


Spring 2010

Integrated Water Resources Management: A Theoretical Exploration of the Implementation Gap Between the Developed and Developing Worlds

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INTEGRATED WATER RESOURCES MANAGEMENT: A THEORETICAL
EXPLORATION OF THE IMPLEMENTATION GAP BETWEEN THE DEVELOPED
AND DEVELOPING WORLDS

by

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A Dissertation Submitted to the Faculty of Old Dominion University
in Partial Fulfillment of the Requirements for the Degree of

DOCTOR OF PHILOSOPHY
INTERNATIONAL STUDIES
OLD DOMINION UNIVERSITY
May 2010

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ABSTRACT

INTEGRATED WATER RESOURCES MANAGEMENT: A THEORETICAL EXPLORATION OF THE IMPLEMENTATION GAP BETWEEN THE DEVELOPED AND DEVELOPING WORLDS

Jennifer S. Schiff
Old Dominion University, 2010
Director: Dr. David Earnest

As part of its Millennium Development Goals, the United Nations acknowledges that solving the world's water woes requires giving one billion additional people access to safe and affordable drinking water, while also noting that this is a difficult goal to achieve considering present environmental challenges. Amidst this atmosphere of vanishing freshwater, the legislative policy community has begun to encourage diverse discourse on the topic of efficient resource management, but the form and function of such a solution present unique political and theoretical challenges for policymakers and scholars alike. The current consensus among water managers is that a multifaceted policy framework known as Integrated Water Resources Management (IWRM) is the most viable strategy for conserving freshwater resources, and as such, it provides a proactive solution for mitigating future bouts of water scarcity. There is a puzzling disparity in IWRM implementation, however, as developed states have experienced more success with the policy than states within the developing world. IWRM's policy framework establishes a set of concrete goals for water use, including effective demand management, the encouragement of "a water-oriented civil society," transparency in the policy creation process, conflict resolution guidelines regarding regional and international water issues, equitable access to water resources, the decentralization of water policy, and the privatization of water provision. Drawing from scholarship on the efficacy of

spontaneous, negotiated, and imposed environmental policy regimes, this thesis considers the German, Indian, Canadian, and South African IWRM implementation experiences from the perspectives of the theoretical literatures on regimes, common-pool resources/public goods, privatization, and constructivist arguments about the development and diffusion of transnational human rights norms. While all the literatures prove useful at explaining various facets of the implementation puzzle, it is the scholarship on regimes that offers the most robust explanation of the problem at hand by highlighting the importance of a linear sequence of environmental regime creation, the integration of both decentralized and centralized water governance mechanisms, and the extant character of a region's previous water management regimes as central components that help to explain disparate levels of IWRM implementation success.

ACKNOWLEDGEMENTS

This dissertation would have proven an impossible task without my extended and wonderful support system. I would like to thank my dissertation committee chair, Dr. David Earnest, for all of the input, inspiration, and dedication he invested in me as a student, and I would also like to extend credit to the other two members of my committee, Dr. Kurt Gaubatz and Dr. Glen Sussman, for their ideas and suggestions along the way. Of course, my family played a primary role in this project as well. First, I must thank my mom, Sharon Smith, for providing such a strong example of female empowerment and for serving as a source of constant inspiration. I also owe my husband, Dan Schiff, an enormous debt of gratitude. His patience, encouragement, and support made this six-year endeavor possible, and so this dissertation, and the doctoral degree that accompanies it, is as much his as it is mine.

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CHAPTER I

THE PUZZLE OF IWRM IMPLEMENTATION

*Water is the principle, or the element, of things.
All things are water.*

-Plutarch, *Placita Philosophorum*

Water is not only a necessary condition for the existence of life, it is also a substance infused with cultural, political, environmental, and religious importance. Such complexity is enhanced by the fact that the world's population depends on one water system that, by its very nature, transcends international boundaries. Yet human beings commonly fail to act as responsible custodians of the world's water supply, a reality that seems surprising given the circumstance of increasing water scarcity. Such water scarcity, as a "condition in which demographically-induced demand for water exceeds the prevailing level of local supply," presents obvious policy issues, as individuals around the globe require water for sustenance and continuation of life.¹

Indeed, the United Nations (UN), as the paramount global environmental policy body, addresses the world's water issues in many of its deliberations and operationalizes its water-related policy objectives in the Integrated Water Resources Management (IWRM) framework. This framework, in theory, serves as a management tool for democratizing water governance, valuing water as an economic good, and safeguarding the sustainability of water resources. Certain developed states, most notably Canada, had

This paper follows the format requirements of *The Chicago Manual of Style*, 15th Edition.

¹ Turton and Warner, "Exploring the Population/Water Resources Nexus in the Developing World," 52.

been using IWRM components in their national water policies for years, but the international community did not become involved in implementing such a comprehensive water strategy until the early 1990s when the United Nations formally introduced IWRM at the 1992 Conference on Environment and Development (Earth Summit) in Rio de Janeiro, Brazil as a potential solution for encroaching water scarcity and increasing pollution levels.

To date, almost all of the 155 states that signed the Rio Declaration and its corollary Agenda 21 agreement have employed facets of the IWRM policy framework within their own water governance regimes, and as such, Rio stands as one of the most successful environmental policy regimes of the 20th century in terms of international commitment.² One must note, however, that the majority of Rio signatories have only begun to implement IWRM principles in earnest within the last five years. The verdict, then, is still out on the success of the policy framework in the majority of adopting states, although the next decade will see a number of transboundary and national IWRM frameworks maturing to the point at which the efficacy of the policy should become more apparent. Despite this relative novelty of the framework's implementation, the United Nations still believes and publicly advocates that IWRM is a highly flexible policy regime with the potential to improve the water resources of all countries, no matter their socio-economic environments, severity of water scarcity, or infrastructural development levels.

