Water, Place, and Equity

edited by John M. Whiteley, Helen Ingram,
and Richard Perry

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The Importance of Equity and the Limits of Efficiency in Water Resources

Helen Ingram, John M. Whiteley, and Richard Perry

Importance of Water

Water will dominate world natural resource politics by the end of the twenty-first century much as oil dominated the late twentieth century. Even more profoundly than oil before it, water permeates the larger part of political, economic, social, and even religious conflicts. Water is also integral to a sense of place, and fairness in its allocation will be a fundamental cornerstone to a more equitable future for humankind.

No longer can water be found in the quantity and the quality, and at a price, that can accommodate the ever-accelerating demand for it around the world. Though it may well be the case that the total volume of water on the planet is sufficient for societies' needs, the largest portion of this water is located in the wrong places, and it is misallocated, wasted, or degraded by pollution. The poorest of the poor people, perhaps more than 800 million, live in arid areas and depend on water for life and livelihood (UN 1999, 2004). The general anxiety about global warming—accompanied by specific panics about flooded cities like New Orleans, or about advancing deserts in the Sahel region of Africa, or about the melting ice sheets at both of the earth's poles—has simply heightened the stakes of a problem that has been long in the making.

A growing recognition of the importance of water is marked by the fact that access to water is widely regarded as a basic human right. The United Nations articulated in 1992 the right of all human beings to have access to clean water and sanitation at an affordable price (UN 1992). The South African Constitution in its Bill of Rights has gone so far as to guarantee to every citizen access to sufficient water for life, and to make the provision of life-sustaining water the positive obligation of

government (Stein 2000). The understanding of water as a human right derives from the nature of our water-dependent and water- suffused bodies and from the nature of our waterborne civilizations. Yet, all signs are that the water crisis is getting worse and will continue to do so unless corrective action is taken (UN/WWAP 2003).

Insufficient and degraded waters are tracers pointing directly to problems of global poverty and inequality. Water and sanitation have a prominent place in the Millennium Development Goals of the United Nations that set targets to halve the 1.1 billion people currently without access to drinking-water services by 2015 and the 2.2 billion without proper sanitation by 2020 (Schouten and Schwartz 2006). So far, the levels of investment are falling woefully short, and even if greater funding were provided, there remain serious issues of water governance. The 2003 United Nations Report *Water for People, Water for Life* concludes, "This crisis is one of water governance, essentially caused by the ways we mismanage water" (UN/WWAP 2003, 4).

The movement for water governance reform began nearly two decades ago. The tenets for improved governance are endorsed by nearly all water academics, professionals, and institutions including the World Bank. These tenets for improved governance include full-cost recovery water pricing, the reduction of subsidies, water transfers through markets, and decentralization of control and citizen participation in watershed management and in the allocation and distribution of public supply. Yet, water continues to be an enormously contentious issue, and to date the fruits of governance reform fall far short of the promise of benefit to humankind, especially to the poorest of the poor.

One of the major impediments to attaining higher levels of agreement on water management is the failure to recognize value pluralism in relation to water. In an earlier volume in this series—in which the editors and several authors of the present volume joined—we argued that an adequate understanding of transboundary water conflicts required a recognition of the multiple and incommensurable meanings of water in all of its specific geographical and historical sites of encounter. In that volume we argued that "water is good to think with" (Blatter and Ingram 2001, 297). In this volume we and our collaborators continue to use water to think with. More specifically, we shall use water to consider the broader notions of fairness, equity, and justice that must temper the dominant sociopolitical notions of efficiency and markets that distinguish the early twenty-first century.

This chapter will examine the historical roots and contemporary emergence of the commitment to equity and justice in water management. In the first of two sections of the book, we provide more substance to our ongoing discussion of the efficiency turn in contemporary water discourse among water scholars and practitioners. Our argument is that such reforms are needed urgently, but unless they are embedded in considerations of equity and justice, they cannot succeed. The experience of the twentieth century demonstrates unequivocally that water management based on only one or a narrow range of principles leads to a kind of "tyranny of the water commons," and its governance, or, to use a phrase from Thompson (2000), "tragically difficult."

Next, this chapter examines the case for equity in water. It recognizes equity as a protean, paradoxical concept. Competing equities previously have tended to be ignored in the literature cojoining environmental justice and water. Any articulation of the role of equity must recognize the complexity of the concept, and also recognize that if equity is to emerge, it must do so in specific places under particular circumstances—there is no "one size fits all" conception of equity that is workable. The interrelationships of arguments made in this chapter draw directly on other chapters in this book and are cited throughout. The last section of the chapter reflects on the importance of equity to the future of water governance and principles of water allocation for the remaining years of the twenty-first century. It provides a broad overview of both parts of the book.

The Efficiency Framework in Contemporary Water Politics

The conceptual frame for resolving water disputes on which much of contemporary academic and political analysis has settled is a focus on increased efficiency. It is now widely agreed that simply continuing to construct new water-supply infrastructure is problematic for a host of reasons, most notably because of financial cost and adverse environmental consequences. Instead, there is a turn toward the direction of more efficient use of available water supplies, accompanied by economic incentives and market transaction mechanisms to encourage the movement of water from lower- to higher-valued uses, such the movement of water from agricultural to urban and industrial uses.

Economic efficiency in the allocation of water resources is allocation in such a manner that no further reallocation is possible that would provide gains in production or consumer satisfaction to some water users

without simultaneously imposing losses on others. The efficiency framework, like other frameworks, is based on values. Individual preferences count. Societal welfare is based on the aggregation of individual choices in pursuit of individual interests. A change that makes everybody better off without making anyone worse off is a positive change in total societal welfare. Markets are the preferred institutions for pursuing economic efficiency, because there would not be a willing seller and a willing buyer unless both sides believed they were going to be better off (Young 2005). Of course there are always losers in water transfers besides the buyers and sellers. At least in theory, economists have devised economic tools and incentives through which such losers can be compensated so that no one is made worse off.

It is not our intent here to reprise the many arguments criticizing the economic efficiency framework as applied to water resources. A number of scholars, including the editors of this book, have argued in the literature that water is not simply a fungible volumetric commodity—we maintain that water holds a multitude of values, and that the economic maximization of water captures only one of them—a form of value that is often overemphasized (Blatter and Ingram 2001). For instance, water is an ecological element that is always critical to biological species habitat. One specific example of species habitat broadly conceived is the fact that water is essential to the welfare of human communities. Any strategy to resolve global water problems must rely importantly on attaining greater efficiency. Yet, policies in the sole pursuit of water efficiency are bound to fail either because such policy proposals become bogged down in conflict at the conceptual stage or because efficiencies cannot be implemented in practice on account of the opposition among stakeholders that has been set in motion.

