as if there might be someone in charge, lurking in the background.

The basis for governance decision-making must be, and can only be, a framework of ethics by which alternative choices and their implications can be assessed and compared. At the operational level of management, routine decisions are generally determined by operating rules and procedures, or if greater flexibility is needed to tap into the judgment of the manager, there are guidelines, policies and norms that guide decision-making. The function of water governance, however, needs a bit of distance from operations, and needs room to maneuver, yet also needs a touchstone with what is reasonable. The law is too rigid; economics is too narrow; politics is too volatile, and intuition is too unreliable, but ethics is just right. Ethics, the assessment of what’s right to do or to not do, is designed precisely for the purpose of guiding decision-making.

### **Discussion questions**

- What does “stakeholder engagement” mean to you? How much “engagement” is enough?
- How can water governance address social justice issues?
- Should urban water systems ever be privatized? Under what conditions?

## Notes

- 1 See [www.gwp.org](http://www.gwp.org).
- 2 See [www.worldwatercouncil.org](http://www.worldwatercouncil.org).
- 3 [www.unwater.org](http://www.unwater.org) is the umbrella website for UN organizations working on water in some way.
- 4 The “Ministerial Declaration of The Hague on Water Security in the 21st Century” is available on the World Water Council website, [www.worldwatercouncil.org/fileadmin/www/Library/Official\\_Declarations/The\\_Hague\\_Declaration.pdf](http://www.worldwatercouncil.org/fileadmin/www/Library/Official_Declarations/The_Hague_Declaration.pdf).
- 5 [www.worldwatercouncil.org](http://www.worldwatercouncil.org)
- 6 [www.france-libertes.org/fr/](http://www.france-libertes.org/fr/)
- 7 <https://canadians.org>
- 8 <http://fama2018.org>
- 9 <http://fama2018.org/final-declaration-of-the-alternative-world-water-forum/>
- 10 [www.worldwaterforum8.org/en/documents-1](http://www.worldwaterforum8.org/en/documents-1)
- 11 Adapted from the website of French Water Partnership, [www.partenariat-francais-eau.fr/en/wp-content/uploads/sites/2/2018/03/LIVRE\\_TODD\\_ENG\\_WEB\\_2.pdf](http://www.partenariat-francais-eau.fr/en/wp-content/uploads/sites/2/2018/03/LIVRE_TODD_ENG_WEB_2.pdf)
- 12 <https://waterethics.org/the-water-ethics-charter/>
- 13 <https://waterculture.org>
- 14 The full (draft) version of this charter is available on the Water Ethics Network website: <https://waterethics.org/the-water-ethics-charter/>
- 15 This account is based on a detailed story in *New Yorker Magazine* (Finnegan 2002), and a retrospective account by an on-the-scene reporter at the time (Schultz 2008).
- 16 See the website of the “Berlin Water Platform” (<https://berliner-wassertisch.net/>), or download the English text of the Berlin Water Charter at [https://berliner-wassertisch.net/assets/Charta/Berlin\\_Water\\_Charter2015.pdf](https://berliner-wassertisch.net/assets/Charta/Berlin_Water_Charter2015.pdf).
- 17 The structures were usually concave earthen dams across a drainage line, with the resulting pond covering a large area of between 2 to 50 hectares of land (2ha = 5 acres, or about the area of five football fields).
- 18 Quoted in *The Hindu*, May 23, 2012, [www.thehindu.com/life-and-style/society/article3449172.ece](http://www.thehindu.com/life-and-style/society/article3449172.ece).
- 19 [www.siwi.org/prizes/stockholmwaterprize/laureates/2015-2/#discoverWork](http://www.siwi.org/prizes/stockholmwaterprize/laureates/2015-2/#discoverWork)

## Further reading

- Akhmouch, A. and Clavreul, D. 2016. Stakeholder engagement for inclusive water governance: “Practicing what we preach” with the OECD water governance initiative. *Water*, 8(5). [www.mdpi.com/2073-4441/8/5/204/html](http://www.mdpi.com/2073-4441/8/5/204/html)
- Groenfeldt, D. and Schmidt, J. 2013. Ethics and water governance. *Ecology and Society*, 18(1): 14. <http://dx.doi.org/10.5751/ES-04629-180114>
- Lobina, E. 2017. “Water remunicipalisation: Between pendulum swings and paradigm advocacy,” (pp. 149–161), in Bell, S., Allen, A., Hofmann, P. and Teh, T.-H. (eds.), *Urban Water Trajectories*. Springer, Cham. [www.researchgate.net/publication/309381808\\_Water\\_Remunicipalisation\\_Between\\_Pendulum\\_Swings\\_and\\_Paradigm\\_Advocacy](http://www.researchgate.net/publication/309381808_Water_Remunicipalisation_Between_Pendulum_Swings_and_Paradigm_Advocacy)
- Ziegler, R. and Groenfeldt, D. (eds.) 2017. *Global Water Ethics: Towards a Global Ethics Charter*. Routledge, London.

## 7 Indigenous water ethics



Traditional irrigation channel, Yazd Province, Iran, January 2017

Indigenous Peoples have much to teach us about water ethics, not only because they still retain much of their traditional ecological knowledge, though this is extremely important (Suzuki and Knudtson 1992). The other reason that we have so much to learn from the experience and cultures of Indigenous Peoples stems from their position vis-à-vis the dominant societies that define their cultural boundaries. As minority cultures, Indigenous Peoples are only too aware of their cultural differences, continuously reminded of the role that their cultural and spiritual assumptions, beliefs, values, and ethics play in their perception of and decisions about the natural world, including water. By trying to understand what life looks and feels like to Indigenous Peoples, we can learn something about what it means to bring ethics into the realm of conscious choice. Indigenous Peoples do this on a daily basis.

The clash of cultural values can be seen very readily in choices about physical infrastructure from dams to irrigation canals. Dams have been so utterly destructive to the ecological function of rivers and the Indigenous communities depending on those rivers that dam development has become an appropriately controversial issue. The work of International Rivers and other activist NGOs, along with the soul-searching analysis of the World Dam Commission (WCD 2000), has been seriously addressing dams impacts on Indigenous Peoples for the past three decades. And yet dams continue to be built quite literally on top of Indigenous communities and in spite of the declarations and pronouncements of both UN agencies, individual countries, and business associations. And of course, the damage is not only from dams. Mining probably has even more impact on water than dams, when all the contamination is added up; in fact, that could be an interesting but depressing comparison to undertake!

How is it that the cultural integrity and social welfare of Indigenous communities is so readily sacrificed for dams, mines, and other forms of conventional economic development, which the UN Sustainable Development Goals – endorsed by every country in the world – are seeking to overturn? There is a terrible disconnect between what the world is doing and what the world is saying it wants to be doing. The future we are busily constructing is almost the antithesis of “the world we want” that is described in UN sustainability meetings. In this context, the water sector serves both as a canary in the coal mine (as goes water, so goes the planet), and as the potential finger in the dyke, to use the Dutch metaphor of the boy whose finger keeps the dykes intact to avoid a catastrophic flood. If we can figure out how to sustain our water resources, we will also discover how to sustain our planet, and hopefully it won’t be too late by the time we do!

One premise of this book, echoing Aldo Leopold’s “Land Ethic” (discussed in Chapter 1), is that the deliberate adoption of a new water ethic that incorporates Indigenous values and modes of framing and thinking about water is what we need to get through the ecological mess that our current values have created. And just as shifting gears requires (or used to require) a clutch to accommodate the transition, we need a way to translate the ancient wisdom of Indigenous

Peoples into nuggets of practical water knowledge that we can process (and quickly!). This is the role that ethics can play. We can translate Indigenous knowledge into ethical principles, and then integrate those ethical principles into our high tech, fast-paced, market-driven, information-intensive socio-ecological system that we call modern life.

To do this, we first need to learn about Indigenous water ethics and about non-Indigenous water ethics. Not only do we need to learn; more to the point of ethics, we have a responsibility, a moral duty, to learn. Chief Justice Lance S. G. Finch of the British Columbia Court of Appeal has this to say about “the duty to learn”:<sup>1</sup>

How can we make space within the legal landscape for Indigenous legal orders? The answer depends, at least in part, on an inversion of the question: a crucial part of this process must be to find space for ourselves, as strangers and newcomers, within the Indigenous legal orders themselves.

(Finch 2012)

It is in this sense that we have an obligation, a duty, to learn how Indigenous Peoples view water and water ecosystems. In order to understand how water policies can support the cultural ethics of Indigenous Peoples, we need to have some understanding of what those ethical principles might be (see Box 7.1).

### **Box 7.1 Indigenous views of water**

The water ethics of Indigenous Peoples carry particular importance in considering how ethics motivate water policies and practices and offer a hint of what life with robust water ethics might be like. At the risk of generalizing, it could be said that Indigenous cultures, diverse though they are, feel a relationship with water. Water and water ecosystems are considered part of the extended family that includes the community, the animals, the land, and water. But Indigenous concepts of water go beyond the trope of functioning as a relative; water, and particularly bodies of water, are inextricably interwoven into the fabric of Indigenous identity. In her analysis of what water means for the Carcross/Tagish First Nation in Canada, Eleanor Hayman (2017) identifies a number of distinct but synergistic dimensions that offer a glimpse into the Indigenous water paradigm: (a) water as metaphor, (b) water as map, and (c) water as responsibility.

*Water as metaphor:* Water serves as a multi-purpose metaphor for living one’s life in the sense that everything is connected (my life with yours; our human lives with the natural world) and the concept of flow in the sense of a circulation of virtues, or borrowing from Eastern religions, the law of karma. In these senses water provides a useful and ubiquitous (since water is always close at hand, even for people living in deserts; otherwise they would

not be living!) metaphor that is good to think with (Chen et al. 2013; Cruikshank 2012).

*Water as map:* Water bodies – rivers, lakes, wetlands, springs, or (in the Yukon region especially), glaciers, are ready-made features that can orient direction both physically (north/south, upslope/downslope) and culturally, identified and remembered through story (Basso 1996). Deep mapping “intentionally creates space for ontological difference [and] gives voice to aqua-centric wisdom” (Hayman 2017: 237) through documenting the stories linked to water bodies.

*Water as responsibility:* Indigenous cultures recognize a responsibility to water in the form of respect (through prayers, ceremonies, and storytelling) and protection in the sense of according the category of “sacred” to water bodies and treating them, and speaking about them, in respectful ways. Respecting and protecting constitute a deep ethical responsibility to water which was displayed on a world stage at the Standing Rock protests in South Dakota, USA, during 2016. The tribal protesters called themselves “water protectors,” protecting both the land and waters from the oil pipeline being constructed across their territory and under the Missouri River (Veilleux 2017). Though not successful in blocking the pipeline, which was supported by an overwhelming coalition of state and local government, the US Army Corps of Engineers, and the pipeline company (supported by heavily armed security forces), the protests clearly illustrated Indigenous values of responsibility to the land and water.

The flip side of this “duty to learn” about Indigenous Peoples’ water values and ethics is our duty to learn about our own water values and ethics, both the ethics that are explicitly verbalized through laws and the tacit ethics that are embedded in our culture so subtly that it takes deliberate analytical examination to discover them. For example, in the water laws of my state of New Mexico, there is a very clear ethic that water ought to be diverted from a river only for purposes that are economically beneficial. Environmental flow that benefits the ecological function of the river does not constitute an economically beneficial use, and therefore cannot be protected. This is referred to as the “use it or lose it” policy and is a serious obstacle to river restoration strategies. While there are legal maneuvers that can be taken to support river flow, the ethical principle is quite clear that water use for economic benefit is desirable and considered “good”, whereas water used by the river itself is viewed as not useful.<sup>2</sup>

Learning about conventional (non-Indigenous) mainstream water ethics is not onerous. After all, you are already reading this book! Standard educational approaches including formal schooling, universities, and a seemingly limitless number of studies, reports, articles, and books available through online sources are all available to the student of water ethics. Learning about *Indigenous* water

ethics can also be approached with the same tools, but there are ontological challenges that are not readily surmounted, having to do with colonization and what I call the “semiotic hegemony” of conventional paradigms of water infrastructure and development (Groenfeldt 2016). We need to “decolonialize” our minds (Porter 2010) and learn to see and to listen to Indigenous concepts of what water really is, and how to establish an ethical relationship with water. And to accomplish this stretching of our culturally-formed blinders, we need to make space in our own thinking for other “ontologies.”

### **Ontologies of water**

Ontology is defined as “a particular theory about the nature of being or the kinds of things that have existence.” The word is not used very commonly because there’s little need for thinking about the nature of things; we already know about that from our culture and from the socializing process, both formal (school) and informal (parents, friends, TV, social media, etc). We don’t spend a lot of time reconsidering the nature of things, because we don’t need to. For example, we know that water exists, and we know that its nature is that of an inert physical substance with the chemical formula  $H_2O$ . Is there any debate about this? Is there room for an ontological discussion about the nature of water? Is it within the realm of possibility that water has a type of life energy and could be considered to be alive in some way? “Of course not,” says just about every Western scientist, particularly if you ask him to say it on the record. Most water professionals would be annoyed at being asked a question that has such an obvious answer. However, most, if not “all” Indigenous people would answer the question with a “yes,” and might add, “Of course!” Water within most Indigenous ontologies has a form of consciousness and is in some meaningful way “alive” (see Box 7.2). Let me add the qualifier that I have not conducted a formal survey on this question, and my statements here are based on my own sense of Indigenous vs. Western ontologies about whether water is alive or dead or something in between.

Questions about water ontologies, our beliefs about the fundamental nature of water and bodies of water, such as rivers, take on very practical relevance when something drastic is proposed for the river, such as a dam or a mine that could irreparably harm the river. Whose ontology matters? Well, we all know the answer to that. Indigenous ontologies are rarely accorded serious thought when they run counter to Western scientific rationalism, and the observable historical facts that the prescriptions of Western science change over time and from one paradigm to the next does little to dampen the certainty of its proponents. Yates et al. (2017) refer to this as “ontological hegemony.” How can we overcome our own hegemonic tendencies when it comes to defining the world according to the culture we have become socialized into? We need “to take seriously the possibility and politics of a multiplicity of water-related worlds, highlighting multiple water realities and ways of being-with-water, not just different perceptions of or knowledge systems tied to water’s (singular) material existence” (Yates et al. 2017: 797).