² Joyner, ed., *The United Nations and International Law*, 303.

THE POLITICS OF WATER

Is such a water policy framework even necessary? The evidence suggests that it certainly is, as many scholars argue that a lack of a regulatory framework in the form of an international water management regime has allowed decades of water pollution and excessive water use to increase almost unabatedly. Certainly, the growing potential for water scarcity across the world presents an extremely pressing policy issue, and states and intergovernmental organizations struggle to identify and agree upon a unified approach to global water management.³ Any such approach, however, must consider the complexity of the water issue, as a solution would have to address the various factors that contribute to water scarcity, including population growth, pollution diffusion, and the potentially negative effects associated with global climate change.

Although decreasing water availability is a result of various factors, population growth and irrigation demand are two of the main contributors to water scarcity. As the world's population continues to increase exponentially, and with total population expected to reach approximately 8.5 billion by 2030, it becomes progressively more apparent that existing freshwater sources are insufficient for meeting personal consumption demands.⁴ In addition, rising pollution levels further threaten the world's water supply. Sediment, chemical, organic and nutrient pollution degrade water quality, requiring virtually all drinking water to be treated and disinfected to prevent widespread outbreaks of water-borne diseases, such as cholera and dysentery. Sadly, outbreaks of such diseases kill almost two million people a year across the globe.⁵ Climate change also presents a severe threat to the world's transboundary system of lakes, rivers, and

³ Switzer and Bryner, *Environmental Politics: Domestic and Global Dimensions*, 142.

⁴ *Ibid.*, 165.

⁵ United Nations. "Meeting Basic Needs." World Water Assessment Program.

groundwater. Many scientists indeed believe that global warming and water scarcity are inextricably linked, as the negative effects from increased atmospheric temperatures contain the potential to exacerbate droughts and water shortages across the globe, due to changes in rainfall and wind patterns.⁶ These water scarcity problems will not lessen or disappear without governmental intervention because, in order to ameliorate environmental degradation, “policymakers need to implement a broad and integrated set of responses at the international, regional, national, and community levels.”⁷

EXPLORING THE DISCONNECT

To this end, the United Nations envisions Integrated Water Resources Management as a 21st century solution that will alleviate water scarcity, while mitigating escalating levels of water pollution. IWRM principles comprise a set of vaguely-defined goals for water use, including effective demand management, the encouragement of “a water-oriented civil society,” conflict resolution guidelines regarding regional and international water issues, and equitable access to water resources through participatory and transparent governance and the decentralization of water policy.⁸ Unfortunately, the reality of IWRM implementation has not borne out the UN’s policy rhetoric, as states within the developing world experience diminished success rates with IWRM in comparison with their more developed neighbors.

This disconnect between the UN’s theorization of IWRM’s potential and IWRM’s actual policy adaptation certainly deserves further scrutiny, and various bodies of international relations literature, including scholarship on public goods and collective

⁶ United Nations, *World Water Development Report 2*, ix.

⁷ Homer-Dixon, *Environment, Scarcity, and Violence*, 10.

⁸ United Nations, *World Water Development Report 2*, 14.

action, regimes and institutions, privatization, and the construction and diffusion of norms all serve to address, and perhaps explain, the ‘disconnect puzzle.’ One expects, for instance, that the literature on public goods and collective action may explain whether or not the implementation gap is due to the way in which a state views the nature of water as a resource. The rhetoric of IWRM, for instance, assumes that water is a “highly subtractable” resource, since any one individual can deplete the amount of water available to others.⁹ Resource depletion occurs frequently in the field of common-pool resources, as each person with access to the CPR has an incentive to exploit as much of the resource as he or she possibly can.¹⁰

Many developing states, however, define water as a public good, instead of a CPR, due to its many ecosystem and public health services, even though water fails to adhere to the classic definition of such a good. Public goods are defined by two conditions that distinguish them from private goods. First, they are non-rivalrous, meaning that consumption by one person does not diminish the amount available to others. Second, public goods are non-exclusive, so that if the good is available to one person, then it is automatically available to all others.¹¹ While one may argue that water is a non-excludable good because it is exceedingly difficult to prohibit individuals from partaking of open water sources such as lakes and rivers, it is more challenging to make the case that water is non-rivalrous, as one person’s consumption of water definitively reduces the amount available to others. This contradiction in definition, however, seems unimportant to many developing states, which are more likely to classify water as a

⁹ Heikkila, “Institutional Boundaries and Common-Pool Resource Management,” 97.

¹⁰ Sweeney, Tollison, and Willett, “Market Failure, the Common-Pool Problem, and Ocean Resource Exploitation,” 182.

¹¹ Samuelson, “The Pure Theory of Public Expenditure,” 387.

public good because the “social goods” aspect of water cannot be protected if water is primarily valued as a private entity.¹²

Once one examines the nature of water as a resource, the next logical question to ask is whether regime type matters in terms of managing the collective action of states in global water management. Given the collective action literature, one expects that the United Nations’ IWRM policy framework would emphasize the facilitation of information between states, along with binding limits on water usage, as theory suggests that both the number of actors within a regime and the heterogeneity of those actors can complicate the effective governance of CPRs unless information exchange occurs, offenses are clearly defined, and facilitators successfully monitor and sanction offenders.¹³ Indeed, such regimes are a necessary component for overcoming the “tragedy of the commons,” and regimes and institutions play key roles in shaping how CPR users coordinate their actions to solve resource depletion issues.¹⁴ Such institutional arrangements may include “enforced formal laws governing individual behavior,” or “public and private organizational arrangements.”¹⁵

Again, though, the reality of the UN’s proposed framework for global water management defies these expectations. By advocating loosely developed IWRM principles as the answer to water scarcity instead of establishing formal communication networks or clearly defined offenses and sanctions, the UN’s IWRM regime fails to provide a definitive point around which a convergence of actor expectations in these

¹² Gleick, et al., *The World’s Water, 2004-2005*, 60.