In the more than two decades during which the efficiency framework has dominated scholarly and practitioner discourse and action, considerable inroads have been made in a number of areas. Supporters of the application of efficiency principles to water resources decisions are able to proclaim correctly, "Since the 1980's when economists and policy analysts began to recognize that water markets could help allocate water, we have come a long way" (Anderson and Leal 2001, 93). Instead of pursuing new water supplies through the construction of dams and diversions, conserved water and water moved out of agriculture have become major contributors to meeting rising water needs. New water supplies from agriculture are transferred to urban users, often though leases or sales.

Economic incentives rather than regulations have been used to change polluter behavior. Some highly bureaucratic and wasteful municipal water utilities have adopted more economically efficient practices or been replaced by private water providers. At the same time, water problems have continued to worsen almost everywhere. Other considerations usually limit the pursuit of efficiency so that the results in the real world are very far from the ideals of economic efficiency analysis.

Consider the case of water in California that, from an efficiency standpoint, is badly misallocated. Water in the rapidly urbanizing South Coast area of Southern California is much more scarce than in the relatively water rich north of the state. Nearly two decades ago, economist and water expert Henry Vaux examined the exploding growth and water demands in Southern California and cast doubt on policy alternatives that relied heavily on new construction (Vaux 1988). The analysis by Vaux indicated that water users in the South Coast basin would be unwilling to pay the incremental or marginal costs of supplies made available through off-stream storage or other cross-delta facilities in the San Francisco Bay/Delta region. At the same time, taxpayers were unwilling to underwrite costs of construction with large subsidies.

Preferred alternatives identified by Vaux (1988, 363–373) included marginal cost pricing for water that would encourage substantial urban water conservation, and water markets to facilitate interregional transfers. In the years since that analysis, only some of this advice has been taken, results have been mixed, and sustainable water supplies for the South Coast of California are still highly uncertain. Reviewing the mounting water challenges to Metropolitan Los Angeles and its environs between 1990 and 2004, Steven Erie (2006) foresees mounting problems of all kinds, including water supply deficits, and places more faith in ingenuity of long established water agencies than the application of efficiency logic.

While cities on the South Coast have incrementally raised water rates and promoted water conservation, population growth and the urban water demands that follow from that growth continue to outpace the results from increased conservation. A statewide Water Use Efficiency Program was found to have fallen considerably short of its goals (Ingram and Lejano forthcoming). Municipal water utilities placed rate increases far down on their list of "best practices." Other strategies, including plumbing and fixture codes, public education and conservation appeals, are relied on more heavily than rate increases. Presently, more than half

of California's water providers use a flat or declining block-rate structure, which rewards the highest water users with the lowest rates (Glennon 2005, 1883).

The Metropolitan Water District, a huge conglomerate of municipal water users in Southern California, has been successful in acquiring large quantities of water through sales and leases from irrigation districts (Anderson and Leal 2001, 93). Still, markets have yet to supply much more than 10 percent of the total supplies. Increases from that baseline depend on the availability of pumping capacity and conveyance through the California Bay/Delta region—an option that is highly controversial. The transactions that have taken place do not reflect the preferences of individual buyers and sellers as envisioned by the theories of efficiency. Fully 90 percent of the water purchasers are governments (municipal, state, and federal) motivated by many values besides efficiency.

It is much cheaper to prevent water pollution than to clean up previously contaminated waters. In the abstract, economic incentives are the preferred policy option to protect water quality. From an efficiency perspective, the adoption of "polluter pays" principles is an appropriate way to reduce the degradation of water quality. Referring again to California as an example, polluted runoff from storm events and other nonpoint and point sources is spoiling and degrading beaches and shorelines despite billions spent in waste treatment facilities and controlling industrial effluents. Eliminating pollution becomes a much more challenging task when sources of pollution are not large, but involve many individual polluters. Contamination from building sites, general construction, freeways, parking lots, fertilized lawns and the like is both hard to quantify and to assess charges to diffuse contributors. Moreover, as Kamieniecki and Below demonstrate in chapter 3, implementation of the polluter-pays principles falters when polluters and the beneficiaries of clean-up reside in places that are far apart.

Despite the commitment of governments and international institutions like the World Bank to water markets, there have been relatively few international, out-of-basin transfers (Gleick et al. 2002), especially transboundary transfers. There are emerging possibilities for water transfers from Austria to the rest of the European Union. Spain has under consideration a pipeline from the Rhone River in France to Barcelona. Israel is negotiating to buy water from Turkey, although Middle East conflicts have dimmed possibilities (Boulton and Sullivan 2000; Rudge 2001). Many of the impediments are the same as those affecting any large-scale

water-basin transfer. There are other more fundamental disincentives as well. A nation's water tends to be thought of as part of its patrimony (Sandford 2003). The uproar caused by the North American Water and Power Alliance's proposal to ship water from Canada, Alaska, and the Pacific Northwest to the Desert Southwest is instructive. In that case, the United States Congress passed a moratorium on even considering the idea (Ingram 1990).

The efficiency framework suggests that private enterprises are more likely than public institutions to perform rationally. The policy prescription is privatization for addressing bureaucratic public water utilities that display inefficiency and corruption. Endorsements by the World Bank and other water reformers of privatizing water delivery services is relatively recent, but private ownership of water delivery systems has a long history. Up until the end of the nineteenth century, private water purveyors were dominant. Local governments began to take over water utilities in the 1880s because private owners tended to make initial investments that were too small, neglected maintenance, and failed to provide adequate service to poorer districts where profit margins were nonexistent or even negative (Gleick et al. 2002). Since the wave of water reforms beginning in the 1980s, private ownership of water utilities has increased markedly outside of the United States and Canada where adoption has been slow. Two French international firms dominate the private sector and have interests in water projects in more than 120 countries (Gleick et al. 2002, 24).

Private ownership follows different models, many of which are public-private partnerships. The experience to date suggests that whether public or private, utilities work best when a strong, accountable municipal government maintains oversight. As Robert Glennon (2005, 1896) states, "For privatization to be successful, governments must regulate water as a social good, ensuring access to all at a fair price." The case study of water utility privatization in Cochabamba, Bolivia by Madeline Baer in this volume illustrates that citizens expect to be able to participate in transparent and open decision-making processes in relation to their water service. Further, to be acceptable, utility decisions must have consequences that people perceive to be equitable.

Since the efficiency turn in water resources theory and practice, efficiency gains are not nearly sufficient to alleviate the serious global water problems that confront humankind. Markets work well only under conditions that are not as yet common throughout the world. Private investment is

inadequate to respond to needs, even if there were less controversy about privatization. While important progress has been made in some areas, reform ideas adhering to efficiency formulations have also raised serious concerns and resistance. Efficiency is an important principle in policy formulation. But efficiency is no more than one metric to be considered within a broader effort to facilitate an equitable justice in environmental politics, and for this volume, in the principles which undergird allocation determinations about water from a global perspective.