### **Box 7.2 Is water alive?**

At the 2006 World Water Forum in Mexico City, I co-organized a session about Indigenous perspectives on water, along with Tom Goldtooth, the founder and president of Indigenous Environmental Network ([www.ienearth.org](http://www.ienearth.org)). The title of our session was “Is Water Alive? Indigenous Understandings of Water.” The title was meant to convey two simultaneously obvious and opposite meanings. Within the frame of indigenous cultures, water, whether water bodies or water as a substance, is universally held to be in some sense “alive” with spiritual and life-generating properties and consciousness. Within the frame of Western scientific rationalism, on the other hand, water is universally held to be an inert substance, necessary for life, but not having life itself. Points raised in the session included the following:<sup>3</sup>

The indigenous communities are linked to their local waters in a symbiotic relationship; indigenous culture and spirituality depends upon the health of the water and watershed, while the environmental health of the water depends on the spiritual practices of the indigenous communities.

Indigenous peoples actively manage their water through spiritual practices (ceremonies and rituals), as well as the more familiar physical practices (e.g., diverting water for irrigation). What outsiders may see as under-utilized water resources are already being managed and “used” through spiritual practices. The deep respect manifested through indigenous spiritual is needed for sustainable management of water bodies. The degradation of the American Great Lakes and the Navajo aquifer are lessons in the dangers of ignoring indigenous peoples spiritual respect for water.

Key messages:

- Concept of a “social basin” that unites all the stakeholders who share a water source and have a common interest in protecting it;
- Religious ritual and spiritual practice is tied to the water source/water body on which the community depends;
- The health of water bodies is protected through spiritual practices, both directly and indirectly;
- Understanding water takes a long time. Indigenous peoples have been learning about their local waters for many generations. Their knowledge needs to be applied to local water management.

Orientations for Action:

- Include the social dimension (local communities) in the concept of watersheds and water basins;
- Include cultural knowledge and spiritual practices of local indigenous communities as an integral part of the watershed/basin;

- Respect the spiritual and cultural knowledge of indigenous peoples, including their understanding of their local waters and watersheds. Accept these local understandings as being equally valid as outsiders' paradigms about water management. The two sets of paradigms need not be in conflict; with mutual respect, each can benefit from the other.

### *Cooperation or conflict?*

The challenge of ontological hegemony cannot be addressed by more hydrological data or more economic valuation studies because the arguments – what Yates et al. (2017) call “ontological disjunctures” – stem from fundamental differences in conceptualizing how the world works. Bridging those differences requires not only understanding, which can come from information and knowledge, but also appreciation and a willingness to see the world from other perspectives. But where does that willingness come from? How can it be fostered and inculcated?

The problem with using “ontologies” as analytical units is that the concept includes beliefs, values and ethics without distinguishing their distinct and interactive roles. Beliefs (for example, in the law of karma) underlie values (e.g., it's good to help people who are less fortunate, but charity begins at home). Beliefs are socialized into you at an early age and, hence, are resistant to change, whereas you can choose your own values, to some extent. “When in Rome do as the Romans” implies that values can adjust to circumstances. Both beliefs and values are expressed in behaviors which are guided by ethics. You can ask people what they believe and what their values are, but to know what their ethics are, you will have to observe their actual behavior. Ethics is the application of values.

Describing ontologies in terms of an undifferentiated set of beliefs, values and ethics imparts a misleading sense of system rigidity: Those materialist Westerners will never be able to truly understand how this Indigenous society conceptualizes nature. It might be fair to say that the two beliefs are contradictory, but that does not necessarily mean that the values don't have some common features, and it certainly leaves open the possibility that the ethics could be similar. And, of course, Western belief systems can have a great deal of internal variation as well: We are not all neo-liberal rational materialists! My point here is that while belief systems may be incompatible, that does not preclude the possibility of compatible ethics at the level of actual behavior. This is where Indigenous ontologies might find common cause with “settler” ontologies. The Indigenous ethic of environmental flow might be to show respect to the river and to the aquatic and riparian plants and animals that depend on a healthy river, while the settler support for environmental flow might be based on a cost/

benefit analysis of the economic value of recreational uses of the flow, coupled with agricultural, industrial, and urban demands downstream that would benefit from consistent upstream flows. In other words, the two sides might agree on the desirability of environmental flow using totally different beliefs and values to justify why environmental flow is desirable.

Understanding the ethical principles important to riparian stakeholders is a prerequisite for cooperative river management, and some level of understanding of the priority values that motivate those ethical principles is certainly useful to support mutual understanding. But does it matter whether the settler stakeholders know the creation stories of the Indigenous communities along the river? Does it matter if the Indigenous leaders understand the valuation methods used in the cost-benefit analysis that demonstrates the economic wisdom of environmental flow? If agreement can be reached on the desirable outcomes, let's count our blessings and move on. But what if the economic analysis does not support environmental flow? What if there is fundamental disagreement about what constitutes a sensible flow regime for the river, or what constitutes acceptable water quality? What recourse do Indigenous communities have?

Differences in cultural norms take on tangible reality when it comes to rights of water access (Boelens et al. 2007). Whose cultural understanding about water will be incorporated into the new irrigation network? How will the water flows be allocated, and by whose authority will this be done? Customary understandings about access to irrigation water or about ownership of canals and the authority to make repairs or alterations to those canals can be a source of conflict between indigenous communities and state water agencies (van Koppen 2007). Indigenous cultural values also come into play in setting up community drinking water systems. Will the new wells be under the control of the traditional chief? Or does the provision of new wells provide an opportunity to overturn that authority in favor of a democratic water supply association?

Conflicts over water sources which are considered sacred to local Indigenous Peoples have become routine and can be seen as a clash between traditional vs. global worldviews (Mander and Tauli-Corpuz 2006). The battle lines can be difficult to distinguish, however, as there are often conflicts within the indigenous community between factions supporting strict interpretation of traditional values vs. those embracing the economic opportunities of the proposed development. In the case of Cochiti Dam, as discussed in Chapter 2, the question of whether to allow the dam to be built or not nearly destroyed the ability of the Indigenous community of Cochiti to survive politically as a village. Ultimately the forces of modernity prevailed, and the dam was built, but the social scars continue to be felt internally.

### **Tools for bridging divergent water cultures**

The culturally based assumptions about water which Indigenous Peoples typically share, at least in terms of their cultural norms, present several unique water challenges: (1) indigenous cultural and spiritual understandings about water are

often misunderstood or simply ignored by the dominant societies; (2) indigenous communities are rarely included meaningfully in water policy and planning processes; (3) customary access and rights to water are seldom recognized by the state authorities that now control indigenous areas, and (4) water bodies that are critical to cultural and physical well-being are being polluted, dewatered, or dammed. Each of these special challenges is elucidated in the following sections, along with some suggestions for how these challenges might become reworked into opportunities not only for indigenous communities, but for all of us.

### *1. Cultural distinctiveness*

One of the defining features of Indigenous Peoples is that they are culturally distinct. They have their own way of doing things and their own reasons for doing them, and their identity as a social group is tied to their shared cultural identity. This is not to claim that all members of the group have the same culturally mandated views and values. As the anthropologist Mary Douglas has observed, there is significant diversity within every cultural group (Douglas 2004). The relative importance of the diversity within cultures vs. the diversity across cultures has served as fodder for countless academic debates, but ultimately it is not for the outside experts alone to decide whether a group is culturally distinct. The members of the group in question also hold a right to determine for themselves whether they wish to be considered a distinct cultural group. This right has been recognized in UN Resolutions and most recently in the Declaration on the Rights of Indigenous Peoples (see Box 7.3).

#### **Box 7.3 UN recognition of Indigenous peoples' rights to water<sup>4</sup>**

The most important declaration for supporting indigenous rights to manage water and water ecosystems is the 2007 UN Declaration on the Rights of Indigenous Peoples (DRIP) which has become an important standard in legal claims. The Declaration makes only two references to water. Article 25 states that

Indigenous peoples have the right to maintain and strengthen their distinctive spiritual relationship with their traditionally owned or otherwise occupied and used lands, territories, waters and coastal seas and other resources and to uphold their responsibilities to future generations in this regard.

Article 32 addresses the delicate issue of control over natural resources and makes three points:

- 1 Indigenous peoples have the right to determine and develop priorities and strategies for the development or use of their lands or territories and other resources.

- 2 States shall consult and cooperate in good faith with the indigenous peoples concerned through their own representative institutions in order to obtain their free and informed consent prior to the approval of any project affecting their lands or territories and other resources, particularly in connection with the development, utilization or exploitation of mineral, water or other resources.
- 3 States shall provide effective mechanisms for just and fair redress for any such activities, and appropriate measures shall be taken to mitigate adverse environmental, economic, social, cultural or spiritual impact.

When a member of an indigenous group identifies the river flowing through the group's territory as "sacred," what precisely does this mean? As with the claim to cultural indigeneity, the individual's assertion that the river is sacred has to be taken at face value. Who can prove it wrong? Yet we know from the analysis of specific cases that different members of the same group may hold very different and conflicting views about whether the river really is sacred, and what that really means. For example, Hindu adherents of the sacredness of the Yamuna River in India agree that the river is sacred, but disagree on the implications in terms of whether the river poses a health risk, and even whether pollution is a problem or not (Haberman 2006).

Indigenous Peoples of Australia view water as an integral part of the world created by ancestral beings during what is colloquially known as the Dreaming (Jackson 2006; Jackson and Barber 2016). The land and the waterscapes are understood to be living entities that are responsive to human actions and human behavior. People place value on their relationships to the landscape, just as they do to one another. This is the meaning of the expression heard in UN speeches by Indigenous leaders referring to "all our relations." Those relationships are with other humans, animals, the landscape, and the waterscapes, and they imply both rights (the right to be acknowledged as a relative) and responsibilities (to protect the land, water, and associated plants and animals). There is also a responsibility for understanding nature as a prerequisite to making use of resources:

Possession of knowledge of the environment, its natural features and vitality, its spiritual dimensions, is a prerequisite to exercising rights to land and water. The crucial sustaining role of culture and country, and of the laws and practices that are associated with them, also place a heavy obligation on its current custodians to protect and pass on as much knowledge as they can to subsequent generations

(Jackson and Barber 2016)

When the Taos Pueblo in New Mexico requested that their sacred Blue Lake, the source of the stream that flows through their village, be returned to them, they knew success was unlikely. The entire upper watershed of Taos Creek, including Blue Lake, had been absorbed years earlier into the administration of the National Forest Service. From the government's perspective, the legitimate religious rights of Taos Pueblo were already being met by allowing access to the lake for ceremonial purposes (which involved applying for a special permit from the Forest Service), but the Indigenous community wanted full ownership. They wanted to prevent non-Indians from fishing in the lake and desecrating it with trash from their campsites. They wanted control over the lake so they would not need to justify their use of the lake with intermediary authorities. The authority of Taos Pueblo to control the lake came from their own creation story, and in their view, no other justification was required.

Taos Pueblo was successful in their quest when then-President Richard Nixon transferred ownership of Blue Lake back to Taos Pueblo in 1972. The reason the federal government acquiesced had little to do with acknowledging the demands of the tribe to freely practice their native religion. Rather, a fortuitous confluence of political interests rendered the land transfer expedient for all parties. The result was a sense of good will, but no greater understanding of the real significance of Blue Lake within the Taos Pueblo worldview (Nabokov 2006).

## *2. Participation in water planning*

How can Indigenous communities participate meaningfully in water planning conducted by agents of the mainstream society, when there are fundamentally different ideas about water itself? The planning process needs to recognize the importance of including all the ideas of water. Planning, in other words, needs to undergo a process of "unlearning" its Euro-American (colonial) assumptions about the nature of water (Porter 2010). Though culturally oriented water planning would constitute a dramatic departure from planning conventions, two important ingredients are already in place. One is the recognized value of stakeholder representation in water planning, particularly at a basin or watershed level. The concept of stakeholder participation creates space for Indigenous voices to be heard as a legitimate part of the planning process (Groenfeldt 2003). The other important ingredient is the growing acknowledgement among planners that Indigenous knowledge constitutes a distinct category of knowledge that has been largely overlooked in conventional planning. Often labelled as "traditional ecological knowledge" or TEK, a term which aims to slot Indigenous knowledge into a pre-existing Euro-American classification system, the concept has at least helped to legitimize Indigenous knowledge by giving it a familiar type of label.

Traditional ecological knowledge is about much more than ecology; it is also about spiritual and social beliefs and values, about honoring ancestors,

and about the responsibility to protect the natural world which provides the broad frame for planning. In the words of Ted Jojola, a professor of community planning at the University of New Mexico and a member of Isleta Pueblo,

There is an ethic or duty of care to the land, its resource, and environments, particularly those located within the traditional territories of the group. By definition, Indigenous planning is place-based and implies a long and close association, therefore knowledge of the specific environment and what it can sustain.

(Jojola 2013)

Indigenous Peoples' positions on their own water knowledge and their views about proposed development projects, such as dams, mines, or irrigation diversions, are rarely simple or uniform. Indigenous communities, like all communities, are composed of different types of people, reflecting a range of personalities and power relationships (Douglas 2004). But the historical experiences of most Indigenous communities add a further dimension of colonial traumas resulting in local governance systems that are neither traditional nor modern (Walker et al. 2013). A further challenge has been the underrepresentation of Indigenous scientists and scholars within the water sciences, who have been left to their own in figuring out how to apply their cultural values to their chosen scientific fields (Chief 2018).

### *Indigenous water plans*

Water plans and strategies have become essential to the conduct of water resources management. The World Bank regularly updates its institutional Water Policy, the European Union has a Water Framework Directive, and the United States, though shying away from developing a national water policy, is rife with water plans at the state and project levels, and increasingly at the level of river basins and watersheds. Water planning by Indigenous communities, however, remains very much the exception rather than the rule. Aside from Australia, where there has been a government-led effort to work with Indigenous communities in developing water strategies (Jackson 2009; Taylor et al. 2016), there are few comprehensive water resources management plans developed by Indigenous communities. Instead, the more common form of Indigenous big-picture water perspectives is a declaration of the fundamental principles and "ethics" describing their relationship to water.