¹³ Keohane and Ostrom, eds. *Local Commons and Global Interdependence*, 22-23.

¹⁴ Ostrom, Gardner, and Walker, *Rules, Games, and Common Pool Resources*, 5.

¹⁵ Heikkila, “Institutional Boundaries and Common-Pool Resource Management,” 97.

areas might occur.¹⁶ Without a formal regime, the opportunity to share information becomes more elusive, and without clearly defined rules and expectations, sanctioning offenders proves an impossible task. Indeed, the voluntary nature of such a policy framework may adversely affect those states lacking strong governing mechanisms of their own, a condition more commonly found in the developing world.

Regime theory, however, may help to clarify the UN's reluctance to strengthen the overall IWRM regime. On the one hand, international regimes serve as responses to the "pervasive collective action problems that make cooperation problematic at the international level."¹⁷ These regimes protect the "availability of key resources to actors," while they also define the rules by which actors must operate.¹⁸ Such regimes are often less effective when dealing with distributive issues, however, as the actors that "benefi[t] from the preexisting arrangements will naturally suspect that the proposed adjustments will improve the outcomes for others at their expense."¹⁹ Thus actors in these situations view mutual gains as unlikely, and this theoretic idea may help to explain the UN's reticence to develop a formal regime regulating the highly distributive issue of global water management.

It appears, then, that the literatures on collective action and institutions speak to the implementation gap that exists regarding a global water management framework, but the privatization literature may also help to decipher part of the puzzle. Indeed, the fiscal component of IWRM calls for valuing water as an economic commodity, a policy goal that is often operationalized, in the developing world at least, as the privatization of water

¹⁶ Krasner, ed., *International Regimes*, 2.

¹⁷ Young, *International Cooperation*, 5.

¹⁸ *Ibid.*, 16.

¹⁹ *Ibid.*, 223.

supply. At first glance, the literature on this subject implies that the privatization of water supply is an appropriate solution to issues of water scarcity in the developing world. Although theory certainly suggests that a formal institutional framework is necessary for water management, as such a framework can “regulate external spillovers from individual actions,” such a formal regime would be more appropriate to states with strong domestic political institutions.²⁰ The same literature also suggests, however, that if those states benefiting from the redistribution of a natural resource lack power in the international arena, then a formal regime is a less likely solution, thus privatization represents a more effective and pragmatic resolution to the problem.²¹ This pragmatic perspective implies that privatization is beneficial to states with weaker governments because it leaves the burden of providing certain goods in the hands of the private sector. Thus, in this context, the IWRM’s emphasis on the privatization of water supply makes sense in terms of finding a solution to water scarcity in countries whose governments lack both effective governance mechanisms and international influence.

Unfortunately, though, privatization most often takes the form of “contracting out,” where governments act as “service arrangers” who determine the task at hand and then solicit private bids for the implementation of that task.²² Given governmental inadequacies or economic restrictions in some areas of the developing world, one may characterize the availability of water in the world’s poorest states as a choice “between inadequate public services offered by the public sector versus inadequate services offered by a private firm that is inadequately regulated by the government.”²³ Certainly, the

²⁰ Feigenbaum, Henig, and Hamnett, *Shrinking the State*, 14.

²¹ *Ibid.*, 30.

²² Henig, Hamnett, and Feigenbaum, “The Politics of Privatization,” 443.

²³ Bennett, *The Politics of Water*, 76.

UN's voluntary IWRM regime does not invoke the power to sanction private water suppliers who raise prices to the point that poverty-stricken individuals can no longer afford to have water piped into their homes.²⁴ The privatization literature, then, may help to illuminate the reasons why the economic component of IWRM has found differing levels of success in both the developed and developing world.

Finally, the normative dimension of water provision, or the acceptance of the idea of water as an inalienable human right, may further explain the disconnect between IWRM rhetoric and reality across different states. Conceptually, a human right is an absolute normative value that stands in direct contrast to the idea of market-driven policies characterized by low levels of governmental intervention, and for this reason, many scholars and policymakers consider human rights to be public goods provided for by the state, not rights protected by private entities.²⁵ Certainly, if one considers human rights as a "service" protected or provided by the state, it does not seem unreasonable to expect that the UN might take the cause of water availability under its mantle as the normative diffusion of the human right to water reaches a critical mass by incorporating this policy goal within the IWRM framework.

Indeed, the UN certainly attempted to establish water as a human right throughout the latter portion of the 20th century and into the early years of the 21st century. Although the 1948 Universal Declaration of Human Rights failed to explicitly mention the human right to water, the UN remedied this omission in 1977 with the development of an action plan stating that "all peoples, whatever their stage of development and their social and economic conditions, have the right to have access to drinking water in quantities and of

²⁴ Falkner, "Private Environmental Governance and International Relations: Exploring the Links," 77.

²⁵ Taylor, "Is Environmental Health a Basic Human Right?," 1007.

a quality equal to their basic needs.”²⁶ The 1989 Convention of the Rights of the Child further strengthened the recognition of water as a human right, as this Convention declared that children must be guaranteed access to “nutritious foods and clean drinking water.” Finally, in 2002, the United Nations Committee on Economic, Social and Cultural Rights finally adopted a provision stating that governments have a legal responsibility to fulfill the human right to water.²⁷ Despite the UN’s attempts to codify this right into international law, however, the rhetoric of IWRM fails to include an emphasis on the human rights aspect of water provision, and indeed, the idea of valuing water as an economic good seems contradictory to such a notion.