Historical Roots of Equity

Efficiency has a history in Western political theory that goes back at least to Bentham and Smith in the eighteenth century. Equity has a considerably longer history. Equity is part of the tradition of common law and ideals arising from particular cases of water deeply attached to its social and environmental setting. The principles of equity are complex and contingent on circumstances, varied and nuanced, and cannot be fully understood until put back into the life cycle of living things. Consequently, there is no simple principle or set of principles, like those guiding efficiency, which can be set out as rules and universally applied in all places and circumstances. Instead, equity is a complex and protean idea. Like the concept of democracy, equity is not some objective state of being, but rather an ideal, vision, or aspiration that continues to challenge citizens to strive toward achieving it in greater depth, scope, and authenticity (Dryzek 1997). Justice is a broader concept than equity and embraces fairness, dignity, respect for mutual rights and obligations, and ensuring that institutional arrangements—for managing water, as for other necessities of life—nurture the full development of human capacity. Equity is a necessary condition for a just society. The search for equity requires deliberation, discourse, and inclusive argument such as we provide in this book.

Among the arguments bolstering equity in relation to water is its roots in antiquity and long-established practice. Classic philosophers concerned with establishing the conditions for a just society recognized that water is an important part of its health, defense, and beauty. Several passages in Plato's *Laws* argue that of all the resources and necessities of life, water is the most basic to human well-being. Water is vulnerable to "doctoring, diverting or interception of supply," and water "must always

be subject to public regulation." Much the same association of water to the just society is made in Aristotle's *Politics,* which observes that public management of water "is a matter which ought not to be considered lightly." According to Aristotle, sufficient water supplies for life need to be guaranteed to all householders, including slaves, before allocation to other economic activities like agriculture (Ingram, Scaff, and Silko 1986). These principles were widely appreciated throughout the ancient Mediterranean world. The Hebrews understood the importance of water to hygiene and personal health, recognized that the availability of water influenced the abundance of crops, and were admonished by the Old Testament to honor their sacred covenant with God both to ensure this continued abundance, and to serve as just stewards of the resource (e.g., Numbers 19–20; Deuteronomy 8:7, 8:15, and 29:19). In essence, the declaration of the United Nations making access to water a human right has very old roots.

There has been much written about the importance of the aqueduct system to the Roman Empire and the exceptional efforts made by the Romans to assure civilization to its far-flung outposts by providing adequate supplies of high quality water. Histories of the oldest irrigation societies on the planet identify fairness as the critical criterion to explain both the adoption and enforcement of water allocation regimes. Maass and Anderson (1978, 395) found during their study of water allocation that evolved in six irrigation societies in Spain and the American West that fairness carried considerably greater weight than efficiency in the design of institutional arrangements. Water apportionment policies reflected concerns with popular control, distributive shares, economic growth and farmers' conception of fairness (Maass and Anderson 1978, 395). Keeping the peace and maintaining trust among farmers was essential in drought-prone climates where water shortages requiring rationing were common. If equity concerns were paramount for these relatively simple societies made up primarily by farmers, how much more important must equity be to water governance in contemporary, more complex societies?

Fair Consideration of Multiple Values of Water

Equity dictates recognizing value differences and treating them evenhandedly. Among the utilitarian values that must be considered is efficiency, but no particular privilege need be attached to this consideration. As

Sheldon Kamieniecki and Amy Below note, utilitarianism itself requires the consideration of diverse equities. There are ends-based, or consequentialist standards that dictate actions which should be judged simply on results. According to these principles, the just action is that which leads to the greatest happiness. Some utilitarian thinkers believe that it is not enough for actions to improve the welfare of the greatest number. Additional alternatives need to be considered so that the best possible consequences will be reflected in choice.

Of course, what is judged to be a good consequence to some may be disputed by others. Further, there is a specific kind of utilitarianism that focuses on motives as well as outcomes. This framework may lead to contradictory conclusions about the equity of choices. According to Kamieniecki and Below, procedural utilitarianism requires some equality in access to decision making so that there is some chance that each person's happiness will be considered. There may be significant gaps between procedures and results. In chapter 4, Margaret Wilder argues that even when procedural utilitarianism (which she terms "political equity") is served reasonably well, other values need to be taken into account including the access to and affordability of water to the poor. Wilder finds that what appear to be democratic procedures instituted by water reforms in Mexico have led to discord and inharmonious equity that separate poor communities even further from productive resources than previously was the case.

For some people in some cases, the values associated with water are intrinsic, not utilitarian. Equity requires that these values be treated even-handedly, even though equity does not allow one set of values in the abstract to trump all others. Water flows through natural and human communities in such close association that abstracting it from its setting and rationalizing it by assigning a quantitative value is to do irremediable damage. In this reading of intrinsic value, humans, other living things, and water are inseparable. Ecosystem sustainability requires water for life for both human beings and animals in their natural habitat (Arrojo-Aguda 2006).

Symbolic, religious, and lifestyle meanings of water are among the diverse values that are poorly captured in any kind of utilitarian calculus. Yet they must be included in deliberation for equity to be served. Consider the Hindu association with the Ganges and the Christian ritual of baptism. Spectacles like Old Faithful in Yellowstone National Park or Victoria Falls are the patrimony of humanity. The native peoples, the Northern Apache, identify and bind their culture to place, and ancestral

myths are believed to have occurred at particular locations. The invocation of a particular place name, such as where a brook bends around a large rock, may signal a moral lesson about flexibility (Basso 1996). To lose or alter physical place, including water, is to lose culture and the values that make the community distinctive.

Water has increasingly assumed a key position in defining healthy lifestyle whether in sports such as surfing or in designer label water bottles. Of course, symbolic values are socially constructed. Long established precedent weighs heavily in considering legitimacy of claims because over time a particular symbolic value of water becomes deeply embedded. Robert Sandford (2003) chooses the canoe as the appropriate object that binds together Canadians to their water-rich home. He writes:

> Of all the symbols that have survived from the period before European Contact in what is now Canada, the canoe is both the most unique and the most enduring. It has been said that if there is an intergenerational symbol of the sense of place shared by all the peoples and cultures who have experienced this land, it is the canoe. More even than the maple leaf, the canoe means Canada. The canoe is a symbol of the exploration and discovery that defined this nation. It is a symbol of our deep connection to our waters and the harmony that is possible in our relationship with nature. (Sandford 2003, 55)

Newer lifestyle symbols may carry less legitimacy in terms of serving equity than those instilled over long periods of time. Ismael Vaccaro expresses a distinct reservation about the postmaterialist values that fuel the movement of waterscapes in the Spanish Pyrenees from their historic uses in agriculture to their role in creating leisure spaces for tourists. Similarly, Robert Glennon (2005), who embraces much of the efficiency framework for making water decisions, distinguishes what he sees as the more legitimate claim of Coors beer to large quantities of "Rocky Mountain Spring" water from that of Nestle Waters North America intending to bottle approximately the same amount from the same source with the same refreshing symbol. The difference is a matter of past uses that should be grandfathered in versus proposed new or newer uses (Glennon 2005, 1897).