There have been a considerable number of Indigenous water statements and declarations over the past decade, with very consistent messages. The Indigenous Peoples Kyoto Water Declaration is perhaps the best known. The declaration was drafted during the third World Water Forum held in Kyoto in 2003 by the Indigenous participants (see Box 7.4). The key drafters were Tom Goldtooth, president of Indigenous Environmental Network, and Victoria

Tauli-Corpuz, the Executive Director of Tebtebba. The declaration was partly modeled on an indigenous statement to the UN Sustainable Development Conference held in Johannesburg in 2002, the Kimberley Declaration, which some of the same people had also been involved in drafting. The Kyoto Declaration was initially communicated to the World Water Forum through an unofficial march through the conference center with the indigenous participants speaking the declaration out loud, followed by a press conference. Later the declaration was posted on various websites<sup>5</sup> and is also included in the UNESCO publication *Water and Indigenous Peoples* (Chibba et al. 2006).

#### **Box 7.4 Indigenous Peoples Kyoto Declaration on Water**

Two sections of the declaration outline a set of ethics for water governance. The first section, titled, “Relationship to Water” (paragraphs 1–3) explains why Indigenous Peoples feel a responsibility to protect water ecosystems. Another section is labeled “Right to Water and Self Determination” (paragraphs 9–12) and describes the rights and responsibilities of Indigenous Peoples to protect their cultural way of life.

##### Relationship to Water

- 1 We, the Indigenous Peoples from all parts of the world assembled here, reaffirm our relationship to Mother Earth and responsibility to future generations to raise our voices in solidarity to speak for the protection of water. We were placed in a sacred manner on this earth, each in our own sacred and traditional lands and territories to care for all of creation and to care for water.
- 2 We recognize, honor and respect water as sacred and sustains all life. Our traditional knowledge, laws and ways of life teach us to be responsible in caring for this sacred gift that connects all life.
- 3 Our relationship with our lands, territories and water is the fundamental physical cultural and spiritual basis for our existence. This relationship to our Mother Earth requires us to conserve our freshwaters and oceans for the survival of present and future generations. We assert our role as caretakers with rights and responsibilities to defend and ensure the protection, availability and purity of water. We stand united to follow and implement our knowledge and traditional laws and exercise our right of self-determination to preserve water, and to preserve life. ...

##### Right to Water and Self Determination

- 9 We Indigenous Peoples have the right to self-determination. By virtue of that right we have the right to freely exercise full authority and control of our natural resources including water. We also refer to our right of permanent sovereignty over our natural resources, including water.

- 10 Self-determination for Indigenous Peoples includes the right to control our institutions, territories, resources, social orders, and cultures without external domination or interference.
- 11 Self-determination includes the practice of our cultural and spiritual relationships with water, and the exercise of authority to govern, use, manage, regulate, recover, conserve, enhance and renew our water sources, without interference.
- 12 International law recognizes the rights of Indigenous Peoples to:
  - Self-determination
  - Ownership, control and management of our traditional territories, lands and natural resources
  - Exercise our customary law
  - Represent ourselves through our own institutions
  - Require free prior and informed consent to developments on our land
  - Control and share in the benefits of the use of, our traditional knowledge.

(Chibba et al. 2006: 176–179)

The Kyoto Declaration was drafted and agreed at an international gathering (the 2003 World Water Forum) to establish a moral policy at the global level, and thereby constitutes an expression of global water governance, as discussed in Chapter 6. A similar approach of negotiating moral statements about water at local levels offers the potential not only for delineating specific management goals, but also, through that process, empowering collective action of the stakeholders. Planning, in other words, can serve as a mechanism for participatory water governance.

In British Columbia, the Simpcw First Nation Water Declaration shares many concepts of the earlier Kyoto Declaration, but tailors the provisions to local circumstances. In particular, the Simpcw Declaration builds on the 2007 UN Declaration on the Rights of Indigenous Peoples, to specify how the concept of free, prior, and informed consent should be applied to negotiations involving the Simpcw Nation (Reading et al. 2011: 101–108). For example, the declaration specifies that the Simpcw Nation would require financial support to fully engage in the consultative process and the involvement of spiritual authorities as well as secular (governmental) authorities. Also, the Declaration makes explicit that if the consultative process does not result in agreement to whatever development project is being proposed (e.g., a dam or mine), that there must be “respect for the right to say no” (Reading et al. 2011: 106). In western Australia, the Indigenous community living along the Fitzroy River formulated a water declaration specifically about that river and its basin, the Fitzroy River Declaration (see Box 7.5).

### **Box 7.5 Fitzroy River Declaration**

In the Kimberley region of Western Australia, Indigenous people (referred to as Traditional Owners) are concerned by the extensive proposals for mining and oil exploration within the Fitzroy River catchment. In November 2016, the Traditional Owners agreed on common principles in the form of the Fitzroy River Declaration. The short document serves as a basis for any future management decisions about the river and its catchment:

The unique cultural and environmental values of the Fitzroy River and its catchment are of national and international significance. The Fitzroy River is a living ancestral being and has a right to life. It must be protected for current and future generations, and managed jointly by the Traditional Owners of the river. Traditional Owners of the Fitzroy catchment agree to work together to:

- Action a process for joint PBC decision making on activities in the Fitzroy catchment;
- Reach a joint position on fracking in the Fitzroy catchment;
- Create a buffer zone for no mining, oil, gas, irrigation and dams in the Fitzroy catchment;
- Develop and agree a Management Plan for the entire Fitzroy Catchment, based on traditional and environmental values;
- Develop a Fitzroy River Management Body for the Fitzroy Catchment, founded on cultural governance;
- Complement these with a joint Indigenous Protected Area over the Fitzroy River;
- Engage with shire and state government to communicate concerns and ensure they follow the agreed joint process;
- Investigate legal options to support the above, including:
  - 1 Strengthen protections under the EPBC Act National Heritage Listing;
  - 2 Strengthen protections under the Aboriginal Heritage Act; and
  - 3 Legislation to protect the Fitzroy catchment and its unique cultural and natural values (Lim et al. 2017)

In the Andean region, Indigenous communities maintain a water culture that goes back to the Incas but which is today challenged by state-sponsored water governance forms and values (Boelens et al. 2010). From a planning perspective, however, the struggle for water governance can be seen as a potential pathway for indigenous participation in the planning process. Through activism (e.g.,

protest marches demanding water rights), dialogue, and even through violence, messages about water values and ethics are communicated to the authorities who control water policies and planning.

In too many other instances, where Indigenous communities lack effective organizations, and where government agencies fail to invite indigenous representation, water planning proceeds without input from Indigenous Peoples' interests. Such has been the case in Chhattisgarh, India, where pressures on water resources from mining, industry, and agriculture are impinging on customary uses by indigenous communities. Without making a concerted effort to incorporate Indigenous representation into water planning, development assistance projects are very unlikely to represent Indigenous interests. Instead the old colonial legacy can be replicated in the form of development projects reflecting the priorities of outside donors and local elites who have input into the planning process (see, e.g., Anderson and Huber 1988).

Perhaps the most common pitfall in water planning carried out in Indigenous areas by non-Indigenous experts (typically a private consulting firm or a government water agency) is making too many assumptions about how water is perceived locally. Jackson (2006) notes that even such basic terms as "cultural values" and "social values" are not easily agreed upon among regional planners in Australia. In a planning effort to capture the cultural values of Indigenous aboriginal groups along the Daly River, the term "cultural values" served as a gloss for "Indigenous values" while "social values" was the term used for what an anthropologist would call the cultural values of the non-Indigenous (mostly Euro-Australian) population.

Members of a dominant culture tend to overlook the values dimension of their own worldview. What an outside observer might label as a "cultural value" is perceived from inside the culture as simply the way things are, a basic piece of reality unencumbered with any overlay or underlay of values. Indigenous Peoples, on the other hand are keenly aware of their own culture, to the extent that they are sometimes accused of exaggerating their cultural uniqueness as a negotiating strategy. In the Australian and American contexts especially, Indigenous Peoples are very much aware that they have "culture" whereas the hydrologists, engineers, and economists driving the water planning process from the government side can afford to overlook their own cultural values. Their dominant culture has set the terms within which the Indigenous community is being invited to comment. In the words of anthropologist Arturo Escobar (1995), this is a case of "semiotic hegemony." The dominant society has usurped not only the land and water, but the very code by which indigenous communities conceptualize their natural resources (Groenfeldt 2016).

### *3. Whose laws? Customary vs. "legal" rights*

Under the Doctrine of Discovery proclaimed by the Vatican during the 15th and 16th centuries, the Portuguese and Spanish Crown adopted very explicit policies of ignoring the customary land and water rights of Indigenous Peoples. From both a

legal and religious perspective, the Doctrine of Discovery justified the enslavement of Indigenous Peoples and the seizure of their lands, including the water flowing through those lands. The Doctrine was later invoked by the US Supreme Court in 1823. Not only has the doctrine never been formally repealed (though this process is ongoing at the United Nations), but contemporary legal frameworks, including US law, still incorporate references to the Doctrine as a justification for state expansion into traditional indigenous territory (Miller 2005:2–3).

The moral legacy of this ethic is seen today in the general absence of state recognition of customary water rights (van Koppen et al. 2007). The Pyramid Lake Paiute Tribe in the US state of Nevada have relied on the once plentiful fish from Pyramid Lake for some 4,000 years. The lake is fed by the Truckee River which flows out of the Sierra Nevada mountains. Shortly after 1900, the US government constructed a dam on this river, upstream of the lake, to divert water into an irrigation canal destined for Euro-American farmers some distance away. The dam diverted about half the flow of the river, launching a cascade of ecological interactions: the lake level dropped, salinity increased, and fish could no longer reach the upper river to spawn. The result was the near decimation of the Indian tribe, bereft of its primary source of subsistence (Wilkinson 2010). Court rulings during the 1970s to 1990s found that the US government had acted wrongly in ignoring the customary water rights of the tribe, but ruled that since so much time had elapsed, there was no practical way to compensate the tribe for their degraded lake (Wilkinson 2010:220–222).

Similar cases abound where Indigenous communities relied on water supplies that were later wrested from their control. In the northwest United States, the coastal Indian tribes who relied traditionally on salmon have seen fish populations collapse from water diversions and hydroelectric dams (Fisher 2012). In the Andes, farmers are engaged in a similar struggle: the irrigation canals first constructed by their Indigenous Incan ancestors have recently been expropriated by state agricultural or irrigation agencies (Boelens et al. 2007).

Where the dominant state authorities choose to respect customary law, as in Australia, the two sides can enter into a discussion or a negotiating process to find a mutually acceptable solution. However, because of the unequal power relations, the final agreement is normally couched in the terminology of the more powerful side. Thus, in the Fitzroy River Declaration, the “First Laws of the River”, Warloongarri law is expressed through recognition of the river as a living ancestral being with a right to life, the obligation to protect the river for current and future generations, and provisions for joint management of the river by the local Indigenous people.

Strategies of “water diplomacy” (Islam and Susskind 2013), which presume a negotiation process among roughly equal partners, are less useful when one side holds the power to force a settlement. And even if the powerful party has the best of intentions, the cultural values and ethics implicit in the language and categories (e.g., the concept of water “resources”) skews the frame towards the worldview of the politically dominant party. Two strategies might offer a solution to the dilemma of skewed water diplomacy: (1) Agree to disagree, and avoid negotiation or diplomacy that aims at compromise or assimilation. By treating water

management as a political (and ethical) issue, Indigenous Peoples become freer to create their own relationship to water without trying to fit the categories of the dominant society (Palmer 2006). The cultural differences are too great to bridge, nor is there any good reason to try; just embrace diversity! The other approach is (2) use the dominant legal framework without embracing the values it represents. Thus, we find Maori attorneys arguing successfully in New Zealand that the Whanganui River should be accorded legal standing as a person (see Box 7.6). This legal fiction has a basis in both the Western legal framework and in Maori customary law; both legal systems recognize that “personhood” can be applied to things other than human people.

### **Box 7.6 Rivers as people**

The Whanganui River will become a legal entity and have a legal voice under a preliminary agreement signed between Whanganui River iwi and the Crown. This is the first time a river has been given a legal identity. A spokesman for the Minister of Treaty Negotiations said Whanganui River will be recognized as a person when it comes to the law – “in the same way a company is, which will give it rights and interests.”

The agreement was signed on behalf of Whanganui iwi by Brendan Puketapu of the Whanganui River Maori Trust, which represents a group of iwi along the river, and the Crown in Parliament. Under the agreement the river is given legal status under the name Te Awa Tupua – two guardians, one from the Crown and one from a Whanganui River iwi, will be given the role of protecting the river. An agreement between the Crown and local iwi on what the values will be in protecting the river are yet to be decided. A whole river strategy, in collaboration with iwi, local government, and commercial and recreational users is still being decided. An eventual settlement will also include monetary compensation for historical claims.

The Minister for Treaty for Waitangi Negotiations, Christopher Finlayson, said the signing was an historic event. “Whanganui River iwi have sought to protect the river and have their interests acknowledged by the Crown through the legal system since 1873. They pursued this objective in one of New Zealand’s longest running court cases.” Today’s agreement which recognizes the status of the river as Te Awa Tupua (an integrated, living whole) and the inextricable relationship of iwi with the river is a major step towards the resolution of the historical grievances of Whanganui iwi and is important nationally.

“The agreement does not signify the end of the settlement, but it is a significant step towards settlement. Matters of detail and additional redress will be to be negotiated between the parties,” said Mr Finlayson. “Whanganui Iwi also recognise the value others place on the river and wanted to ensure that all stakeholders and the river community as a whole are actively engaged in developing the long-term future of the river and ensuring its wellbeing,” said Mr Finlayson.