Certain developing states, however, seem much more amenable to this normative dimension of water provision. South Africa, for instance, has even gone so far as to incorporate the human right to water within its constitution.²⁸ Perhaps, then, one can attribute part of the IWRM implementation gap between the developed and developing world to whether or not the human right to water has emerged, reached a tipping point, cascaded, and been internalized by a state government.²⁹ For those states that value such a normative approach, a water policy regime that disregards that approach may prove dysmorphic to overall state water policy goals.

THE CHALLENGE OF WATER PROVISION

In a world of mounting water challenges, one truth seems undeniable -- the international policy community should welcome diverse discourse on this topic, as it is difficult to overstate the magnitude of the globe’s impending freshwater issues. The form

²⁶ United Nations, *World Water Development Report 2*, 77.

²⁷ Ibid.

²⁸ Gleick, et al., *The World’s Water, 2004-2005*, 60.

²⁹ Finnemore and Sikkink, “International Norm Dynamics and Political Change,” 895.

and function of a solution to the world's water woes, however, present unique political and theoretical challenges for policymakers and scholars alike. The challenge of giving one billion additional people access to safe and affordable drinking water seems presently insurmountable, and there has never been a more necessary moment for the creation of an encompassing global water management solution.³⁰

The United Nations' proposed reliance on IWRM represents the beginning of a workable solution, but that solution is plagued by an uneven implementation record between the developed and developing worlds. As a first step at correcting the framework's inconsistency, then, a theoretical analysis of its performance under diverse conditions will help policymakers discover the answers they require to improve the efficacy of IWRM's application across the globe. Ultimately, although the four distinct bodies of literature on regime creation, common-pool resources, privatization, and human rights all help to disaggregate and assess pieces of the UN's policy puzzle, it is the scholarship on regimes and collective action that best explains variations in IWRM implementation. The theoretical perspective regarding regimes highlights the importance of a historical sequencing of environmental regime creation, the integration of both decentralized and centralized water governance mechanisms, and the extant character of a region's previous water management regimes as key factors underlying disparate instances of IWRM implementation success. These findings are significant, as they can help improve the IWRM policy framework's value in the future – an essential task if the international community is ever to meet the goal of alleviating ever-increasing and severe episodes of global water scarcity and pollution.

³⁰ Gleick, *The World's Water*, 48.

CHAPTER II

A LITERATURE REVIEW

*Water is life's matter and matrix, mother and medium.
There is no life without water.*

-Albert Szent-Gyorgyi,
1937 Nobel Prize Winner

As a “social institution” purportedly governing the actions of those involved in the provision of freshwater resources, IWRM represents an attempt to counteract and mitigate collective action problems in the international system by offering a blueprint for the homogenization of state-based water management.¹ The disconnect between the rhetoric of IWRM and its implementation remains puzzling, however, as more developed economies have found success with its principles, while developing economies struggle to accomplish the same goals. A review of the relevant literature on the subject may shed some light upon this contradiction; and a multidimensional analysis of the bodies of literatures on public goods and common pool resources, regime creation and maintenance, privatization, and the creation and diffusion of normative ideas remains necessary for a true assessment of IWRM’s potential effectiveness or appropriateness at solving the world’s water woes.

PUBLIC GOODS/COMMON POOL RESOURCES

Is water a common-pool resource or a public good? This question lies at the heart of the IWRM implementation gap between the developed and developing worlds.

Indeed, does the definitional contradiction between the North and the South regarding the

¹ Young, *International Cooperation*, 13.

specific nature of water help to explain why IWRM fails to perform as expected across every type of state? Interestingly, the literature tends to support IWRM's focus on water as a common-pool resource (CPR) rather than a public good. This distinction is certainly an important one, as the problems inherent in providing a CPR and a public good differ; thus it seems logical that the solutions may differ as well. For their part, public goods are non-rivalrous, meaning that consumption by one person does not diminish the amount available to others. Second, they are non-exclusive, so that if the good is available to one person, then it is automatically available to all.² Conversely, CPRs are goods that are non-excludable, but rivalrous or subtractable in nature, meaning that one person's consumption of water reduces the amount available to others, and it is this rivalrous nature that helps to distinguish water as a CPR rather than a public good.³

Although the subtractable nature of water seems difficult to dispute, the idea of water as a non-excludable resource appears more nebulous, as water is routinely piped into individual homes, and that water supply may be turned off at the whim of the supplier. The literature itself is somewhat ambiguous on this point. Many scholars suggest that CPRs are certainly excludable in theory, but in reality, total exclusion is an impossibility, as it is far too cost-prohibitive to partition off a CPR of a large size, such as a lake or a reservoir that provides freshwater resources.⁴ Moreover, theorists concede that when CPR exclusion occurs, it is through either partitioning or packaging the good (or piping it into homes), but to be effective, legally defensible property rights must back these partitioning efforts.⁵ On its most basic level, then, and as a matter of definition and

² Samuelson, "The Pure Theory of Public Expenditure," 387.

³ Ostrom, et al., *Rules, Games, and Common-Pool Resources*, 6.

⁴ *Ibid.*, 7.

⁵ *Ibid.*

practicality, CPRs are not excludable, and if open access is part of the natural state of CPRs, it seems logical that the difficulties faced by this resource type most often involve exclusion of the resource, or what the literature deems ‘appropriation’ issues.

A brief explanation of the relevant terminology and definitions involved in CPR issues may help to focus this discussion. Common-pool resource users, commonly termed ‘appropriators,’ are “individuals who withdraw or appropriate resource units from any kind of CPR.”⁶ In turn, appropriators withdraw those resources from a CPR ‘facility,’ and this facility allows for the existence of a cache of resource units.⁷ With the problem of water scarcity, for instance, a lake or some sort of groundwater reservoir serves as a facility from which appropriators withdraw water units.