Past promises lend legitimacy to equity claims. Unlike efficiency, equity is grounded in the context of time, taking into account the historical sacrifices and past promises as well as hopes and dreams of a better future. Efficiency takes no account of past investments, treating them as sunk costs. In contrast, equity attends to covenants or other legal forms such as prior appropriation, or first in time, first in right. In order to secure

investment for the development of the American West, state governments promised that diverters of water from water courses would not be left high and dry when another diverter moved in upstream at some later time. Without such guarantees, agriculturists would not have made investments in water distribution infrastructure.

The principle of equity suggests that past promises must be considered, even if they are outweighed by needs to provide equity to existing deserving but underserved populations. Similarly, opportunities for development exist for a region or people if future access to water is preserved. Equity dictates that present day decisions not unduly burden the scope of future human choices. In chapter 6, Paul Hirt considers the conflicting time-related equities of Native Americans, hydropower generation, irrigators, fishermen, endangered species, and other actors in the Columbia River Basin. Seeking for the antiquity or headwaters of equity claims in treaties and litigation resolves very little.

The rights of future generations in relation to those of the present generation are clearly equity matters. The efficiency argument is tilted toward weighing most heavily the economic interests of the present day. The argument is that if water is used efficiently, human welfare improves and future generations inherit higher levels of human welfare on which their own generations can build. While this argument has merit, especially in terms of theory, the many case studies in this volume dealing with the inheritance of past policies slighting equity suggests otherwise (see particularly chapters 5 and 6). Legacies of unfair treatment leave distrust, bitterness, and disinclination to cooperation that undercuts human capacity to deal with present and future complex water problems. Also, water has emotional and identity attachments not typical of other common resources like coal. Only some of its services can be provided to future generations through technological advances or other resource substitutions.

Intergenerational equity may be served by providing citizens with long term scenarios and models that project into the future trends such as climate change. Models of likely future withdrawals from river basins measured against possible reductions in supply may help refocus citizens toward longer term consequences of present day decisions. Yet, the case study from Brazil of Maria Carmen Lemos, which examines how watershed governance councils use such technical information, suggests that it may also serve to perpetuate the dominance of technical elites over water resources decision making.

Community Equity in Water

Unlike efficiency, equity applies not just to individuals but to groups of people and to communities in particular places. Moreover, equity may often demand that individuals look beyond their own welfare, recognizing that the good of the community may well be different from personal welfare. The community association with water is sufficiently prevalent in many communities to merit status as a distinct equity concern. F. Lee Brown and Helen Ingram (1987) examined the cultural and identity association of communities of rural Hispanics in the Upper Rio Grande Basin and Native Americans in Southern Arizona. They found that in the continued proximity of these communities to the natural environment, and in the insecurity of these cultures, the presence of water was absolutely crucial to their community well-being (p. 29). The experience of building and maintaining the historic *acequia* system through which water was shared by community members was transformative in building a sense of community among the residents of northern New Mexico.

An outgrowth of the merging of Spanish and Native American custom, the *acequia* system originated as associations of all persons served by the ditches, and required all members to contribute labor for maintenance and fair operation of gates so that even in times of shortage all could be served equitably. Far more than just a means of water distribution, the *acequia* was the fundamental organizing unit for rural peoples in northern New Mexico. It united people across lines of race and class (Brown and Ingram 1987, 49). The extent to which community members built their identity around water became the theme of the John Nichols novel (1974) and later movie, *The Milagro Beanfield War.* This fictionalized account, drawn partially from real events, portrayed attacks on local control over water brought by state and federal governments to be threats to culture and community (Brown and Ingram 1987, 61).

For the Tohono O'Odham in Southern Arizona, the ongoing loss of groundwater to the city of Tucson was symptomatic of a long series of sacrifices including loss of land, loss of ability to move freely across the international border that isolated some of their members, and loss of the political autonomy of individual bands imposed by the federal government's wish for administrative simplicity. In the legal and legislative battles to regain groundwater rights, what was at stake seemed much less related to exercising community control than to securing the long-term survival of their community in the face of continual siege (Brown

and Ingram 1987, 104–177). The idea that security for communities is a value at stake in water controversies is supported by other studies. For example, an opinion survey of community leaders in communities on the receiving end of proposed rural-to-urban water transfers (El Paso, Texas, and Tucson, Arizona) and their counterparts in rural areas of origin were in agreement that when water rights were lost, the community sacrificed opportunities in the future that could not be compensated adequately by money transfers (Oggins and Ingram 1989).

Clay Arnold moves the discussion of community equity in water resources considerably beyond previous understandings. Rather than referring to cultural and symbolic associations between water and community, Arnold analyzes how a sense of community is generated through water. In discussing the collective relationship of the residents of the San Luis Valley in Colorado to their water, not only is their association tied to the historic and ongoing *acequia* system, but also to continuing struggles to assimilate successive waves of immigrants and new institutions without losing the "sense of attachment and mutual obligation by which they recognize themselves as members of a community" (Arnold, chap. 2). Arnold names "moral economy" as the construct to describe the difficult reconciliations that are made between competing values related to water in the community.

A far richer concept than "social capital," the community's "moral economy" relates to its capacity to act collectively and successfully on the most challenging water conflicts. The "moral economy" of the San Luis Valley, particularly the networks of associations built up over a succession of struggles, and the active sense of shared fate, becomes easier to mobilize on each successive challenge. Successive mobilization strengthened rather than weakened community. This circumstance allowed the San Luis Valley to handle skillfully the legal and political challenges of powerful and astute adversaries. In addition to honing decision-making skills as part of the "moral economy" of the community, the habit evolves of thinking about water issues in complex rather than one-dimensional terms. Arnold argues that complex equity opposes reductionism and furthers the justice of nondominance. The hard-earned "moral economy" achieved by members of the community simply rejected as inappropriate any economic of efficiency solution. The community in the San Luis Valley favors policy choices that reflect both inclusion of, and balance among, diverse values.

Inequitable Water Development and Redressing Distributional Inequity

Water has long been used as an engine of regional economic development. While construction of new dams and reservoirs has slowed in the United States and Canada, such construction continues in Turkey, China, Brazil, Malaysia, India, and elsewhere. Moreover, there is still a lot of other water resources construction ongoing including flood control structures, wastewater treatment plants, water-based recreation facilities, and environmental restoration of wetlands. The World Bank and other donors are pursing urban water supply and sanitation projects in many developing countries, often in the name of poverty alleviation (Bhatia and Bhatia 2006).

While pursued in the name of consequentialist utilitarianism, only a minority of water development projects could survive a formal test of efficiency that included all direct and indirect costs (Bhatia and Bhatia 2006, 217). Yet, water development appears to go hand in hand with prosperity so often that belief persists in the Midas touch of water. Examples are legion: the enormous boost given to the Pacific Northwest through hydropower development; the head start gained by the city of Los Angeles in laying claim to abundant, cheap water from the Owens Valley to fuel population and economic growth; the economic development and uplifting from poverty of the mid-South's Tennessee Valley through the federal Tennessee Valley Authority; and, the dependence of New Orleans for an economic future on dam and levee reconstruction after Hurricane Katrina.