The legal term for the art of seeing the same things from two very different perspectives is “legal pluralism.” If we are serious about embracing cultural diversity then embracing legal pluralism offers a way of operationalizing that diversity. The Western legal system and the water ethics that underlie the laws and – the word fits – customs of that legal system are not going to disappear very soon. In order to retain their cultural integrity, Indigenous groups will need to find ways of accommodating their customary water behavior and ethics, within that Western reality. Legal pluralism offers a ready-made label that can legitimize Indigenous water ethics to a Western audience and relax the pressure on Indigenous worldviews. Granting legal personhood to rivers is a way of using Western legal concepts to Indigenous advantage and is exciting in this regard, even though the Whanganui remains unique. Attempts to endow rivers with formal legal personhood in India were successful at the state level but were overturned at the national level (O’Donnell and Talbot-Jones 2018).

#### *4. Indigenous perspectives on water quality*

The right to be able to drink water directly from the river is not yet recognized by the United Nations as a human right, but for many indigenous communities, that is the water quality standard to which they aspire. Such a standard is far simpler than the “total maximum daily loads” (TMDLs) used by the US Environmental Protection Agency or the goal of “fishable and swimmable” rivers cited in the 1972 National Environmental Protection Act (National Research Council 2001). Many countries recognize the rights of their citizens to enjoy a healthy environment, including healthy rivers (Boyd 2012), yet the practical significance of this ethic is often overwhelmed by competing values, particularly economic values.

Pollution, the contamination of water ecosystems, is generally regarded in the sustainability literature as an economic issue more than a moral or ethical one. The principle of “polluter pays” is seen as central to social and economic justice. Ethics comes into play in setting the fees for pollution high enough to have some bearing on behavior. But from an Indigenous perspective, money, even a lot of money, is not necessarily adequate. Though speaking of forests, this observation by Griffiths applies equally to water:

Many reject the principle that industrial and corporate polluters can buy permission to continue polluting by trading in forest carbon credits. They also dismiss the notion that the value of forests can be reduced to the monetary value of their carbon stocks, and stress that for their peoples the non-monetary cultural and spiritual values of their forest are of utmost importance and must be respected.

Griffiths (2007:111)

The sticking point in using monetary valuation to restore justice from environmental degradation is a matter of both incommensurability of values (Trainor 2006) as well as a basic sense of fairness. At the 2003 World Water Forum in

Kyoto, Pablo Solon, who would later become the Bolivian ambassador to the United Nations, noted that pollution is a crime, and the “polluter pays” principle is an attempt by governments and corporate interests to legalize a crime by offering compensation. Nonetheless, when compensation or no compensation are the only two choices (as in the case of compensating for past CO<sub>2</sub> pollution into the atmosphere) fairness would suggest that compensation does have a role. During the December 2010 climate negotiations in Copenhagen, Mr. Solon, as an ambassador, suggested, in reference to the United States as the biggest contributor to global CO<sub>2</sub> levels, that “the polluter should pay ... If you break it, you buy it!”<sup>6</sup>

When a river or lake is already polluted, what can be done besides restoration on one hand or compensation on the other? In the worldview of Indigenous Peoples, there is still more that can be done. Ceremonies can be offered to help heal nature, while also helping heal the spirits of people as well. Since 2003, Grandmother Josephine Mandamin, a member of the Ojibway First Nation in Ontario, Canada, has been walking around the Great Lakes. Her reasons are a combination of raising awareness to motivate human action and spiritual healing of the Great Lakes water. The consciousness of both realms – people and water – are linked, and must be healed together (see Box 7.7).

### **Box 7.7 Grandmother walks to protect water**

Grandmother Josephine Mandamin of Thunder Bay, Ontario, a member of the Anishinabekwe (Ojibway) First Nation, along with her sister Melvina Flamm, initiated the Mother Earth Water Walk to pray for water’s health and promote awareness that water needs protection. They, along with a group of Anishinabe women, plus other supporters, walked around Lake Superior in Spring 2003, around Lake Michigan in 2004, Lake Huron in 2005, Lake Ontario in 2006, Lake Erie in 2007, Lake Michigan again in 2008, then around the St. Lawrence River in 2009.

While she was walking throughout North America, Mandamin said she was “collecting consciousness.” Mandamin says, “Collecting consciousness is not easy to explain. But when we are walking with the water, we are also collecting thoughts with that water. And in the collecting of thoughts, we are also collecting consciousness of people’s minds. The minds, hopefully, will be of one, sometime.”

Through her walks of awareness, Grandmother Mandamin is trying to get the attention of leadership and corporations. “The main thing that I’m trying to raise consciousness for, is that the people that are destroying everything, and the powers that be, like the presidents and the prime ministers, really need to step forward and really protect the water just like endangered animal species.”

To really understand the importance of water, Grandmother Mandamin recommends people learn to have a deep appreciation of it by fasting to know what it's like to be without water, and to use it in a good way. Mandamin says using water in a good way means thinking consciously about how water is being used. She says people need to question how they are using it and whether they are working at conserving water. But, Grandmother Mandamin says it's not her place to tell people how to protect the water, and instead, she poses a question, "What are you going to do about it?"

(Ashawasegai 2011)

### *Protecting the waters of the Rio Grande*

The indigenous community of Isleta Pueblo is located on the Rio Grande in central New Mexico, just downstream from Albuquerque, a city of 450,000 people. In 1992, the tiny pueblo of 2,500 people gained the legal right to set its own water quality standards for the river, forcing the much larger upstream city of Albuquerque to clean its effluent water to a higher standard (Lenderman 1998). The city had already been in compliance with the standards established by the state of New Mexico, but those were based on water to be used for irrigation and recreational boating. The Pueblo of Isleta, however, wanted to perform traditional ceremonies in the river, which included wading in the river and drinking small amounts. In 1987, when the US Congress amended the Clean Water Act, it gave Indian tribes the option of setting their own water quality standards rather than being subject to the standards set by the states, in this case, the state of New Mexico. Isleta Pueblo jumped at the chance to set its own standards for the Rio Grande and adopted much stricter standards for arsenic and ammonia, in particular, forcing the upstream city to upgrade its water treatment facility to meet the new standards. The city of Albuquerque appealed, but in 1998 a court ruling settled the issue in favor of Isleta Pueblo. This was a legal decision which recognized the ethical principles of the tribe. Writing in a *New England Law Review* article that same year, Allison Dussias discusses the significance of the case:

The very fact that the Pueblo would officially establish ceremonial use of the Rio Grande waters as a designated use indicates the different perspective that the Pueblo brings to its role as environmental regulator. The river is not seen as merely a venue for fishing and recreational activities. For the Pueblo, protection of the quality of the river's water has a religious and cultural motivation. The water plays an important role in tribal ceremonies, which, the district court noted, members of the Pueblo were reluctant to describe in detail because it is considered inappropriate to reveal the nature of the ceremonies to outsiders. By approving the

ceremonial use designation, EPA, in effect, allowed the Pueblo to use its own understanding of the importance of water as a basis for establishing standards under a federal regulatory program. Clearly this is a great departure from the efforts of earlier federal government officials to eradicate the nature-based religious beliefs and practices of Native Americans and replace them with an understanding of natural resources as mere commodities readily available for exploitation. Moreover, the Pueblo's promulgation of strict water quality standards demonstrated its willingness to use its sovereign authority to protect the purity of the river water beyond the level of protection that the state was interested in providing.

Dussias (1998:1-653-1-667)

### **Conclusions: Water ethics and cultural diversity**

When Indigenous views about water use or water protection are at odds with the ethics and/or laws of the dominant society, what happens? With few exceptions, the dominant society prevails. Cases where indigenous groups prevail against these odds, such as Isleta Pueblo's successful dispute with the city of Albuquerque, point to the importance of a legal system that gives recognition to indigenous rights. In this instance, the legal basis was a 1987 amendment to an existing federal law establishing the governance arrangements over water quality. But that pre-existing law is itself tied to a colonial legal framework imposed on the Pueblo Indian tribes through a long history of Spanish rule followed by American military interventions that brought the Pueblo lands under American control in the 19th century.

Legal rights, including human rights, are fundamentally important to people as individuals and to the cultures of social groups, but laws do not create cultures, they only enable cultures to flourish within those legal protections. As intruders onto the landscapes and waterscapes of Indigenous Peoples, our responsibility to respect their cultural rights does not stop with delineating their legal rights to water of a certain quantity or quality, by saying, in effect, "OK, this is yours and this is ours." That was the logic underlying the countless treaty agreements between American Indian tribes and the United States government during the 19th century. Those treaties reflected the values of the dominant society's culture. The legal agreements today do effectively the same thing; they are cross-cultural negotiations but through a legal process set by the dominant society and reflecting the values and ethics of that society.

How should we view Indigenous Peoples' ethics about water? I am suggesting that we (and the "we" in this case means non-Indigenous and Indigenous people alike) should view those ethics seriously and respectfully. Those values are not anachronisms from another era that will inevitably be replaced by the more evolved values of Western materialism. Not only do Indigenous Peoples have (in theory) an individual right to be different, but they also have a cultural right to participate in their collective culture (Engle 2010). As individuals they are

protected by human rights, and as members of an indigenous culture they are (again, in theory) protected by cultural rights, most recently expressed in the UN Declaration on the Rights of Indigenous Peoples.

The new opportunities that international aid programs offer to the developing world in general, and to the indigenous world in particular, need to be examined through an ethical lens. What are the values that are implicitly designed into those development programs of a village water supply or irrigation system or micro-credit options? Are those programs part of an unwitting stealth attack on the cultural principles of the people we claim to be helping? Or do the development programs consciously try to incorporate the cultural ethics of the communities concerned?

Attending to the ethics imbedded in water projects and policies is especially important in indigenous contexts for three basic reasons. First, because indigenous and traditional cultures possess philosophical wisdom as well as practical techniques for peaceful coexistence with the natural world. The second reason is that Indigenous Peoples bear a disproportional impact from water development and water pollution (e.g., from mining) that disrupts their lives, livelihoods, and cultures. For traditional fishing cultures displaced by dams along the Narmada River in India, or the Mekong River in Laos, the disruption is not confined to looking for a new job; it is an entire way of living and a way of knowing. And the third reason is that it is our “duty to learn” (Finch 2012); it is our reciprocal duty to try to understand the water ethics of Indigenous Peoples, and to promote water policies which respect their ethical principles.

The injustices suffered by Indigenous Peoples, such as displacement of entire communities and cultures in the name of water development, is now generally accepted as a moral issue and not simply an economic or legal issue. As a global society, we are making ethical progress even to establish these concepts. But our newly evolved concepts of cultural rights need to be operationalized with corresponding moral tools of analysis. This is precisely what ethics analysis can offer, and how it can help address seemingly intractable issues. Rather than using an understanding of indigenous ethics to try to induce indigenous communities to comply with external plans for water development, we can adopt a learning attitude to explore with our indigenous counterparts what their own ethical principles would suggest for a water future.

Water strategies which blend indigenous ethics with the latest global thinking on sustainable water policies are not nearly as far-fetched an idea as might have been the case two decades ago. In the next chapter we consider how the ethical assumptions of global water thinking is evolving. Might we become so advanced in our globalized concepts that we find ourselves aligned with the worldviews of Indigenous Peoples?

### **Discussion questions**

- How do Indigenous Peoples conceptualize water? How do you conceptualize water? How does one’s worldview about water influence practical decisions about water management?

- Is “rights of nature” a spiritual concept, a philosophical concept, or a practical concept?
- Do you agree with the proposition that non-indigenous people have a “duty to learn” about Indigenous cultures and values? Why or why not?

## Notes

- 1 Further details about the conference where this talk was presented (but not the talk itself) can be found at the website for the Continuing Legal Education Society of British Columbia, [www.cle.bc.ca/onlinestore/productdetails.aspx?cid=648](http://www.cle.bc.ca/onlinestore/productdetails.aspx?cid=648).
- 2 Attempts to obtain legal support for environmental flow to be included as a beneficial use have so far not been successful in New Mexico (Bardwell and Oglesby 2013).
- 3 Based on the World Water Forum session report by Martinez Austria and van Hofwegan (2006: 7) and notes taken by the author.
- 4 The full text of the United Nations Declaration on the Rights of Indigenous Peoples is available on the UN website, [www.un.org/esa/socdev/unpfii/documents/DRIPS\\_en.pdf](http://www.un.org/esa/socdev/unpfii/documents/DRIPS_en.pdf).
- 5 The Declaration can be viewed or downloaded from the website of the Water Ethics Network, <https://waterethics.org/resources/publications/ip-kyoto-water-declaration-2003/>
- 6 Source: Climate Justice Now website, [www.climate-justice-now.org/bolivia-respond-s-to-us-on-climate-debt-if-you-break-it-you-buy-it/](http://www.climate-justice-now.org/bolivia-respond-s-to-us-on-climate-debt-if-you-break-it-you-buy-it/).

## Further reading

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## 8 Charting a new water ethics



Selling drinks to tourists, Polonnaruwa, Sri Lanka, December 2017

It is the aim of this book to propose both a new water ethic, and a new water *ethics* (with “s”). The word “ethic” refers to a particular set of principles, while “ethics” has two different meanings: (1) As the plural of ethic, it refers to distinct and different sets of principles; and (2) As a singular noun that does not have a plural version, “ethics” refers to the overall field of knowledge about ethical principles. Applying these meanings to water, we have “water ethic” which refers to one coherent set of principles about how water ought to be managed, “water ethics” (plural noun) referring to multiple and often competing sets of principles, and the field of “water ethics” (singular noun) referring to the study of ethical principles related to water.

My purpose in writing this book, and indeed in writing it twice (as this is the second edition), is only partly to explore the ingredients for a sustainable “water ethic” which, as the book’s subtitle suggests, could solve the water crisis. That’s certainly a laudable aim, but it will not come about merely through writing a book. The more important contribution, even more important than a set of water ethics principles, is to build, or to contribute to the building of, a new field of water ethics. Marshall McLuhan used to say that “the medium is the message,” and I suggest that in water ethics, the process of ethical debate and reflection is the contribution. A dynamic process will generate the right ethics. “Reflection is the ethic” could serve as the tag line for this book.