Thus, two types of CPR dilemmas exist -- problems of appropriation and problems of provision. An appropriation problem consists of “excluding potential beneficiaries and allocating the subtractable flow,” while a provision problem relates to “creating a resource, maintaining or improving the production capabilities of the resource, or avoiding the destruction of the resource.”⁸ In simpler terms, appropriation problems involve the users of the resource and provision problems involve the CPR facility itself. Water scarcity constitutes a provision issue because factors such as global climate change and overpopulation lead to the depletion of stock at water resource facilities. At the same time, water scarcity also constitutes an appropriation issue, as the privatization of water supply may potentially exclude individuals who cannot pay for the water that is pumped into their homes and businesses. Consequently, IWRM, as an attempt to address global water scarcity issues, represents an effort to solve both a

⁶ Ostrom, et al., *Rules, Games, and Common-Pool Resources*, 8.

⁷ Ibid.

⁸ Ibid., 9.

provision and an appropriation issue, and this dual-nature may speak to the contradictory character of the proposed IWRM regime across states.

With water-based resources, issues of appropriation are directly related and proportional to issues of provision. If too many appropriators are using the resource in an unsustainable manner, and this overuse is coupled with low recharge rates of the facility (perhaps due to drought brought on by global climate change), the provision potential of the resource decreases exponentially. Indeed, the most critical issue in environmental management in general and water scarcity in particular, is that users of environmental resources do not see the direct or indirect costs that their usage imposes on others, and they certainly do not marry their usage with outside factors that decrease recharge rates. This seemingly selfish behavior occurs because the costs of one individual's use may seem so insignificant that he or she does not notice them, while "the cumulative costs of many users yield destructive consequences" to the resource as a whole.⁹ Thus, individuals jointly "providing and/or appropriating" from CPRs can face a situation in which their individual rationality leads to a suboptimal outcome for the group. Scholars often refer to this state as a "tragedy of the commons," or a situation in which each appropriator seeks to maximize his or her gain, but that individual maximization degrades the overall condition of the common-pool resource.¹⁰

The mitigation of such a CPR dilemma may call for an agency or institution with the power to coordinate or to allot individual use of the resource, and certainly much of the literature suggests that the "free-rider" issue makes government intervention a necessary option since "social arrangements that produce responsibility are arrangements

⁹ Bish, "Environmental Resource Management: Public or Private?," 65-66.

¹⁰ Hardin, "The Tragedy of the Commons," 1244.

that create coercion of some sort.”¹¹ A free-rider is an actor who chooses to receive the benefits of a public or a common good without paying the costs for such a good.¹² Thus free-riders comprise a “major source of the difficulties afflicting efforts to develop resource regimes in highly decentralized social systems like the international system.”¹³ Additionally, in large-scale situations involving common-pool resources, political institutions can help to overcome the high transaction costs of decision-making, by providing an iterated forum allowing for communicating the identification of any potential free-riders.¹⁴

Any regime created to address CPR issues, then, whether that regime is government-related or independent, must utilize a coordinated strategy between actors that addresses both appropriation and provision issues if it is to be effective.¹⁵ There are two types of coordinated strategies for this purpose, one of which consists of an “evolutionary process by which appropriators eventually reach and maintain a set of individual strategies that increase joint (and individual) payoffs relative to problematic outcomes.”¹⁶ This particular strategy seems to echo the idea of a “spontaneous regime,” where actors do not set out to explicitly create a regime, and instead one arises naturally through a sort of tacit learning process.¹⁷ The second type of coordinated strategy involves more formal regime creation, where appropriators bargain and agree upon

¹¹ Hardin, “The Tragedy of the Commons,” 1247.

¹² Olson, Jr., *The Logic of Collective Action*, 76.

¹³ Young, *Resource Regimes: Natural Resources and Social Institutions*, 48.

¹⁴ Baden, “A New Primer for the Management of Common-Pool Resources and Public Goods,” 55.

¹⁵ Ostrom, et al., *Rules, Games, and Common-Pool Resources*, 16.

¹⁶ *Ibid.*, 16-17.

¹⁷ Young, *International Cooperation*, 84-85.

“particular actions they will adopt if others adopt them,” while they also develop rules for monitoring and sanctioning one another.¹⁸

Ultimately, a combination of these regime arrangements may be necessary for solving CPR dilemmas, and the literature also indicates that additional conditions must be present for effective resolution of such issues. First, given the geographic diversity that exists among natural resource provision, a CPR regime should emphasize a variety of solutions to the initial problem, meaning a “one-size-fits-all” approach will not effectively stem CPR issues. The involvement of local appropriators in the decision-making process is a key component of success as well, since local appropriators understand the particular environmental conditions in their areas and may be more invested in addressing specific localized issues than would a regime composed of ‘objective’ bureaucrats.¹⁹

Moreover, issues of scope and heterogeneity may play roles in the effectiveness of CPR regimes, but not the roles traditionally suggested by the dominant international relations literature. Conventional wisdom indicates that the scope of a regime, or its number of participants (N), can make a difference in a regime’s effectiveness. This occurs because with a large N , each participant understands that he or she will have little impact on the outcome, so each regime member may not feel truly invested in the regime’s goals, thus hindering cooperation.²⁰ The CPR-specific literature, however, counters this assertion with its introduction of the ‘nested enterprises’ concept. A nested enterprise may compensate for difficulty imposed by the N issue, as these enterprises function as places where “individuals are organized through smaller groups that are then

¹⁸ Ostrom, et al., *Rules, Games, and Common-Pool Resources*, 17.

¹⁹ *Ibid.*, 242.