Uplands watersheds tend to be treated inequitably in water resources development. Historically, mountain peoples have been displaced by dams backing water up into mountain valleys and flooding out residents. Displacement today is different but no less disrupting, as high-income vacationers attracted to water-based recreation crowd out natives with longstanding cultural roots in the mountains. Chapter 8, by Ismael Vacarro, about modernizing mountain water in the Pyrenees in Northern Spain, tells this story. Many environmental services such as storing water in snow and icepacks, preserving wetlands that buffer downstream floods, water quality protection, and silt control are provided for free or for low cost to downstream residents by upland regions. Global climate change that is disproportionately threatening higher elevations is drawing long needed attention to upland water problems (Rosenberg Forum 2006).

Many water developments fail to satisfy the basic distributional equity and environmental justice tenet that no groups, particularly the disadvantaged, should be made worse off in absolute or relative terms because of water policies. It is unfortunate that the treasure which cities, states, and nations continue to sink into water projects, if invested elsewhere, could provide higher economic efficiencies. The more profound tragedy is the inequity in the distribution of benefits and costs of many water development projects. Several chapters, especially 4, 5, and 6, provide specific, historical analysis of how injustice came about. Developments including canneries as well as dams on the biologically rich rivers in the Pacific Northwest broke treaty promises to Native Americans and deprived them of their livelihoods and way of life (chapter 6). The risks to farmers in Mexican borderlands, especially those most economically vulnerable, grew as a result of historic water development projects that stretched water supplies beyond ecological sustainability (see the Mumme and Wilder chapters, 4 and 5).

The construction by the United States of the Welton-Mohawk irrigation project was done with disregard of the impact of the salinity runoff from the irrigation project on water quality delivered to the Mexicali valley. This disregard of equity on the part of the United States continues with the lining of the All-American Canal, which deprives Mexico of waters that probably belong to Mexico under international law (chapter 5). As the authors of these cases demonstrate, appropriately considering distributional equity in water development decisions would have resulted in avoiding debilitating conflicts and lingering distrust among peoples who must cooperate if water problems are to be resolved.

Flagrant disrespect for equity might appear to be less of a problem as large-scale water development projects have been scaled back. Yet, equity problems persist in the handling of the water quality problem, and under new laws instituting water reforms. The application of the "user pays" principles to water quality problems presents equity problems as chapter 3, bySheldon Kamieneicki and Amy Below, shows. Chapter 4 is a rude awakening for advocates of market-based water reforms. Examining the consequences of water resources reforms in several areas in Mexico, Margaret Wilder finds that poor farmers have become more vulnerable to competition from larger and more efficient farmers in Mexico and elsewhere as a result of free trade. Further, the ability of poor, small farmers to retain collectively rights to water resources are undercut by

reforms allowing more liberal sales and exchanges of water collectively owned by poor communities (*ejidarios*).

The reforms would seem to have provided better political forums for poor farmers to express their interests, but the problems of poverty rob them of the resources necessary for effective political participation. Poor Mexican farmers are even further alienated than previously from the very resources they need to bring themselves out of poverty.

In fairness, it must be observed that many of the inequities suffered in the water developments considered in this book have come at the hands of political rather than market driven processes. Inequities can be traced to asymmetries and imbalances of political as well as economic power. Chapter 8 reminds us that water policies are related to the larger repertoires and natural resources policies of the state. States have often exercised their power on behalf of narrow, special interests. Politically subsidized water to farmers, urban residents, and hydropower users threaten sustainability as well as equity. Water development projects generally have not served the interests of indigenous peoples. Further, politically driven water projects have encroached on the water rights reserved to native peoples, and, at least in the United States, the federal government has been a poor steward of trust obligations to Native American tribes.

Political power, or the ability to marshal support in authoritative venues such as the branches and levels of government and media, is often decisive. Efficiency and equity may be important rationales employed in the process of building and wielding political power. But there are many cases in which political power serves neither of these values, yet still prevails. The state of California, for example, has long used more than its fair share of Colorado River water, and has succeeded in getting guarantees that it will continue to get its full legal entitlement even in drought years when all other Colorado River basin states have to cut back their uses. The strength of the California voting block in Congress, and the expertise the state has been able to command in administrative settings and the courts have trumped competing claims from other contenders for water. As a consequence, California was the first state to fully develop the Colorado River with huge dams linked to aqueducts moving water at federal government expense to supply cities and farms located hundreds of miles from the main stem of the river. The association of the economic success of Southern California with water development has served as a

vivid lesson to other boosters of development in arid areas that ample supplies of good quality, cheap water are necessary for a brilliant future.

Compelling equity arguments can attract public support and therefore political power in some circumstances and venues (see chapter 7, on Cochabamba, by Madeline Baer). Indigenous peoples have sometimes been successful in courts and congresses in asserting equity claims to waters expropriated by white settlers. The argument of native peoples becomes more powerful politically when they are socially constructed as deserving in the eyes of public opinion. The romantic images of noble Native Americans created in literature and cinema have done much to reconstruct peoples once thought to be savages in need of total assimilation. In a similar social construction process, the equity rights of small farmers, fishermen, and others have become more positive through media portrayals, even though these groups lack efficiency arguments or economic power.

While politically driven decision-making processes often involve inequities, political processes, including the courts, do provide opportunities for mobilization and protests on equity grounds. Many government project appraisals around the world now include benefit-cost analysis, administrative review procedures, and environmental assessments. Environmental Impact Statement processes in the United States provide venues and forums to raise equity issues. Environmental justice offices in federal and some state agencies, and the Bureau of Indian Affairs, can flag equity problems for further debate. While fewer big projects would have been built without government involvement, private projects typically have not provided the same kind of structured opportunities to raise equity concerns.

Institutions charged with protecting the interests of the poor and disadvantaged groups need to balance the opportunities as well as harms to their clientele, and assure that processes of review are open to the disadvantaged to express meaningfully their own preferences. While equity does value diversity and variety, it does not require that indigenous peoples retain ancient practices in environments where such practices no longer lead to happiness and productiveness. Water scholars are well aware that much has been learned from "backward" peoples about environmentally sensitive and technologically appropriate water practices (Ostrom 1990). If for no other reason than to provide viable alternatives to dominant cultural practices, access for indigenous peoples to water and to water based livelihoods needs to be reevaluated seriously.

Alternative schemes for water development and water reform involving markets and privatization present equity problems in areas of water origin. Poverty alleviation on water investments may well require postponement or even shelving efficiency notions of full cost recovery. In addition, lifeline water rates that levy only token charges to the poor for urban water delivery serve equity. Also serving equity, and to offset low rates to poor users, is the setting of high water rates to the well-off, serving as a form of subsidy of lifeline water rates (Bhatia and Bhatia 2006, 216). Government regulation of markets through conditioning marketing permits can mitigate some of the inequitable effects of inter-basin water transfers. Many states have passed legislation protecting areas of water origin by limiting the amounts of water that can be transferred out, imposing permit or other requirements on diversion and return flow, requiring the consulting of communities affected, and insuring that compensations are both provided and acceptable.