How can the still-emerging field of water ethics develop into a recognizable body of study and become acknowledged as an important and necessary domain of water governance? Simply describing its basic principles and documenting illustrative examples can help to systematize and publicize the field. This is a useful start, but it is clearly not enough. An analogy can be made with the emergence of the field of bioethics in the 1970s. Bioethics was of broad interest to environmental and natural resources management, in addition to medicine and public health.

Before 1980 we might well have seen departments of bioethics emerge in liberal arts colleges, rather than medical schools. They might have included faculty addressing issues ranging from euthanasia to population control and environmental protection. Nutrition and food production issues could have easily fallen into this mix.

(Thompson 2015: 79)

But, of course, that did not happen. The field of medicine adopted bioethics with enthusiasm, while the social sciences – economics, geography, sociology, anthropology, and the agricultural sciences as well – basically ignored the ethical dimensions. Bioethics was embraced by the medical fields as useful and, indeed, essential to a broad range of decisions ranging from treatment protocols to research strategies. Today virtually all medical schools in the US and Europe have dedicated faculty lines in medical bioethics (Thompson 2015: 81), whereas agricultural ethics remains poorly elucidated as a field, and water ethics is almost unheard of.<sup>1</sup>

Why the lack of interest in the ethics of natural resources? In pondering this question with regard to agricultural ethics, which certainly has better name recognition than water ethics, Thompson (2015: 82–83) suggests that the broad range and dynamism of the social sciences has taken up the intellectual space where a field of natural resources ethics might otherwise have taken root. Social justice, human rights, and environmental values have been quite thoroughly addressed by the social and economic sciences. And indeed, just as Robert Blake observed that the world can be seen in a grain of sand, agriculture, forestry, land and water can each be analyzed through lenses of justice, human rights, institutional capacities, or economics. Ethics is not needed to motivate social analysis of natural resources management; there is already ample interest from the social scientists. But ethics is most definitely needed to sort through the multiple and often conflicting values that people have about the use of water and our relationship to water ecosystems.

Is there simply too much intellectual competition for a field of ethics to develop? I do think that is part, but not all, of what is going on. Value-based explanations for why water is being used in certain ways are usually placed well down the priority lists of causal factors. We are comfortable talking about economic forces and economic values as causal factors because they can be quantified, and there are well developed economic theories which can structure the quantified values into models. Psychological values, cultural values, and spiritual values do not lend themselves to quantification although we can count their presence or absence, and we can rank emotional intensity. Perhaps social scientists find the subjectivity of values to be uncomfortable, and the term “ethics” may carry a connotation of holier-than-thou guilt-inducing finger-wagging about what you should have done but didn’t. Whatever the reasons for not exploring values and ethics outside of medicine, the state of natural resources ethics today – whether forestry, land, biodiversity conservation, or freshwater – is poorly developed.

The project of building a field of water ethics and the project of defining a new water ethic are very much intertwined. A new water ethic can only take form if there is a field of water ethics to nurture that project, while the field of water ethics cannot be created out of nothing. It needs to grow in response to a demand, and who is demanding water ethics? So far there have been no street demonstrations about water ethics *per se*, but there have been street demonstrations and even armed conflicts that are essentially value conflicts. The protests at Standing Rock, North Dakota, in 2016 saw corporate security police fighting Indigenous “Water Protectors”. Residents in Flint, Michigan, demonstrated against the environmental and racial injustice of lead contamination in their drinking water. And as this book has tried to document, even the less dramatic daily decisions faced by water managers and policy makers have an ethical dimension. Should my city of Santa Fe impound our local river for municipal water supply, in violation of the principle of environmental flow? Downstream of the city’s water reservoir is a dry ditch where the river used to be. There is no law requiring compliance with ecological standards of

environmental flow, but is that ethical? The priority of the city-owned water utility is to ensure a reliable water supply and damming the river is the easiest way to get water. A clear majority of local residents, and probably all the elected officials, support the policy of damming the river. Alternatives of relying more on groundwater and less on surface water would introduce new risks (groundwater quality is uneven; legal rights to groundwater are complicated) and higher costs. Sacrificing the river for the sake of management convenience is an accepted outcome in the eyes of the community. Are these policies leading us to the future we want?

It's difficult to argue for an alternative policy of "Let the river flow!" that is supported neither by the legal system or by short-term economics. There is not even a soft-law UN Declaration that rivers have a right to environmental flow. There is a Brisbane Declaration and Global Action Agenda on Environmental Flows (Arthington et al. 2018)<sup>2</sup> but that's not going to make a difference to local decision makers in New Mexico. Without a shared concept that decisions about water are inherently moral decisions and without an awareness that there is such a thing as "water ethics", the fate of the Santa Fe River will continue to depend on local laws, policies, and customs. There cannot even be a debate about the ethics unless the relevance of ethics is agreed beforehand, and for that to happen, a field of water ethics would need to be in place and accepted as a reference for water decisions.

Though we are far from establishing a widely recognized field of water ethics, what we do have is substantial agreement on certain ethical principles within the very well established field of water governance. As discussed in Chapter 6, we have the concept of IWRM to thank for delineating a core set of shared water values. Water professionals, and policy makers whose policies impinge on water, are already in broad agreement about such principles as robust stakeholder participation, the responsibility for data transparency regarding water quality and infrastructure finance, and the importance of environmental flow. The problem, from an ethics perspective, is not that agreement is lacking on specific principles of water values. Disagreement can actually serve as a stimulus in developing a field of ethics; disagreement provides material for thinking through and reflecting on ethical outcomes. The real impediment in developing a field of water ethics is that neither the IWRM water principles that are already agreed on, nor the points of enduring controversy (e.g., regarding water impacts from hydropower dams or mining activities) tend to be viewed as ethical dilemmas. Instead the dilemmas are polarized as social justice conflicts that need to be negotiated using legal and economic arguments. Both sides will invoke competing values favorable to their position, but the values of each side are not mutually mapped out and discussed. Of course, there is not going to be much willingness to map out the values when the conflict is raging, and then when the conflict subsides, there is little interest in mapping out the values because what's the point?

Faced with the challenge of promoting a field of study – water ethics – that is not yet widely recognized even as a concept, much less a field, our initial efforts

will be better spent in raising awareness about the concept of water ethics by building upon the value principles already embedded in the global consensus of water governance best practice. The three sections of this chapter mirror the steps that can lead to a new field of water ethics. The first section, “The consensus on global water values”, discusses five key value principles that underlie the global consensus about water governance principles. The meta message here is that, while the word “ethics” is rarely, and in fact almost never, used in the water governance literature, there is a high degree of consensus on some very critical ethical principles. By recasting these value principles as, in fact, ethics principles, we are not only playing word games; we are creating an ethical space within which a field of water ethics can be nurtured.

The second section of this chapter, “Towards a global water ethic”, recounts how these global water value principles, plus some other principles such as the right to culture formalized in the UN Declaration on the Rights of Indigenous Peoples (UN-DRIP), have been compiled into a Global Water Ethics Charter (Ziegler and Groenfeldt 2017). Although this charter remains in the form of a rough draft, it has nonetheless served as a platform for framing not only a charter, but also suggesting the need for a field of water ethics. The third section of this chapter, “Towards a new field of water ethics”, discusses the content of the proposed new field.

### **The consensus on global water values**

Is there any doubt about what kind of water management we want? Isn't there a fairly clear consensus that we want water management that is sustainable, that does not continually “chip away” at natural systems, leaving us with lifeless rivers and dried up lakes and aquifers? And isn't there also a consensus, articulated into a UN Resolution, that everyone on the planet has the right to safe water and sanitation? And to ensure that the basic needs of people and ecosystems are being met, aren't we also committed to participatory forms of water governance?

A careful assessment of the water policy statements from the UN General Assembly and the many UN-related water organizations would suggest that we already have a strong set of principles and guidelines that can lead us to sustainable management, simply by following the prescriptions. And as the recent experience with the 2010 UN Declaration on the Right to Water and Sanitation has shown, global standards can empower local communities in advocating through local political processes. For example, WASH (water and sanitation for health) programs in Moldova and in India are basing their outreach campaigns on the UN designated right to water and sanitation. By spreading the message that clean water is a human right, they are mobilizing local citizens to clean up trash from the river banks, and to put pressure on local government officials for toilets.

From distilling values from global water statements made since the 1992 Dublin Principles five key values can be distinguished which represent a

remarkable cross-cultural consensus: (1) nature needs to be kept alive (ecological function); (2) everyone has a right to water and sanitation (social justice); (3) water should be used responsibly in agriculture and industries (responsible use); (4) stakeholders should be involved in decision-making (participation), and (5) diverse cultural identities and understandings about water should be respected.<sup>3</sup> These five principles constitute a conceptual foundation for envisioning and formalizing a shared water ethic.

### *1. Environmental values: Keep nature alive*

The notion that restoring natural ecological functions is desirable is a central tenet of IWRM generally. IWRM assumes that ecosystem services have value, and healthier ecosystems generally have more of those values than unhealthy ones. Healthy water ecosystems are fundamental to water security and resilience (UNEP 2009), since society relies on nature's services. The overwhelming consensus about our water future, whether from businesses, governments, or environmentalists, is that functioning natural ecosystems must be part of the solution. The details about how to do this are, of course, full of controversy, but the overarching principle that some degree of natural ecological function is necessary for a sustainable water future is a central tenet of IWRM.

The consensus that nature is indispensable and will remain so into the foreseeable future may come as a surprise to jaded observers of actual water development. Blasting rivers into submission, inundating irreplaceable global heritage under deep reservoirs, and turning lakes into toxic waste dumps has become such a routine part of what passes for modern water management that we might easily overlook the ethic of respect for nature which has persisted, at least as a minority view. Thus, whether we accord nature the right to exist (Boyd 2017) or not, the practical implication could be the same either way. We need nature to be alive and healthy, for our own interests. But establishing rights for nature that are independent of human species-specific interest is recommended in any case because of the human tendency to over-exploit. The concept of "sustainable yield" is important for protecting resource stocks, but the concept of "maximum sustainable yield" is dangerous because our information about dynamic fish populations will always be imperfect, and yield targets need to be viewed through the lens of the precautionary principle (Holt 2011).

The "frame" of sustainable water management based on functioning natural ecosystems provides an important dimension of the global water ethic from which we can consider the pesky operational details. Just about everyone can agree that we need to balance the needs of nature with the needs of people. The argument is not about the principle of balance, but the operational issue of determining the balance point in any given situation. The principle of "functioning natural ecosystems are indispensable" is not quite of the same order as "rivers have a right to exist", but the two concepts are logically linked, and an exploration of the former principle can lead, I believe, to support for the latter principle, as is discussed later in this chapter.

## 2. *Social values: The human right to water and sanitation*

Granting priority to drinking water over any other competing use is a standard, and perhaps universal, principle during times of drought. The logic seems obvious: access to drinking water is a matter of life or death, and sanitation is needed to protect the safety of water supplies. This was the logic behind the UN General Assembly's 2010 vote to accord access of safe water and sanitation as a human right. This event solidified the stature of the human right to water as having a basis in international law.

It is up to individual countries, of course, to implement the human right to water and in the process, the concept can become diluted. The infamous case of water supply for the city of Flint, Michigan, stands as a reminder that, even in developed countries like the United States, the human right to water cannot be taken for granted (Rothstein 2016). Poor Black neighborhoods in Flint faced shutoffs if they failed to pay some of the highest water prices in the country, for water that the authorities knew was contaminated with lead. The health of hundreds of children was permanently impacted in a tragedy that had elements of racism, political corruption, and professional malfeasance. But underlying this governance failure was the rejection by the local authorities of the ethical principle that access to water really is a human right (Ranganathan 2016; Ranganathan 2017). The notoriety of the Flint tragedy, ironically, has now reinforced the message that water is indeed a human right, even though it is not universally followed.

## 3. *Economic values: Responsible use*

The intuitive concept of using water carefully was given an economic interpretation in the IWRM literature, starting with the 1992 Dublin statement that, "Water has an economic value in all its competing uses and should be recognized as an economic good," (see Box 6.1). Responsible use also means doing more with less. The International Water Management Institute has a campaign to deliver "more crop per drop", but the larger message could be stated as "more value per drop" where "value" is determined according to the user and the context. Responsible use of cultural flows, for example, would use the least amount of water needed to achieve a particular outcome (e.g., ensuring inundation of the river floodplain in order to stimulate growth of culturally important herbs).

In the private sector, business associations are usually careful to avoid commitments to specific outcomes, but they do commit to specific reporting of their water use. A requirement for companies signing on to the CEO Water Mandate, for example, is a pledge to provide public annual reports of water use and management for the company and its supply chain. With the rise of water stewardship as a formal standard, the concept of "responsible use" now has a detailed definition in the form of the Water Stewardship Standard<sup>4</sup> certified by the Alliance for Water Stewardship (and which works closely with the CEO Water Mandate).

Adoption of water conservation measures has become expected behavior for all water users whether individuals, cities, industries, or farmers. Identifying ways to save water, and then implementing the most cost-effective of these strategies, is part of “responsible use.” Finding ways to use the same water for multiple purposes, as well as reusing and recycling water, is also included in the evolving concept of responsible use. Urban water utilities in particular have reconceptualized wastewater as a resource, providing a new source of (recycled) water, as well as fertilizer, heat, and potentially fuel in the form of biogas (SIWI 2017).

#### *4. Governance values: Participatory water governance*

Water management “based on a participatory approach, involving users, planners, and policy-makers at all levels” and the principle “that decisions are taken at the lowest appropriate level, with full public consultation and involvement of users in the planning and implementation of water projects” (Dublin Principles 1992; see Box 6.1) have long been central features of IWRM. More recent statements, such as the OECD principles for water governance endorsed in 2015, avoid reference to participatory management and instead promote “stakeholder engagement for informed and outcome-oriented contributions to water policy design and implementation” (see Box 6.5, OECD Governance Principle 10). Does this imply some level of executive authority should be accorded to stakeholders, or are they participating only as advisors rather than as managers?

While there are important unresolved questions about the nature of participation, the basic principle of stakeholder involvement is firmly embedded in the theory and practice of IWRM. In addition to the application of stakeholder engagement in management, participation is also central to promoting financial and professional integrity (anti-corruption), transparency and accountability within the water governance system (WIN 2016).