²⁰ Olson, Jr. *The Logic of Collective Action*, 53.

organized into larger groupings.”²¹ Such tiered organization allows large group cooperation to be built upon the foundation of successful small group cooperation, so that the number of regime members becomes secondary to other considerations within the regime.²²

Heterogeneity, as well, may not pose much of a hindrance to cooperation. Instead, the CPR literature asserts that heterogeneity can help regimes thrive if regime members have differing preference intensities on alternate issues. This situation of varying preferences “creates the potential for mutually advantageous issue linkage, thus increasing the probability of successful cooperation.”²³ Most importantly, however, any successful issue linkage requires that states be able to make credible commitments to each other, meaning that the facilitation of cooperation requires some sort of monitoring and enforcement of local, regional, or international rules regarding the provision of water.²⁴ By using ‘top-down’ enforcement in combination with regionally-based organizational groupings, regimes created to deal with CPR issues can overcome problems associated with the scope and heterogeneity of actors.²⁵ Interestingly, the principles around which the UN formed IWRM parallel this regional approach to solving water scarcity and certainly involve local stakeholders. In its current form, however, IWRM contains absolutely no monitoring or sanctioning schemes to hold states to the overall agreement, suggesting perhaps, that issues of heterogeneity may prove problematic in IWRM’s current incarnation.

²¹ Keohane and Ostrom, eds., *Local Commons and Global Interdependence*, 57.

²² *Ibid.*, 22.

²³ Martin, “Heterogeneity, Linkage, and Commons Problems,” in *Local Commons and Global Interdependence*, 88.

²⁴ *Ibid.*

²⁵ Keohane and Ostrom, eds., *Local Commons and Global Interdependence*, 22.

REGIMES AND COLLECTIVE ACTION

Thus, particular regime conditions and strategies may help appropriators to overcome certain kinds of CPR dilemmas. Regimes use the convergence of actor expectations to “exert pressure on their members to act in conformity with some clear-cut social or collective goal,” while they also link actors together through rules or conventions that “may or may not be formally articulated.”²⁶ Some theorists even argue that regimes exist wherever one finds consistent behavior within any cohesive issue-area in international relations.²⁷ Most broadly, one may define regimes as “sets of implicit or explicit principles, norms, rules, and decision-making procedures around which actors’ expectations converge in a given area of international relations.”²⁸

Thus, the facilitation of uniform international expectations stands as just one benefit of an international regime. Additionally, regimes can make it easier for states to improve their reputations within the international system because they help to “reinforce and institutionalize” reciprocity, rather than serving as its substitute.²⁹ Regimes may also promote future cooperation by sanctioning states that violate the stated goals of the regime, and in this way, regime constructions “delegitimize defection...and make it more costly.”³⁰ Finally, regimes reduce transaction costs within the interstate system, while they may also help to develop and perpetuate new norms.³¹

The cooperative benefits of regimes do not automatically negate the importance of power in regime formation and operation. For instance, power may play a role in

²⁶ Young, *International Cooperation*, 24 and 13.

²⁷ Stein, “Coordination and Collaboration,” 300-301.

²⁸ Krasner, “Structural Causes and Regime Consequences: Regimes and Intervening Variables,” 186.

²⁹ Axelrod and Keohane, “Achieving Cooperation Under Anarchy: Strategies and Institutions,” 250.

³⁰ Keohane, “The Demand for International Regimes,” 338.

³¹ Ruggie, “International Regimes, Transactions, and Change,” 384.

determining which states choose to comply with regime objectives and which states knowingly violate those objectives, with more powerful states choosing when and if they will comply with the regime consensus.³² Certainly, power factors can also play a role in enforcing compliance to a regime's objectives, as "enforcement can only be supplied if there is authority backed by coercive resources."³³ Within this view, a hegemonic power is a necessary component for the development of strong regimes and the prevention of regime collapse.³⁴ Alternately, some scholars feel that this perspective fails to explain the delay in international regime change once a hegemon falls out of power, while it also does not account for the endurance of regime-inspired institutions created under a fallen hegemon.³⁵ One may explain this dichotomy by envisioning international regimes as representing "a fusion of power and legitimate social purpose," and due to this synthesis, a decline in hegemony will not necessarily destroy a regime, "provided that shared purposes are held constant."³⁶

Thus, regimes are developed in part because actors in world politics believe that such measures will allow them to construct mutually beneficial agreements that would otherwise be very difficult to create, but not all regimes emerge under identical formative circumstances.³⁷ Some regimes are spontaneous creations, and such regimes do not require "conscious coordination" among actors or clear consent of regime participants.³⁸ Conversely, a regime may be explicitly negotiated among its members, and formal accounting of results and conscious agreement on the part of actors characterize this

³² Mitchell, "Regime Design Matters," 428.

³³ Keohane, "The Demand for International Regimes," 344.

³⁴ *Ibid.*, 326.

³⁵ *Ibid.*

³⁶ Ruggie, "International Regimes, Transactions, and Change," 404.

³⁷ Keohane, "The Demand for International Regimes," 334.

³⁸ Young, *International Cooperation*, 84-85.

category of regime.³⁹ Imposed regimes constitute a third regime type. The notion of imposed regimes harkens back to the idea of hegemonic dominance, as powerful international actors establish the ‘rules of the game’ and force others to conform to these arrangements through a combination of “coercion, cooptation, and the manipulation of incentives.”⁴⁰ The IWRM regime, for its part, does not seem to fall in the spontaneous category of regimes, but instead, appears to be a negotiated regime with elements of imposition, depending upon which state’s perspective is at issue.

Moreover, for the purpose of this study, one must note that although Young’s work speaks directly to the creation of international regimes, this analysis applied his ideas to intra-national water management as well, playing upon his acknowledgement of the “disconcerting elasticity” of regime definition.⁴¹ This seemed an appropriate application as both national and international water regimes have a similar structure and face similar collaborative problems. Indeed, international water regimes include the very same stakeholders that comprise an intrastate water regime because national stakeholders play a vital role in complying with the water restrictions set forth by any international regime mandate. Moreover, their structural similarity means that both interstate and intrastate water regimes contain a large number of stakeholders who all hold differing positions of power within their respective contexts and have their own vested interests to protect -- interests that may or may not be replicated by a neighboring country, province, or municipality.