Equity across Boundaries

There are many kinds of physical, political, and social boundaries. Whether and how those boundaries are drawn have enormous implications for equity in the allocation of water resources. River basins and watersheds have physical presence and systemic properties. Thus, what happens in the headwaters of a river system has clear implications for downstream flooding, water quality, and the environmental health of riverine species and estuaries. Despite this connection of physical boundaries and their broad implications, political boundaries frequently create fragmented management and introduce serious problems of transboundary governance. For many years the systemic aspects of river basins and watersheds, in terms of the transboundary governance structures and their broad implications, were ignored. Uncoordinated actions resulted in severe environmental damages. Even when there are adequate arrangements for watershed management within states, there continue to be equity problems in upstream-downstream distribution of benefits and costs, as chapter 3 demonstrates. Further, decentralization of power to basins and watersheds does not assure that forums at lower levels will sufficiently reflect equity values (see chapter 4 for a clear example).

Many rivers cross international boundaries. There is a large literature on transboundary water, including another book in this series (Blatter and Ingram 2001). Chapters 5 and 6 in this volume contribute importantly

to the understanding of equity in treatment of transboundary waters. Nation-states are reluctant to relinquish sovereignty or to honor international norms of equitable apportionment or utilization. The experience of the United States with its neighbors to the North and South suggests that great powers are more likely to honor equity principles when the asymmetry between the wealth of nations is not large. Mexico is twice cursed with a neighbor that has greater resources in international relations as well as citizens who are much less poor. As Stephen Mumme explains, the United States once ascribed to the Harmon Doctrine that essentially allowed it as the upstream party to do whatever it wanted to develop the Rio Grande and the Colorado Rivers. Both because the power differences are not so great between the United States and Canada, and because hydroelectric power revenues as well as control over water are involved, there are more resources with which to offset injuries. Paul Hirt sees the relations between the United States with Canada in the Pacific Northwest to reflect a far greater concern with equity.

Equity and environmental quality may be aided rather than hurt under some circumstances. Paul Hirt, in chapter 6, on relations between the United States and Canada, argues that the location of the Fraser River entirely in Canada, as opposed to the Columbia River, which is shared with the United States, facilitated the maintenance of salmon on the Fraser. Initially alone by the United States, and then later with the assent of Canada, the entire Columbia River was developed for hydropower, essentially dooming the huge salmon runs that once made up between 30 and 80 percent of the diet of indigenous peoples living in the Columbia River basin. Canada learned from the experience on the Columbia River. The existence of the international border insulated it from pressures to expand hydro-electric development to the Fraser. However, Hirt observes that a battle continues between the United States and Canada on the rights to catch what are essentially Fraser River fish in international waters.

While domestic and international law often uses equitable utilization and apportionment as operative criteria in treatment of shared waters, negotiators of transboundary compacts usually recognize only a narrow range of economic values as legitimate. Professors Hirt and Mumme, in chapters 5 and 6, note some encouraging trends that recognize equity, public participation, and sustainability as factors in the management of bi-national water resources. Subnational regions that encompass several states or provinces also exhibit some positive movement. There are examples of regional water management that encompass whole river sys-

tems. The Murray Darling Basin in Australia is an example of a strong basin institution dedicated to ecological restoration. Similarly, the California Bay/Delta Authority and the Everglades in Florida are examples of multiparty regional ecological restoration arrangements involving not only states and localities but also the federal government and nongovernmental entities. The success of these efforts depends strongly on the ability of the participants to engage in a unifying basin-wide vision that transcends political jurisdictions and embraces equity. An essential problem is that these examples of successful transboundary governance are the exception rather than the rule.

Recognition of social and political boundaries sometimes greatly advantages place-based minority populations asserting equity interests. Tribal sovereignty over natural resources including water has been enormously important to the ability of Native Americans to preserve Indian reserved water rights. While it has often been difficult for native peoples to turn their "paper" water gained through court decrees into usable water, the territorial integrity protected by reservation boundaries has been critical to what gains have been made. As chapter 6 attests, indigenous peoples have not been able to hold on to their water related rights, including fishing, in face of efficiency and development pressures despite having official recognition, and dedicated homelands. There are signs, however, that indigenous rights in shared water resources are being afforded more protections, although as Paul Hirt observes, recompense for past injustice is difficult in the present era of scarce water and limited financial resources.

Equity, Participation, and Process

Equity requires fair, open, and transparent decision-making processes in which all individuals and groups affected by water decisions have an opportunity to participate. David Feldman has written that "no ethical approach to the management of water resources should be adopted that categorically excludes any constituency or alternative approach to management out-of-hand. This means that any approach to management should emphasize process as much as substance—providing the widest possible debate and deliberation" (Feldman 1991). Participation must be meaningful so that choices made in participatory forums actually matter and are taken with utmost seriousness. Participatory rituals are not to be performed simply for cosmetic purposes. Participants need to have the

necessary resources with which to participate in terms of information and time so that they can afford to engage fully. Participatory processes ought not to be dominated by professional and economic elites. Nor should such processes be subject to procedural manipulation that distorts the equity issues in question. In one way or another, almost all of the chapters in this volume link equity with process and procedural fairness and reject the false notion that good results can excuse unfair processes.

In explaining what he calls the "moral economy" of water practices in the San Luis Valley, Clay Arnold documents why the multiple values that are associated with water must be reconciled in conflicts over the scarce water resources that have historically plagued this Colorado community. The process of reconciliation is critical. Early on, valley residents constructed a forum, the Rio Grande Conservancy District, through which collective decisions could be made that both reflected the community view and stood for community interests in relation to state and federal agencies and to private interests as well. This institutionalized voice of the valley was supplemented by a number of other grassroots organizations that drew together valley residents in face of outside threats to water security. San Luis Valley residents objected to both water markets and state-wide referendums as inadequate forums through which to make community water decisions, the first because it was too narrow in its representation of only the economic values at stake; and the second because it was too broad and involved a slightly engaged state-wide public vulnerable to manipulation.

From the perspective of the "moral economy" of the San Luis Valley, appropriate decision forums ought to represent fairly the way of life of the valley, and ought not to represent overly the economic interests that would benefit from water transfers out of the valley to front-range cities. Equitable arenas reflect the complexity of values associated with water, not overly simplified efficiency claims. When proponents of water transfers tried to manipulate public opinion by claiming false benefits of water transfer schemes to the public schools in the San Luis Valley, mobilized citizens responded by unmasking the strategy as mainly benefiting out-of-state speculators. Clay Arnold in chapter 2 observes "Decisions and decision-making processes that fail to regard complex social goods as complex commit a kind of injustice; they conceive the good as something other and less than what it is for many of the individuals and communities directly affected. More precisely, they conceive the good incompletely and therefore unfairly."