Though the interests of Indigenous Peoples and the natural environment were seldom cited in early IWRM discussions of participation, both are generally (but not always) included in contemporary lists of stakeholders. This is an example of the “social learning” taking place within the IWRM approach (Pahl-Wostl et al. 2007). Indigenous Peoples’ interests have been energized through the concept of free, prior and informed consent (FPIC) regarding proposed developments (e.g., mines, oil/gas and dams) on their territories. Outstanding issues revolve around the right of refusal when consent from the Indigenous community is not forthcoming. Environmental representation is personified in the form of environmental advocacy groups using soft-law tools such as the Convention on Biological Diversity<sup>5</sup> aimed at protecting species. Here the participation question is about the standing of ecosystems such as rivers, lakes and wetlands: How can the river participate in its own protection? One answer is through the designation of legal personhood, as has been done for the Whanganui River in New Zealand (O’Donnell and Talbot-Jones 2018). Do all rivers

have natural rights to exist as healthy rivers, or is the Whanganui River an exceptional case?

### *5. Respect the diversity of water culture*

The rights of rivers to exist and to live the life of a reasonably healthy river is widely accepted as a good thing, as a value, but how strongly held are these values? The report that China has lost more than half its rivers in the past 50 years<sup>6</sup> made brief headlines. Loss of freshwater fish species continues unabated (Darwall and Freyhof 2016). But would you stand in front of a bulldozer and risk your life to protect the river? In 2016, Native Americans did exactly that in an ultimately unsuccessful attempt to stop construction of the Dakota Access Pipeline under the Missouri River. The US government deems the river to be a resource; the Standing Rock Sioux Nation regards the river as foundational to their spiritual, social, and economic identity as a people. The question is not whose ontology will win and whose will lose; that question was answered in the 19th century with political and military force, confirmed by dam construction on the Missouri River in the 20th century, and further re-affirmed in 2017 with the forcibly imposed construction of the DAPL pipeline through the traditional territories of the Standing Rock Sioux Nation (Whyte 2017). The question for water ethics now is how can multiple worldviews about society's rightful relationship with nature – and associated values about water – co-exist in a politically amicable way?

The UN Declaration on the Rights of Indigenous Peoples (UN DRIP), adopted in 2007, has played a particularly vital role in supporting cultural values through clear statements on the right to culture, to self-determination, and to their lands and resources. The declaration sets a global standard which all countries have signed onto (in some instances with qualifying language added as a condition of the country's support). Though often flouted in practice, the declaration is too well known to be ignored, and the principle of free, prior and informed consent (as previously discussed) provides a tool for ensuring some measure of accountability. Implementation is, and will remain, fraught with challenges and failures, but the standard itself is important as a basis for awareness-raising and sometimes can lead to effective legal protections as well.

The task for a field of water ethics is to develop skills and tools for accommodating value diversity. The more immediate task for developing a shared water ethic is to clarify the conflicting positions surrounding cultural rights to water and, most particularly, the rights of Indigenous Peoples and other traditional or minority cultures to live according to their own cultural values. For traditional peoples whose cultures have co-evolved with rivers, lakes, or desert oases, there are particularly compelling issues of cultural sovereignty at stake. At the same time, the forces of economic development can hardly claim to occupy the moral high ground when the very forms of development they are promoting (e.g., market-based capitalism closely tied to supportive governmental policies) is precisely what is causing the climate change that is

threatening our common future. Who is to say that Indigenous communities should make way for that kind of economic development?

Globally accepted ethical prescriptions about water can be easily ignored (because there is no enforcement), while local water decisions are accountable to locally held cultural principles and norms, which in turn are influenced by local politics and economic incentives. What is the potential for applying principles of water ethics within this messy context of practical, mostly local water decisions? The basic strategy I can imagine is the following: By forging a fresh set of ethical principles, or simply clarifying the ethics already in place but hidden in the background, local decisions about water can be informed by those ethics. This does not mean that the decisions actually taken will be consistent with those ethics, since power, politics, and greed also exert influences that may be counteractive. But going to the trouble of articulating key ethical principles can enhance the likelihood that those ethics will have some influence on decisions and outcomes.

Global standards about water management also have a role to play even without the threat of enforcement. In fact, the necessarily voluntary aspect to global water ethics standards might increase the likelihood of uptake at national and local levels. Global standards can be adapted to local contexts and used as local principles of best practice. For example, a commonly held goal for urban water supply systems is to ensure the sustainability of the natural water ecosystems which serve as the water source. To meet that goal, the sustainable yield of the natural water sources (groundwater and surface water) would need to be calculated and would then serve as the frame within which operational management would be carried out. The question for water planning then turns to the definition of sustainable yield and the assumptions underlying the concept of “sustainable.” Is the frame of sustainability limited to the physical water in the environment that serves as the source of the urban water supply system, or are we also concerned about the sustainability of the water-dependent natural ecosystem, including vegetation, fish, insects, and other wildlife?

### **Towards a global water ethic**

What water ethic would best support “the world we want”? Is there a single answer, or should we instead talk about a diversity of water ethics? My personal belief is that, just as the proverbial road to hell is paved with good intentions, focusing too much on delineating a single set of values can be counterproductive. For ethics to serve as inspiration for innovative ways of using and protecting water and water ecosystems, we need to maintain a sense of openness around our ethical debates. My vote is for ethical diversity, even though I have devoted a lot of time and energy to developing a global water ethics charter (Ziegler and Groenfeldt 2017). But though I do believe that we need to be open to ethical diversity, and to encourage debate on ethical issues, it’s important to construct an ethical roadmap, or in the terminology of Mephram et al. (2006), an “ethical matrix” and to locate our personal predilections within

that menu of options. By clarifying for ourselves the values and ethical principles that we deem to be priorities, we are better able to engage in dialogue with other value perspectives. In other words, we need to formulate, or at least clarify, our own concepts of water values in order to engage constructively with other viewpoints.

As an initial step this direction, this section distills key water value principles that are generally agreed on, appear to be attracting support (e.g., the principle of a human right to a healthy environment), or may do so in future (e.g., rights of nature). For the most part, the value principles identified as important are already incorporated into the concept of IWRM, or other internationally recognized statements and declarations, as discussed previously. The following discussion seeks to associate these already established value principles into the following six categories

- 1 Water ecosystems
- 2 Water for food
- 3 Water for people
- 4 Water for industry
- 5 Water rights of Indigenous Peoples
- 6 Water governance

### *1. Managing water ecosystems*

Even as holistic understanding of river health becomes increasingly valued within and beyond ecological science, big dams, which unquestionably cause irreversible damage to these rivers, are being constructed at record rates. The justification given is an environmental one: to manage climate change, we need to develop carbon-neutral renewable energy sources. Are there not other renewable energy sources? And are there not alternative modes of tapping the latent power of rivers? Mark Weiser (2016) outlines non-standard hydropower options in a blogpost titled, “How to Make Hydropower More Environmentally Friendly.” There are options but their higher cost would be justified only if the river ecosystems they would protect were more valued. It is in this way that water ethics hold the promise of new solutions to the water crisis. When different values are prioritized, different solutions start to make sense.

Under the EU’s Water Framework Directive the ecological status of rivers is assessed as normal, modified, or heavily modified (EU terminology) to establish a baseline for improvement. In considering an intervention to the river, such as new levees along the bank to prevent flooding, analysis as to whether this is a good idea or not proceeds on the basis of ecological as well as economic analysis. Not merely, “Do the economic benefits warrant the economic costs?” but also, “Will the ecological benefits outweigh any ecological costs?” (Johnson 2012).

The application of environmental flow standards in many countries has been especially influential in shifting the expectations about water development.

Instead of expecting a new project – a wastewater treatment plant, or a river diversion – to inflict ecological harm on the river, projects can also be seen as opportunities for investing in ecological restoration (Brierley and Fryirs 2008). A wastewater treatment plant, for example, might improve downstream water quality, and a river diversion project, which would certainly leave the river in a less healthy state than before, could be amended to include a restoration component such as an area of floodplain reconnection, or removal of a dam from an upstream tributary. Indeed, the growing movement to remove some of the least useful dams is motivated by ethics that place a high value on re-naturalizing rivers both for human enjoyment (tourism and recreation) as well as for the rivers themselves (Grossman 2002).

Ecologically based management strategies for water ecosystems, whether rivers, lakes, wetlands, or aquifers, harness nature's own methods to serve the interests of society (UN Water 2018a). As discussed in Chapter 2, engineers in the Netherlands are investing billions of euros in “making room for rivers” to allow for managed flooding between widely spaced levees. The river's ecology becomes more dynamic and healthier, while society benefits from decreased risk of major flooding. The terminology of flood management also marks an evolution of ethics about what constitutes best practice. The term “management” has replaced “control” in reference to flood strategies, along with “non-structural” and “vegetative barriers” when concrete and steel were the former construction materials of choice.

There is widespread acceptance of “nature-based” water solutions, as evidenced by major reports on the theory and practice, including the 2018 World Water Development Report from UNESCO (UN Water 2018a), and a 2016 report from IUCN (Cohen-Shacham et al. 2016). But embarking on new strategies for solving old problems such as flooding requires clarity of purpose and a willingness to undertake extra work that innovation often involves. What are the incentives that can motivate changes in established patterns? Much hinges on the values that will be enhanced as a result of nature-based solutions. In the case of flood management through nature-based approaches, the ecological health of the river and floodplain would be expected to benefit (environmental values), there would be new opportunities for stakeholder engagement in setting flood management targets (governance values), and there would likely be significant cost-savings both up front and in terms of annual maintenance (economic values). Particular for factoring in benefits that are difficult and perhaps impossible to quantify, such as stakeholder engagement, attention to values and the corresponding ethics can contribute to structuring an argument for (or against) the proposed strategy.

## *2. Water for agriculture*

Of all the uses of water, none is as quantitatively important as agriculture, which uses some two-thirds of the fresh water abstracted from nature. From the water perspective, agriculture is a very costly enterprise; what benefit does

agriculture provide to outweigh its heavy water cost? As discussed in Chapter 3, agriculture is multifunctional, providing not only food and fiber, but also a wide variety of jobs and socio-economic networking opportunities (which have both social and economic security benefits), environmental impacts both positive and negative, opportunities for governance capacity-building, and important roles in strengthening cultural identity. For all these varied services, there are value implications. A nature-oriented farmer would probably favor agro-ecological farming practices, whereas a farmer enamored with science and technology might be drawn to high-tech seeds and agro-chemicals. Our imagined farmers would not necessarily need to agree on a joint strategy, but for certain decisions, such as irrigation timing and technologies, would need to be coordinated to some degree. At a policy level, there is far greater need for coherence in terms of water sources, pest management, and seed choice. Clarifying the values that diverse farmers, their customers, and government land and water managers wish to advance can enhance the overall economic and social returns.

### *3. Water for people*

It is hardly surprising that people take priority over any other competing uses, whether for agriculture, industry, or even nature. Sustainable Development Goal 6.2, “by 2030, achieve access to adequate and equitable sanitation and hygiene for all,” sets a high and probably unreachable target for the world community, but it will help maintain the momentum towards this goal. The formal UN decision in 2010 to recognize access to water and sanitation as human rights, spawned a huge response from governments, NGOs, and the private sector, particularly the beverage companies. There are strong values motivating these efforts. The concern is primarily about protecting the health of people who currently lack regular access to safe drinking water and sanitation. Without that access, they will continue to be victims of diseases picked up in their drinking water, often from fecal contamination.

The ethical significance of the global movement to ensure safe drinking water is its embrace of an expanded community of ethical concern. Not only do we feel a responsibility to the welfare of our family members, village, or nation, but the appeals for action on safe drinking water invite an emotional response, rooted in our existing ethical principles, to help people half way around the world, living, and in danger of dying, in places we have never seen. This expansion of our ethical sphere of responsibility offers hope that our ethical space might be enlarged yet further, to include environmental and cultural justice as well.

Safe water and sanitation is central to urban water ethics, and indeed to the priorities of most urban dwellers, but water has much more to offer beyond drinking water and sanitation. Water can contribute to social justice not only by ensuring access (and addressing problems of affordability for low-income residents) but also through employing best practices to monitor and manage

water quality. Beyond the provision of basic water and sanitation services, water can be a social opportunity (Davidson et al. 2015) as well as a governance opportunity. Water can be designed into the urban fabric through water features such as fountains, restored urban streams, attractive and accessible rivers and canals, and water features constructed into buildings and public spaces. The New Urbanism needs to include a focus on water awareness and making water visible and its management as participatory as possible (Brown 2017).

#### *4. Water for industry*

Ethics is an acknowledged topic of concern in industry, though traditionally relegated to the realm of conducting business deals or employee relations. Corporate water ethics falls under the category of Corporate Social Responsibility (CSR), an interesting framework for action where for-profit companies have adopted varying kinds of ethical positions that can go well beyond the economic bottom line. Indeed, the standard model for describing CSR is the triple bottom line of economic, social, and environmental “profit.” Companies like Coca-Cola and Unilever, who have made explicit strategic commitments to water stewardship, use this in their advertising and clearly expect to derive some economic advantage from their ethically progressive positions on water issues.

While the methods of “water footprinting” along with standardization of reporting water use, have enhanced the overall water awareness of corporations and their investors and customers, the most promising new development in my view is the concept of “water stewardship.” Defined and promoted through the Alliance for Water Stewardship, which itself consists of a mix of companies, water research institutes, and environmental NGOs, the Alliance is raising the bar for corporate water responsibility, by inviting various industries to suggest the standards they would like to meet and then holding the individual companies within those industries accountable through a public reporting process. The beauty of the stewardship concept is that it is open-ended and well suited to the real-world dynamics of social-environmental-economic concerns.

#### *5. Water and Indigenous sovereignty*

Indigenous Peoples’ relationship to Mother Earth is very much mediated through the rivers, lakes, springs and wetlands which have nurtured those Indigenous cultures and continue to inform their cultural identity. The ethics of Indigenous water use are not reducible to water rights because it is not only about water; it is also about cultural, spiritual and existential rights. Indigenous Peoples’ statements about water invariably allude to how their cultural identities are intertwined with the water ecosystems they have long depended upon. Their articulations of their relationship with their land and waters provide powerful teachings that can guide the formulation of water ethics for the non-indigenous world as well (Sandford and Phare 2011).