No matter whether they are of an intra- or interstate variety, spontaneous, negotiated, and imposed regimes all help states to solve dilemmas of both common

³⁹ Young, *International Cooperation*, 87.

⁴⁰ *Ibid.*, 88.

⁴¹ *Ibid.*, 195.

interests and common aversion. For its part, a dilemma of common interests occurs “when independent decision-making leads to equilibrium outcomes that are Pareto-deficient.”⁴² As the famous Prisoner’s Dilemma game illustrates, this simply means that all actors involved prefer a solution that is suboptimal. To rectify a dilemma of common interests, then, states agree to coerce one another in order to guarantee that none of their contemporaries will “defec[t] from the pact and refus[e] to cooperate.”⁴³ In this way, states involved in a regime can avoid reaching a suboptimal solution in a given issue-area, while ensuring a particular and preferred outcome. Alternatively, regimes also provide solutions to dilemmas of common aversions. In this type of dilemma, the problem is not with finding an optimal outcome for the group. Instead, all actors involved wish to avoid one specific outcome.⁴⁴ Both of these regime types, then, differ in their requirements, as dilemmas of common interests require collaboration among actors, while dilemmas of common aversion require actor coordination.⁴⁵

Although the formation of regimes in any given issue-area of international relations may present a challenge to all involved, international environmental regimes offer unique challenges to state actors, as the transboundary nature of environmental degradation often means that effective management by individual states is not feasible or practical.⁴⁶ More specifically, many environmental issues constitute dilemmas of common interest, rather than dilemmas of common aversion, and the UN’s IWRM regime arguably falls in this category. At first glance, it may seem that all actors want simply to avoid the depletion of freshwater resources, which would be a dilemma of

⁴² Stein, “Coordination and Collaboration,” 304.

⁴³ Ibid.

⁴⁴ Ibid., 309.

⁴⁵ Ibid., 312.

⁴⁶ Young, *International Cooperation*, 109.

common aversion, but in actuality, each actor desires being the sole user of a water resource. If the actor cannot achieve this outcome, it “next prefers joint restraint in the mutual use of the good, then prefers joint unrestrained use even if it leads to depletion, and least prefers a situation in which its own restraint is met by the other actors’ lack of restraint.”⁴⁷ The problem, then, is to devise rules or codes of conduct that restrict the behavior of states in such a way as to avoid overuse or exhaustion of freshwater resources.⁴⁸ Theoretically, IWRM, as a regime created to mitigate such a dilemma of common interests, should require all states involved to move from a suboptimal outcome to one in which they collaboratively manage the natural resource.⁴⁹ Furthermore, IWRM “must specify what constitutes cooperation and what constitutes cheating, and each actor must be assured of its own ability to spot others’ cheating immediately.”⁵⁰ At this point in time, however, the rules bounding the IWRM regime contain no provisions for defining offenses, much less for sanctioning offenders, suggesting that IWRM may not be effective at achieving its stated goals.

Distributive issues may also come into play within regimes created to manage environmental degradation. In these cases, power and interests within regimes can and do matter, as the more powerful states may make initial decisions about the allocation of global environmental resources, and such allocation “will have distributional consequences,” even “if states are interested in absolute rather than relative gains.”⁵¹ The developing world, especially, has reason to fear unfair allocation of natural resources by the more dominant powers within a regime, as those more powerful states may not take

⁴⁷ Stein, “Coordination and Collaboration,” 313.

⁴⁸ Keohane and Ostrom, eds., *Local Commons and Global Interdependence*, 35.

⁴⁹ Stein, “Coordination and Collaboration,” 313.

⁵⁰ *Ibid.*, 312.

⁵¹ Krasner, “Global Communications and National Power,” 365.

into account any future development needs of their less powerful contemporaries.⁵²

Again, this concept may directly impact the efficacy of the IWRM regime in the developing world, certain states of which have had dismal experiences with private water allocation.⁵³

Considering that environmental regimes must promote allocative efficiency, ecological integrity, and force all actors to collaboratively manage a natural resource, spontaneous regimes seem much more successful than both negotiated and imposed regimes at accomplishing these tasks because they do not “give rise to oppressive procedural requirements or armies of officials charged with implementing and enforcing the terms of formalized regimes.”⁵⁴ Negotiated regimes, in contrast, result in high transaction costs, while imposed regimes cannot guarantee distributional equity.⁵⁵ The literature suggests, then, that a spontaneous regime may be the best option for solving a global environmental ill, although there are other strategies that environmental regimes may employ to improve their productiveness. One of these strategies requires a focus on regionalization rather than internationalization. With a regional arrangement, members of each regime could include all states with a serious interest in the relevant issue “without running into the problems of collective action in large groups.”⁵⁶ Regional environmental regimes may also prove more capable of allocative equity, as a regional arrangement may not be large enough to allow one member to dominate decisions

⁵² Krasner, “Global Communications and National Power,” 343.

⁵³ For example, the cities of Cochabamba, Bolivia and Manila, The Philippines both awarded water allocation contracts to private companies, and both contracts had to be cancelled several years later due to poor performance and the denial of water to impoverished people who could not pay their bills.

⁵⁴ Young, *International Cooperation*, 93.

⁵⁵ *Ibid.*

⁵⁶ *Ibid.*, 122.

regarding the distribution of resources.⁵⁷ Indeed, the United Nations' IWRM regime emphasizes placing the impetus for water control in the hands of local and regional stakeholders, a strategy that the literature indicates may lead to success.