Even a fairly narrow notion of utilitarian standards related to water that marginalizes intrinsic values recognizes procedural equity or equality, although not very satisfactorily. Sheldon Kamieniecki and Amy Below write: "The utilitarian perception of procedural equality infers that everyone is afforded equal opportunity to affect policy decisions as each person's happiness is weighted . . . there is often little actual utilitarian value in procedural utilitarianism. Everyone's opportunity to affect policy outcome is not equally weighted. Some are provided more opportunities while others are victim to others' decisions." As Hans Morgenthau is quoted in chapter 3, "the test of a morally good action is the degree to which it is capable of treating others not as means to the actor's ends but as ends in themselves" (Morgenthau 1945, 14). By the procedural utilitarian standard, equity has not been present in much of the history of water resources decision making in many parts of the globe.

It is totally unwarranted to expect that somehow markets will deliver procedural equity. Equity assumes that affected interests will participate in decisions. One of the most compelling arguments against efficiency is that it maximizes the power in decision making of those with financial and intellectual resources. Clearly, market participation favors those with money and can afford to wait until they get the right price before buying or selling. Further, efficiency in government programs is often driven by benefit-cost analysis that privileges the exercise of experts including engineers and economists. Economic returns not community value of water or other equity issues drive consideration of efficiency.

Contemporary water reformers, supported by such institutions as the World Bank, have looked to the involvement of economic incentives and the formation of watershed governance for insurance of procedural equity. Chapter 7 carefully documents how failure to follow open, fair, and transparent procedures in the privatization of a municipal water utility and in setting higher water rates led to protests and violence in the streets. In contrast, in chapter 5, Steve Mumme concludes that the more participatory forums, which have been created by recent international agreements between the United States and Mexico, have given border residents more control over their lives and resulted in greater consideration of sustainability in water decisions.

Other chapters concentrate on more subtle breaches of procedural equity in the course of implementing water reforms. In chapter 4, Margaret Wilder contributes importantly to our understanding of the requisites of fairness in process. She examines the widely praised new water laws in

the border state of Sonora, Mexico that facilitate grassroots governance of watersheds. What Wilder calls "political equity" afforded by watershed and river-basin planning institutions was not meaningful because poor farmers lacked the resources necessary to make their participation count. Further, decentralizing decision making over water resources at the regional and watershed levels is not a significant improvement in terms of equity if the economic resources necessary to redress distributional inequities are not reallocated also from the central to local governance.

Wilder judges that the positive effects in terms of procedural and participatory equity are more than offset by the drastic decline in economic welfare of poor farmers as they struggle to remain in active farm production under a nexus of economic pressures including trade liberalization, lack of subsidies and state credit, and a growing indebtedness that, for many, is insurmountable. Although they have some of the requisite tools to succeed—including irrigation, access to technological sophistication and knowledge, the opportunity for integration into commercial export economies, and location just miles away from Mexico's largest trading partner, the United States—these poor, small farmers are unable to compete in the market-driven international trade dominated by those with superior resources. Without an economic basis for survival, procedural improvements really are not meaningful.

The dominance of technocratic elites over what is considered legitimate information for water resource decision making is also a contemporary threat to procedural and participatory equity. Watershed governance is supposed to counterbalance the long-term dominance of nationwide-based water resources bureaucracies that have controlled traditional water development. Better informed stakeholders should be able to make wiser decisions. However, if knowledge is controlled by a few actors who mainly use it to bolster their own decisions, technical knowledge can then be used to exacerbate power imbalances between those with access to knowledge and those without.

In chapter 9 on watershed governance in Brazil, Maria Carmen Lemos raises serious questions about the procedural and participatory equity actually realized through watershed governance reforms. She reviews new evidence demonstrating that despite more participation, the inclusion of nonelites—such as small farmers, rural workers, and rain-fed farmers—has been thwarted both in terms of representation (they are less represented) and influence (they exert less influence during the allocation meetings). She also finds that in the cases she studied of watershed reform

in Brazil, the handling of technical information led to "elite capture" of decision-making processes, which in turn affected broader issues of equity and justice in water management. Despite the effort from local *técnicos* to improve communication and the availability of techno-scientific information, Lemos found evidence that a substantial number of stakeholders find technical information neither available nor accessible. Moreover, there is a widespread perception of *técnicos* as the most powerful actors in the water management process.

Interspecies Equity and Sustainability of Water Resources

Notions of equity and environmental justice have generally been related to people and communities, not to the plant and animal world. It is not our intention here to engage in the fascinating debate between deep ecologists, animal rights activists, and others about whether trees and bears have rights. Certainly the Endangered Species Act suggests that when the survival of a living species is at stake, the presumption is in its favor rather than on the side of human desires.

Neither the ethnocentrists nor the ecocentrists have much to offer to understand water and equity. Water is inextricably bound up in all life. Astronomers look first for water as evidence that a distant planet could support life. We are in water before we are born. For Robert Sandford (2003, 12) who survived being swept under a glacier before reemerging in the North Saskatchewan River, the birthing process happened twice. For most of the rest of us, waterscapes ranging from pounding oceans to bubbling streams are sources of joy and renewal. The European Declaration for a New Water Culture, signed by one hundred scientists from different European Union countries in 2005, was correct in declaring water for life for both human beings and animals in their natural habitat as one of four ethical categories of universal rights (Arrojo-Aguda 2006).

While it sometimes appears that environmental interests and equity for human communities are in conflict, a close historic reading of how the conflict developed almost invariably shows prior disregard for equity. Clay Arnold's history of water controversy in the San Luis Valley in chapter 2 is illustrative. Attempts to transfer both groundwater and water rights out of the San Luis Valley to serve the demands of cities along the Front Range of the Rockies threatened irrigation-based agriculture, and would have changed the Valley's culture and way of life. The proposed transfers would have destabilized the Great Sand Dunes in the national

park. The proposed transfers were pursued by processes designed to short circuit public participation. Happily, water in the San Luis Valley is today recognized as a complex social good. The water and rights at the heart of the controversy are relatively safe in the National Park system.

The poor fate of salmon in the Pacific Northwest is shown to be closely tied to the broken promises made to Native Americans. At the end of chapter 6, Paul Hirt refers to the contemporary discourse of regret in which many credible voices question whether the social and environmental sacrifices made for northwest hydroelectric power development was worthwhile overall. The relatively unspoiled environment of the Fraser River that was never dammed is a reminder of the path not taken.

Chapter 5 tells the same story of the shared fate of disadvantaged people and the environment along the United States–Mexico border. In its preoccupation to put to use economically as much water as possible from the Colorado River, the United States has overallocated water rights so that in dry years endangered species like the silvery minnow in the Upper Rio Grande River is driven to the brink of extinction. Plans to increase water use efficiency of Colorado River water in the Imperial Valley by lining the All-American Canal has both environmental and equity consequences to farmers in Mexico that have not been open to public discourse and consideration.