The emerging global values about the legitimacy of Indigenous perspectives on water is clear in its trendline, if not always clear in specific situations. The Standing Rock protests (Veilleux 2017) attracted an outpouring of support by Indigenous tribes and First Nations throughout North America, plus environmental and social justice organizations, including an inquiry from the UN Special Rapporteur on the Rights of Indigenous Peoples.<sup>7</sup> While there are certainly reasons to be concerned that the 19th century history of government warfare against the Lakota Sioux tribes was being renewed in a different form (Whyte 2017), the magnitude of the protests and rebukes from the UN Human Rights Commission indicate that values about cultural rights are gaining ground.

The protections outlined in the 2007 UN Declaration on the Rights of Indigenous Peoples are in many ways the complete opposite of the policies enacted by erstwhile colonial and settler governments on their Indigenous populations as recently as 50 years ago, and with vestiges still in evidence, but fading. Those policies included prohibitions on using or teaching Indigenous languages, forced removal of children to boarding schools, damming of the rivers, inundation of ancestral lands and sacred places, and confiscation of the majority of the lands once used both ceremonially and economically for hunting and gathering. Not only is there growing appreciation of Indigenous cultural values around water, as evidenced in the acceptance of “cultural flows” in the Australian water lexicon; there is also an institutional architecture within the United Nations that calls out violations of human and cultural rights, even if there is little that the UN can do directly to protect the victims.

Indigenous voices have an opportunity today, not only to be heard, but to have their views welcomed. Even as Indigenous activists and water protectors face increasing threats of political assassination,<sup>8</sup> those same activists are gaining a foothold in mainstream awareness. The same Indigenous activists who are threatened, are at the same time becoming our teachers in the emerging discipline of water ethics. The fact that we are listening to them is itself evidence that global values are shifting.

## *6. Water governance*

Global standards of water governance have steadily evolved over the past several decades, the cumulative result of deliberate capacity-building initiatives, advances in social theory and its application, and the maturity of national and international regimes of political governance (Conca 2006; Groenfeldt and Schmidt 2013). Two important trends, which together offer an opening for applying a new set of ethical principles, are (1) inviting and legitimizing a governance role for everyone within a water basin, and (2) applying a broad ecological frame to water use and management. Both trends were stimulated by the concept of IWRM, but go further, fueled by new ideas from feminist studies and deep ecology (Brown and Schmidt 2010) on one hand, and concepts from Corporate Social Responsibility on the other. Largely missing from the IWRM discourse and even from its critiques was the concept of water justice. Of

course, the human right to water was rightly seen as a social justice issue, but what has developed more recently is a broader concept of water justice as an overarching lens for thinking about water (Zwarteveen and Boelens 2014; Harris et al. 2017; Sultana 2018; Boelens et al. 2018). The growth of water justice analysis is motivated by the intransigence of water *in*justice (e.g., the story of Flint, Michigan, cited previously), mirroring the global trend of increasing economic inequity.

Can water governance institutions keep up with the emerging challenges of social justice and environmental sustainability? Institutional responses addressing IWRM challenges include the EU Water Framework Directive which requires river basin councils to be established in major rivers, and South Africa's system of catchment committees. In the United States, river basin coordination bodies are rare, whereas smaller watershed associations, usually without any executive river management function, are common. Can new institutions embody the values and ethics to guide water governance through the storms (quite literally) of climate change?

The water ethics that we will need are already here, expressed in active projects, programs, and in the swirl of ideas about people and nature, what we are doing to the planet, and how we can change the pattern of ecosystem exploitation. It is very easy to become (or remain) discouraged, resigned to the inevitable loss of an ecologically healthy world, and trying to prepare ourselves for what Bill McKibben calls, a "tough new planet" (McKibben 2010). We mostly know what we need to do, we already have the big concepts (e.g., circular economies, regenerative water systems), and we even have, or are aware of, the values and ethics that can lead us through to meeting not only the UN Sustainable Development Goals for 2030 but the much longer term challenges of achieving harmonious balance between people and our planet.

The thesis of this book is that systematic application of values and ethics can make a vital contribution to the many good ideas, expert knowledge, and governance institutions that are already in place. Up to this point my argument has been oriented around the "why" question of water ethics: Why water ethics is important, how a water ethics perspective can be useful and what is the value-added of yet another concept vying with so many other new ideas within the water world. What is yet to be discussed is the "how" – how to put ethics into action. How to harness our values about water to motivate practical endeavors. How to move past the talk and get to work. What do we need to do?

## Towards a new field of water ethics

How can we build upon the rich and growing set of progressive water management practices, and the ethics driving those practices, to chart a new water ethic? Simply by gathering up the disparate initiatives and approaches that are already being implemented, and distilling the values and ethics embedded in these actions, we can claim that, lo and behold, the new water ethic is already here. But though that is true in an analytical sense (if we analyze the water

sector, we can reveal a system of operational ethics), it is not true in a practical or even in a policy sense. Ask a participant at the World Water Forum what principles of water ethics are most important for our future and they might say “the human right to water” because it is in the news, and it does reflect a social value. It’s a start, but there is much more to water ethics.

How might a field of water ethics emerge to become the norm of water policy and practice? This section considers four mutually beneficial strategies for reforming the water ethics we have inherited, and transforming them to the new water ethic(s) we wish to bequeath to future generations: (a) broaden water governance, (b) reframe water knowledge, (c) make water more visible, and (d) formulate water charters for ethical guidance.

### *(a) Broaden the scope of water governance*

While contemporary water governance already reflects a broader set of concerns than was perhaps even imaginable half a century ago, there is still much room for improvement. When water decisions are made by the powerful elite, they are unlikely to reflect the needs of society as a whole, not to mention the future generations of society. We need broader water governance for some of the same reasons that we need democratic governance of our political systems. But governing water systems is even more problematic than governing political systems because nature is involved in water systems, and how can nature’s interests be represented? Obviously nature will have to accept being imperfectly represented by people, highlighting the importance of including people sensitive to nature’s welfare.

Water governance needs to become broader in two ways: (1) Geographically, the whole water basin needs to be represented including groundwater and perhaps coastal zones as well where fresh water interacts with the oceans. (2) Inputs are needed from a diversity of perspectives beyond the conventional water disciplines of hydrology, engineering, law, and economics to include the biological and social sciences, and humanities. In addition to this broader mix of academic specialties, the perspectives of Indigenous and Traditional Peoples, the insights of artists, and inputs from women and youth (who are rarely well represented) can round out the group’s diversity.

Part of the governance solution will come from welcoming a diversity of values and cultures into the governance circle. One pathway to a new water ethic, in other words, is to adopt a new institutional ethic of valuing diversity. Meanwhile, the institutional mechanisms that can engender broad, diverse stakeholder participation in water governance are well known: watershed and river basin councils, stakeholder committees attached to large basin commissions or networks of organizations along a river basin.<sup>9</sup> While it is certainly preferable for such organizations to have legal status with some executive authority over water management, voluntary organizations which rely on influence through persuasion can also be effective. This is the case in most of the United States, where state and federal agencies facilitate (and partially

finance) local voluntary groups, but rarely invest them with any statutory authority. Voluntary river and watershed associations rely, ultimately, on being able to mobilize the ethics of local stakeholders.

*(b) Make way for ontologies! Reframe water knowledge*

Reframing water knowledge starts with citizen awareness about water, and about nature, and about the sanctity of life, and bringing water into that sanctified frame. This is the importance of broadened governance (see [a]) and making water more visible in daily life. Just as the concept of governance needs to be stretched in order to encompass diverse perspectives and values, the “frame” of water education needs to be expanded to include new categories of knowledge. It will always be important to teach children the basics of the water cycle and stream dynamics, but if that is where water education stops, the lesson becomes one of limiting the concept of water management to the physical manipulation of water, and there is no room for an ethical appreciation of water or water ecosystems. Schools serve to socialize children, as well as to educate them, and socializing them into the belief that water management is a technical subject better left to the experts is the kiss of death for inculcating a new water ethic for the next generation. There is a tremendous opportunity, and challenge, to rethink water education at all levels – from elementary and secondary schools to university and graduate degree courses.

Nearly every discipline can offer a unique contribution to our understanding of water management and the underlying water ethics: water law is its own field of study in most universities of the American West, where water use is tied up in complex state-level legal frameworks that require specialists to unravel. Yet while water management is also bound in cultural values and beliefs, which are only partly reflected in those laws, the study of “water culture” remains a niche specialty, the subject of a growing number of books and case studies,<sup>10</sup> but not (yet) a recognized field of study in its own right.<sup>11</sup>

In my own educational evolution, I was drawn to water management as a graduate student in anthropology because it offered interesting social and cultural problems that could shed light on cultural dynamics.<sup>12</sup> Prodding me in this research direction was a flurry of social science interest in irrigation management within the context of rural economic development. The influx of social scientists into the formerly technical topic of irrigation management helped bring about a real paradigm shift in the field of irrigation from being viewed as a purely engineering topic to a broader concept that invited inter-disciplinary expertise under the broad banner of “management” applied to irrigation.

The opportunity for bringing ethics into the mainstream of water education and governance might follow a similar course to the broadening of irrigation as a field of study. Ethics principles, when applied to both water governance and

water education, constitutes a broadening of conventional categories, inviting the application of new disciplinary perspectives. The initial task for ethics (and for ethicists) is to explore how values and ethical principles are already influencing water decisions, in other words, to establish a water ethics baseline of (a) what are the values, ethics, and frames (ontologies) operating in a given water governance context and then (b) analyzing (and “reflecting on”) how these values, ethics, and frames are advancing or obstructing the aims of water sustainability and taking the analysis one step further, reflecting on what we should be aiming for, putting our ethical imaginations to work.

How do we distinguish what knowledge is relevant to water management in addition to hydrology, engineering, biology, law, and economics (to name a few)? This is where the frames which we construct around the topic of water management take on practical importance. To explain how people behave around water, we need to understand political science and economics, as well as ecopsychology, sociology, and anthropology. These and other diverse disciplinary insights about what water is and how it is managed can contribute to a deeper understanding of the underlying values/ethics and their roles in motivating particular water decisions and policies. We also need to invite perspectives from different cultures, especially those of Indigenous Peoples who retain distinctly unique cultural understandings of nature and water ecosystems. This Indigenous cultural knowledge about water is not readily reducible to descriptions by researchers, so we need to seek out Indigenous “wisdom keepers” (Armstrong 2006) who might be willing to teach us.

There is one frame around water which I suspect is not optional for the practice of water ethics: a sense of wonder and respect about water itself, that will open our minds (and our hearts) to the moral nature of water. Our global society has accorded people with fundamental human rights which they have by virtue of being human. The practice of water ethics needs to take its motivation from a similar frame of moral standing. Whether we take the position that water is a moral issue because water itself has intrinsic rights (rights of nature) or whether we view water as a moral issue because water is essential to human life and humans have moral worth, the moral nature of water needs to become part of water education, just as respect for life is part of medical education.

### *(c) Make water visible in everyday experience*

The visceral experience of water and water ecosystems helps establish the conditions for appreciating and valuing water, and developing an ethical sensibility about that water (Carlson 2010). Environmental artists work professionally to bring people in contact with representations of nature, but people can also engage with nature directly. The standard awareness-building approach to connect people with water ecosystems is through recreation (e.g., river rafting, swimming, sailing), fishing, and hikes or community clean-ups along the river banks. While such activities are much appreciated by the participants, these limited experiences of connecting to rivers are unlikely to counterbalance the

opposing indoctrination from society that a river is an unruly ribbon of water that needs to be carefully controlled. How can people experience and interact with water more consistently in their everyday lives? In fact, we already do! Each of us experiences water multiple times every day in our domestic lives (household water use) and in our civic and professional lives as we move through our local landscape/cityscape and see rivers, canals, drainage ditches, fountains, puddles, or nameless stagnant pools of water. These micro-interactions with water offer opportunities for consciousness raising if we are prepared to notice.

Though urban water conservation programs are very much in vogue the ethical opportunities of everyday water experiences are typically overlooked. Indeed, the emphasis on the technological fixes for water conservation, such as low-flow faucets and shower heads, and more efficient toilets and washing machines, might actually reinforce the concept of water as a commodity. One of the important intangible benefits of rainwater harvesting and permaculture practices in inculcating ethical awareness is that these practices help connect us to nature, through attending to rainfall and the drainage patterns around our homes. When we become aware of the water dynamics around us, we may also gain a deeper awareness of the mundane acts of washing our hands or pouring a glass of water.

The flip side of noticing water is the visibility of water; the more visible it is, the easier it is to see it (Brown 2017). This is where urban design makes a difference. When we walk to work and pass over a stream, is that stream channel visible or is it buried beneath the pavement in a concrete culvert (as so many urban streams are)? The practice of “daylighting” urban streams, and sometimes whole rivers (e.g., in Los Angeles) brings benefits not only to urban ecosystems, but also to the emotional life of local citizens. Intelligent urban design can integrate both natural and created water features to create visual, sensual, auditory, and even olfactory experiences of water that enhance our enjoyment while reminding us of water’s multifarious values. In Freiburg, Germany, the ancient small drainage canals (Bächle) that were covered over during the drive for modernity following World War II have been revived as a major design element in the urban center.<sup>13</sup>

Art and artists have a critical role in deepening our aesthetic and emotional appreciation of water, along with conveying factual information which we might not take in without the attractive packaging. Eco-artists contribute to building an ethical sensibility through “critiquing the ways we frame nature” (Boetzkes 2010:2). While art is not very good at providing answers about what should be done, it is very good at offering questions: “Is this right?”; “Might there be some other way of doing this?” Two basic ways that art and artists can contribute to the development of water ethics is (1) through representing water, water bodies (e.g., a lake) or water infrastructure (e.g., pipes, dams, etc.) and showing these to us in a way that might play with our assumptions about how we view water, and (2) through earth art, where the artist intervenes directly in the landscape or waterscape.