Unfortunately, humans, nature, and fairness are knotted together. This knotting together is a fact of life on this planet. The failure to recognize that fact has created the unfortunate inheritance chronicled in this volume of a past not sufficiently conscious of equity issues. Among the most tragic of contemporary conflicts are those between the equities of the interests left behind by the era of large-scale water development. Native peoples now wishing to develop water-based rights and activities find themselves at loggerheads with environmentalists trying to protect the few wild places that have been left undisturbed. The reason, unfortunately, is that the few wild places are often located on tribal lands passed over in the previous era of water development. Balancing equities to species and to disadvantaged communities necessarily involves compromise, including just compensation to parties forced to relinquish equity claims for the greater public welfare.

What kinds of burdens and regulations should be placed on the water uses in areas that prevail in equity contests? Ought the broader society whose actions in the past resulted in the necessity of making such difficult choices in the present share part of compensatory burdens? What is "just compensation" for losses of intrinsic values? Does the efficiency principle

of "beneficiaries pay" serve equity in difficult balancing situations? The processes through which conservation is implemented in communities have a great deal to do with their effectiveness.

Equity dictates that that just compensation will be provided for those who make sacrifices for the good of the whole including other species. The important distinction between compensation provided in efficiency-driven decisions and those where equity comes first is that those who receive compensation are the judges of sufficiency. It may be, for example, that losers in a water decision may be placated by promises of benefits in the future. The equity proof here is not whether humans are better off over the long term, but whether those who make sacrifices believe their sacrifices will ultimately be meaningful in terms of long-term sustainability of water resources.

Equity and Water Ethics

The efficiency framework assumes that the water user will serve his or her self-interest in relation to water. People are expected to respect the economic value of water. Waste is counterproductive but not necessarily unethical. The editors of this volume join with many others, including the signatories to the European Declaration for a New Water Culture, who see water ethics as much more demanding than this. In the words of Pedro Arrojo-Agudo, "it means recovering the holistic perspective embodied in the Aristotelian concept of 'economy' and going beyond narrow mercantile approaches which dominate the reigning model of globalization" (Arrojo-Aguda 2006, p. 24).

Equity as discussed here goes beyond self-interest to include concern with serving broader community values, the effects on the poor and disadvantaged, and respect for equitable processes, and broader issues of justice, such as dignity and the fulfillment of human capacity. Equity considerations suggest some fairly obvious ethical principles that have already been discussed, such as, that every human being should have access to sufficient water to maintain life and health. Community interests and respect for value diversity in water reflects the broader equity principle of solidarity, that is recognizing each person or group has a right to participate in open and inclusive decision-making processes so that their values and visions can be considered fairly (Priscoli et al. 2004).

Distributional equity obligates the husbanding of water resources. One ought not to use all of the water one can afford, but instead use only as much water as one needs and can ethically justify in the particular

contexts of scarcity. Water needs to be used so that it is not unnecessarily degraded by contaminants. Ethics require that one have some knowledge and concern that sources of water supply and means of disposal of water once used are in accord with the underlying values associated with the resource. Concern with intergenerational equity suggests an ethic of stewardship. Each person in each generation should treat water resources so that they are passed along to future generations undiminished—bearing in mind that this is precisely what we would wish prior generations to do for us.

A water ethic requires one to participate in such a way that discourses and actions reflect more than self-interest. A sincere search for common interests requires a spirit of cooperation in seeking to identify broader societal interests. Because water is integral to so many human activities, the smooth running of water systems depends on many interlocking networks of people. Water management is vulnerable to disruption, therefore, at many points by people who refuse to cooperate. However efficient the policy design, policies are unlikely to be implemented without cooperation (Priscoli et al. 2004).

The European Declaration for a New Water Culture provides four broad categories for ethical action. In addition to the "water for life," both human and nonhuman, the declaration elevates "water citizenry" so that water becomes an instrument for maintaining not just water supply and sanitation for health, but also for well-being, social cohesion, social capital, and capacity-building. The Declaration further recognizes the importance of "water business" for economic growth, but this is a third level of priority and it is unethical to allow these business concerns to interfere with water for life. Finally, the Declaration takes a firm ethical stance against the "water-crime" nexus that has led to destructive withdrawal practices, toxic spills, and other actions that threaten the globe's precious and irreplaceable water resources (Arrojo-Agudo 2006).

The Contributions of This Book

While equity is a deeply embedded concept in water resources, it has often been treated in water research as a kind of residual category of concern that is taken into account when all else is equal. As a consequence, equity principles are not as well articulated and accepted as they should be. Further, there is insufficient research on the nuances of weighing equities against other values and considering the merits when equities

conflict. This volume is dedicated to the important enterprise of raising equity to its proper place as equal to efficiency among criteria to evaluate water-related actions and policies.

Issues of equity are best explored in the context of actual cases of social interaction related to water. Much of what is interesting and important about equity flows from the particular context and longstanding relationships among parties at issue. In virtually every case of water and equity, history is important. The perceptions and behavior of people cannot be understood outside of appreciation for, and recognition of, precedent and place. The chapters in this volume consider water and equity in very different situations with an eye to tracing the ways in which equity arguments are constructed, and the situations in which they are effectively expressed and affect the course of water-related decision making.

We adopt the normative case-study method as an approach to investigate the meaning of values, as advanced by David Thatcher (2006). Just as case studies can contribute to identifying causal relationships and the worldviews of people being studied, normative case studies can clarify important public values. Normative case studies contribute to identifying and understanding the ideals society should pursue and obligations that should be accepted. By choosing cases from different contexts as we have in this book, we can help clarify equity as intrinsic as well as an instrumental value. The case studies are intended to facilitate rethinking the ideal of equity by bringing into view through case studies different circumstances in which the concept was applicable. We draw from a wide range of geographical and historical circumstances that inspire equity judgments, and through juxtaposing cases, reflect on analogies. The case studies allow us not only to refine the meaning of equity but also to trace the moral consequences of ignoring or undervaluing the moral claim in managing water resources, addressing disputes over water, and in decisions over how—and by whom—water will be used.

The final chapter of this volume moves from the particulars of the case studies to some overarching concerns. It looks into the future to consider the impact of global climate change on water resources. The chapter moves beyond the impacts of the melting of polar ice and of sea-level rise to consider widespread changes in the pattern and form of precipitation, and more severe climatic events such as floods, droughts, and high-impact storms. Even the energy policies intended to respond to climate change by finding substitutes for fossil fuels have consequences to water resources, as every recipe for creating energy includes in its instruction,

"add water." The example of bio fuels is a case in point as the diversion of water resources to grow crops from energy means depriving present water uses. The burdens of these climate-induced changes are not distributed fairly, and the need to scrutinize equity in future water resources decisions is bound to intensify.

The volume concludes by examining some alternative ways to better incorporate equity into future water resources decisions. An argument is made to move beyond utilitarianism, and the final chapter proposes serious consideration of the advantages and disadvantages of covenants, categorical imperatives, and stewardship. Among the systemic reforms required are inclusiveness and ethical eclecticism, a commitment to democratic processes, making ethical assumptions clear and transparent, and collaboration among parties who disagree. Learning from past error is essential if equity is to be better served, and the final chapter closes with some suggestions for future research.

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