**Box 8.1 Water art**

Basia Irland<sup>14</sup> describes herself as a “water and eco-artist.” One of her projects is creating “ice books” which are ice sculptures in the shape of an open book. She etches out little holes on the open page and inserts native seeds from whatever river she is working on, then adds water to the holes, and refreezes the book so the seeds are embedded in a form that looks like text. Then she ceremonially launches the ice book into the river, where it floats downstream, the ice melts, releasing the seeds which, she hopes, will find a suitable spot along the banks to grow and flourish. It’s a rather indirect way of restoring riparian vegetation, but that’s not the point, or at least it’s not the only point (Irland 2007).

Millennium Water Story<sup>15</sup> is an on-line communication initiative on water in India featuring beautiful black and white photography by Om Prakash Singh, paired with detailed descriptions of what is being depicted and why, written by Nandita Singh. Their objective is “to stimulate public dialogue” through the photo stories on particular themes. “Photographs have the unique power to easily convey complex ideas across nationalities, cultures, languages, generations and genders,” explains their website. Recent topics have included, wastewater reuse, rural drinking water, water and religion, and shrimp aquaculture.

Representations of water may be as old as art itself and water motifs and symbolism continue to hold a prominent place in contemporary art. Earth art provides a different sort of experience. Whereas representational art helps us see water (and rivers, etc.) in new ways, earth art is more about relationships: how water is related to and connected with the rest of nature, and to us. When Basia Irland launches an ice book into the river (see Box 8.1), she is helping us see the context of that river as we imagine the book floating downstream, releasing its buried seeds into the water and eventually to take root along the banks.

*(d) Water charters to guide the ethics we want*

Ethics-based decision-making at the community level depends on analysis and reflection about the values that the community (the stakeholders) desire to live by. But values are not like votes that can be tallied and the winner announced. Everyone has multiple and conflicting values, and especially about water. Sorting out our values is itself a challenging process, as Ralph Keeney pointed out way back in 1992 in his book *Value-focused Thinking*. Keeney wrote his book with companies in mind, pointing out that a company’s strategic objectives need to be derived from the company’s values;

otherwise, the objectives might take the company in a direction that it does not want to go (Keeney 1992).

Choosing between two options, A or B, can best be done not by considering the merits of each, the way we normally approach such tasks, but by shifting our thinking away from the details of the two options and delving into our values (Selart and Johansen 2011). What values are most important to us, and how can we best realize those values? The option we choose might be neither A nor B, but something we had not thought of before examining our values. When conflicting stakeholders use the language of values, they will not necessarily agree on the specifics of what water policies to adopt, but they can often agree on the design parameters that need to be considered in any ultimate design solution. To operationalize water ethics, it helps to have some design principles already worked out. This was the idea behind the global Water Ethics Charter discussed in Chapter 6 (see Box 6.7). That charter was intended to establish a global standard about values that should be adhered to in water management and governance (Ziegler and Groenfeldt 2017).

Water charters can be big (global) or small (local watershed or municipality), and they can be radical departures from convention, or they can affirm principles that have already been broadly accepted. They can be done rapidly by an individual or through intensive consultative processes over a long timeframe. When the citizens of Berlin regained municipal control over their city's water services through a democratic referendum (discussed in Chapter 6) the new owners – the city of Berlin – decided to formulate a “Berlin Water Charter” (see Box 6.9) to articulate the value principles that would guide the city's water management. That process took several years altogether, as preliminary consultations took the form of mobilizing citizen support for the city to buy back its water utility, and meetings to develop the actual charter statement took another year following the referendum (Härlein 2017).

Declarations about water have become a strategy for Indigenous communities to defend their water sovereignty (see Chapter 7), and a similar motivation underlies non-Indigenous water charters. Declaring the values about water use and governance focuses on two audiences: One is the group itself, clarifying and reaffirming the shared values about how water and water ecosystems should be managed and cared for. The second audience is the outside world, alerting any interested parties that these values about water should be respected.

The global water ethics charter developed through UNESCO and the Water Ethics Network (see Box 6.7) is a synthesis of existing value statements reflecting principles already vetted through international conferences and other fora. The global charter does not claim to represent the values of any particular set of stakeholders, but is intended to facilitate the development of local water ethics charters which would be adapted to the specifics of each location whether a watershed or river basin, or a city or state. Whether at the global or local

level, what is the purpose of documenting values and ethics about water in the form of a charter?

On one level, a systematic statement of water values and ethics is educational for the community, to inform us that these are the values we have already agreed to, tacitly if not actively. For example, the human right to water was agreed by your representative to the UN in 2010 when the vote was held. The message here is not only the specific content of the water charter, but the meta message that there is such a thing as water values and ethics in the first place. But in addition to the information content of the Water Ethics Charter, its principles can be used as basis for making decisions about infrastructure investments and water policies.

The growing community of practice on water ethics and ethics-based water decision-making holds a powerful potential for creating an enabling environment for water-related ethical reflection. Realizing this potential, and establishing water ethics as a legitimized, mainstream set of theory and practice within the water profession, hinges on the interaction of the global and local levels of water ethics. A draft of a global water ethics charter may sound rather weak, but it can nonetheless serve the important function of a point of reference for stimulating local water ethics charters. A local community water ethics charter might seem disconnected from the technically sophisticated realm of national and global water policies, but it can draw legitimacy from the global water ethics charter. And both the global and local initiatives can build collective strength through networking with communities, cities and even corporations engaged in applying ethical principles to water policies. Local decisions about water are not made in an ethical or political vacuum. Making tacit values explicit, reflecting on the ethical implications, and referencing international standards and best practice can facilitate the process of ethics-based reflection and decision-making.

## Conclusions

The proverbial glass of water ethics is both half-full and half-empty. Looking at the portion that is half-full, we can identify a strong concept about multiple values of water, and we can see that the values most critical to “the world we want” (in terms of the consensus position described in the UN Sustainable Development Goals) are on the rise. Environmental values, social justice values (e.g., the human right to water and sanitation), a broader set of economic values that includes the economics of ecosystem services, increased willingness to respect diverse cultural values, and an emphasis on integrity (transparency, accountability and stakeholder participation) in the water governance process. Not only do we have broad agreement on basic values about how water should be used, managed, and governed, but we are clearly making progress in actually translating many of those values, into practical actions.

Shifting our gaze to the empty half of the “water ethics” glass, we see that the broad set of water values such as the values placed on healthy rivers and

biodiversity, and on social justice and Indigenous cultural rights, tend to be interpreted less as values intrinsic onto themselves, than as dimensions of economic values. Even such concepts as environmental justice falls between an expression of truly social values in the sense of a fundamental human right to flourish, and an expression of economic values, that human resources (people) should not be wasted; rather disadvantaged people should be empowered so they can contribute to the economy. The problem with taking an economic perspective on environmental justice is not that it's wrong; there are very strong economic arguments for a socially inclusive economy. The problem comes when decisions are taken exclusively on the basis of economic values, without factoring in social, environmental, cultural, and indeed, governance values in their own terms. It is almost as if the analysts (who are often economists) are wary that legitimizing other value categories too much might create a drag on the economic benefits, so the importance of water education (for example) is accepted only in so far as the education advances economic goals. When only economic values are considered without balancing other values, the results can become ludicrous (which is why there are so many jokes about economists) yet still plausible. The former president of Harvard University, Lawrence Summers, gained international notoriety when, as chief economist for the World Bank, he suggested in an internal memo (that was quickly leaked) that toxic wastes from wealthy countries should be disposed of in poor countries where individual lives have less economic value. The memo may have been intended as a joke,<sup>16</sup> but the concept is of serious concern for social justice as evidenced in the disproportionate number of toxic mines, chemical plants, and waste disposal sites in economically depressed regions.

The reason that economic values play an outsized role in decisions about how water should be used, and how much should be set aside for nature to function, is only partly due to advantages of dealing with, for the most part, measurable indicators of values, such as price. Economics just happens to have a lot of theories built around measurable indicators. But there is a more important reason, I believe, that water decisions are so commonly translated into economic reasoning, even by non-economists. The reason has to do with the way water decisions are framed. We are accustomed to approaching public infrastructure issues from an economic perspective: When the road system develops so many potholes that it becomes bad for business, we are willing to pay for new roads. Road improvements are rightly seen as good housekeeping. Ethics comes into the picture in terms of ensuring that the process of drawing up the contracts is transparent, that local stakeholders have input into the process, and that there is proper accountability. As with water, roads are also a type of commons that affects the whole community. Ethics in this context is about ensuring integrity and accountability to the concerned community, in the process of managing the road repairs.

Water, however, is a very much more important thing than roads; there is no equivalence. Water is necessary for all life and all aspects of life. Bad

roads can be rebuilt, but contaminated aquifers are not so easily remediated. The decisions we take about water have far-reaching consequences and opportunities. We need to approach water ethically, but what does that mean? There are multiple domains of water ethics. Should we focus more on the environmental dimensions or the social? The economic or the governance and cultural dimensions? The unique contribution of water ethics, in my view, comes through integrating diverse values into an approach that (1) is balanced across the value domains (environmental, economic, social, cultural, and governance) and (2) aggregates the benefits of those diverse values. Rather than negotiating trade-offs (win-lose) or synergies (win-win), the integration of multiple value categories establishes the conditions for values-alliances; everyone's values matter. This is the attitude that can stimulate ethical imagination.

The initial enabling condition for taking an ethical approach to water is the recognition of water as the sort of thing that deserves to be dealt with in an ethical way. This is a logical "Catch-22" conundrum that we can't treat water ethically unless we recognize it as worthy of being treated ethically. Fortunately there are many belief systems that can support an ethical view of water, ranging from the spiritual (we have a sacred duty to protect water) to the social (we have a social responsibility to other people and future generations) to the economic (we need to manage water risk).

The more challenging step is identifying the values that we wish to advance through our use of water. We need to know what our objectives are and for that we need to know what values we hold. Management guru Ralph Keeney offers this advice,

Your interest in any decision is to avoid undesirable consequences and achieve desirable ones. The desirability of consequences is based on values. Values are fundamental to decisions.... The fundamental basis for decision-making should be values, not alternatives. Alternatives are the means to achieve the more fundamental values.<sup>17</sup>

Then once we determine our values how do we assess whether the values we are aiming to realize are the right ones? This question is best addressed with help from other stakeholders. After all, water is a commons, and our neighbors' views about how water should best be used is, arguably, just as important as our own views.

Let me conclude by reiterating a plea for nurturing the development of water ethics as a field of study and practice, which can, and I would suggest "must" complement the more focused schools of thought that render water policy such an intellectually stimulating professional arena. The themes of water sustainability, resilience, justice and integrity all offer important insights and perspectives on how water should be used today and protected for the future. We are not lacking in concepts, yet the practical outcomes are concerning at best and alarming at worst. How can we harness our collective

knowledge, values, and good will to repair the health of our freshwater resources? There are many answers to this question, but one of the answers must be a systematic application of water ethics. I invite you to become engaged in shaping the field of water ethics and contributing your ideas and passion to this collective effort!

### Discussion questions

- Is the human right to water and sanitation an expression more of social values or economic values, or something else? Explain.
- What additional value is gained by having a field of water ethics, or is a separate field not necessary?

### Notes

- 1 While there is a growing literature on water ethics, most water professionals I meet are not personally familiar with this literature and often are only dimly aware of the concept.
- 2 <http://riversymposium.com/about/brisbane-declaration/>
- 3 The first three of these themes correspond to the four “combs” of water use categories within the IWRM concept (water for nature, water for people, water for food, and water for industry), while the fourth theme (participation) corresponds to the “integrated” part of IWRM, i.e. integrated governance (GWP 2000:29). The fifth theme of water culture lies outside the conventional frame of IWRM, but was addressed by UNESCO in their program on Water and Cultural Diversity: [www.unesco.org/new/en/jakarta/about-this-office/all-publications/scs/water-cultural-diversity-and-global-environmental-change-emerging-trends-sustainable-futures/](http://www.unesco.org/new/en/jakarta/about-this-office/all-publications/scs/water-cultural-diversity-and-global-environmental-change-emerging-trends-sustainable-futures/)
- 4 <http://a4ws.org/our-work/aws-system/>
- 5 [www.cbd.int](http://www.cbd.int)
- 6 Reported by International Rivers, [www.internationalrivers.org/resources/alm-ost-28-000-rivers-disappear-in-china-8009](http://www.internationalrivers.org/resources/alm-ost-28-000-rivers-disappear-in-china-8009)
- 7 End of Mission Statement by the United Nations Special Rapporteur on the rights of indigenous peoples, Victoria Tauli-Corpuz of her visit to the United States of America, 3 March 2017; [www.ohchr.org/EN/NewsEvents/Pages/DisplayNews.aspx?NewsID=21274&LangID=E](http://www.ohchr.org/EN/NewsEvents/Pages/DisplayNews.aspx?NewsID=21274&LangID=E)
- 8 Indigenous peoples: UN expert condemns killing of rights defender Berta Cáceres in Honduras, [www.ohchr.org/EN/NewsEvents/Pages/DisplayNews.aspx?NewsID=17153&LangID=E](http://www.ohchr.org/EN/NewsEvents/Pages/DisplayNews.aspx?NewsID=17153&LangID=E)
- 9 An example of such a network is OneMississippi, <http://1mississippi.org/>.
- 10 See especially, Johnston et al. (2012).
- 11 The absence of “water culture” as a recognized field of study motivated me to establish the Water-Culture Institute in 2010, [www.waterculture.org](http://www.waterculture.org).
- 12 My PhD Dissertation was titled, “Change, persistence, and the impact of irrigation: A controlled comparison of two North Indian villages,” University of Arizona, 1984.
- 13 For a discussion and photographs of the bächle, see [https://en.wikipedia.org/wiki/Freiburg\\_Bächle](https://en.wikipedia.org/wiki/Freiburg_Bächle)
- 14 <http://basiairland.com>
- 15 [www.millenniumwaterstory.org/](http://www.millenniumwaterstory.org/)

- 16 Wikipedia provides links to diverse accounts of this infamous 1991 memo: [https://en.wikipedia.org/wiki/Summers\\_memo](https://en.wikipedia.org/wiki/Summers_memo)
- 17 <https://ralphkeeney.com>

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