Moreover, international environmental regimes will find more success if they avoid "explicit attempts to define noncompliance" in the early stages of regime formation.⁵⁸ Such an approach may "facilitate the confidence building necessary for the creation of a regime, as well as encourage broader participation by states."⁵⁹ This does not mean that the regime will never define noncompliance, just that the process should occur organically over time through the process of regime building.⁶⁰

Epistemic communities must also play a role in environmental regime formation, as they may "introduce new policy alternatives to their governments," while also educating actors on the complexity of environmental issues.⁶¹ Such education may lead those governments to "accep[t] the need for more comprehensive and coordinated policies to accomplish state and regional goals."⁶² In turn, when states recognize the complexity and interdependence of environmental issues on many other facets of development and economic policy, this new awareness may encourage states to pursue compliance-oriented environmental regimes, since enforcing compliance in environmental areas may carry over and benefit other issue-areas as well.⁶³ Such issue density can certainly lead to "greater demand for international regimes and to more

⁵⁷ Young, *International Cooperation*, 123.

⁵⁸ Brunnee and Toope, "Environmental Security and Freshwater Resources," 57.

⁵⁹ *Ibid.*

⁶⁰ *Ibid.*

⁶¹ Haas, "Do Regimes Matter? Epistemic Communities and Mediterranean Pollution Control," 402.

⁶² *Ibid.*

⁶³ Hisschemöller and Gupta, "Problem-Solving Through International Environmental Agreements," 168.

extensive regimes.”⁶⁴ Above all, environmental regimes are “apt to be hybrids that do not conform precisely to the essential features of any analytic type.”⁶⁵ Dynamism and the constant evolution of social, political, and economic realities characterize these collective attempts to mitigate transboundary environmental issues.

PRIVATIZATION

Regime type is just one aspect of the problem, however, as the UN’s advocacy of water supply commodification as a potential solution to the provision issues associated with water scarcity could spawn a new type of appropriation problem, in which private suppliers may now exclude individuals who cannot pay for their water supply.⁶⁶ In theory, states privatize certain governmental functions in order to more efficiently provide an economic commodity to their citizenry. The history of water privatization, however, suggests that such a process is rarely apolitical, as the economic benefits of privatization are often overshadowed by rent-seeking behavior on the part of state governments or private resource providers. Perhaps even more importantly, the literature implies that a state-led regulatory framework is necessary to counteract rent-seeking behavior regarding private provision of natural resources. Such a regulatory ideal, though, leads to a ‘paradox of privatization,’ meaning that a policy which is intended to reduce government involvement must be regulated by the government.⁶⁷ This contradiction echoes the more fundamental inconsistency at the center of this study – that privatization of water provision may ultimately deprive poorer individuals of their human right to water. Obviously, such deprivation does not reflect the intent of the United

⁶⁴ Keohane, “The Demand for International Regimes,” 341.

⁶⁵ Young, *Resource Management at the International Level*, 217-218.

⁶⁶ Dolsak and Ostrom, eds. *The Commons in the New Millennium*, 8-9.

⁶⁷ Robinson, “Privatization: Analyzing the Benefits,” 50.

Nations' proposed water regime, although the gulf between intent and reality in this case may prove impossible to bridge.

Certainly, IWRM's emphasis on the valuing water as an economic commodity, often operationalized as the privatization of water supply, represents a break from traditional thinking, as states, rather than the private sector, have most often provided water services throughout modern history. State provision of such services makes theoretic sense, since water provision can succumb to Pareto sub-optimality.⁶⁸ In order to counter such a situation, conventional wisdom holds that state governments, rather than competitive market instruments, are more suited to providing services that private entities either do not have the incentive or means to efficiently supply and allocate.⁶⁹

If states are better providers of certain natural resources, why might the United Nations ignore institutional tradition and instead support a principle that often leads to the privatization of water provision? The literature suggests that the answer to that question lies in improving both profits and efficiency. Indeed, the efficiency potential of privatization is not a novel idea. As long as two centuries ago, Adam Smith argued the merits of privatization with his support of the sale of British public lands, when he declared that the sale of such lands would "deliver from mortgage a much greater revenue than any which those lands have ever afforded to the crown."⁷⁰ In other words, the virtues of privatization rest on the assumption that private owners want to generate for themselves as much wealth as possible. As such, these private owners face incentives to monitor their businesses and employees closely, so that they may reduce waste in asset production. Of course, more waste leads to fewer dollars in the pockets of the business

⁶⁸ Abu Shair. *Privatization and Development*, 36-37.

⁶⁹ Ibid.

⁷⁰ Smith, *The Wealth of Nations*, Book IV -V, 496.

owner; thus, the private owner will pursue efficiency as a way of maximizing his/her wealth. In contrast, states lack these incentives, as state-owned enterprises (SOEs) are owned by “taxpayer-owners,” instead of private individuals. These “taxpayer-owners” cannot buy or sell the asset in question, and they do not reap direct profits from that asset. Consequently, “taxpayer-owners” lack strong incentives for efficient business performance.⁷¹

In addition to increasing the efficiency of asset production, governments pursue privatization in order to attain various other objectives, including the introduction of competition, exposing SOEs to market regulation, encouraging foreign investment, and raising revenue for the state.⁷² Moreover, privatization not only involves conveying ownership of a particular enterprise from the state to the private sector, but also transferring the responsibility for the allocation and pricing of assets and any access to the residual profit flows generated by those assets.⁷³ In its extreme form, privatization represents a deliberate effort to “shrink the governmental apparatus and ‘roll back’ the boundaries of state responsibility.”⁷⁴

Privatizing industries is also not a homogenous process, and in keeping with this notion, current scholarship separates privatization into two different typologies – administrative and economic. For its part, administrative privatization “presents privatization as a series of options available to public officials seeking to make government work better.”⁷⁵ Privatization, from this point of view, symbolizes a “toolbox” of techniques from which officials may draw those methods most appropriate

⁷¹ Hanke, “Privatization: Theory, Evidence, and Implementation,” 102.

⁷² Adam, Cavendish, and Mistry, *Adjusting Privatization: Case Studies from Developing Countries*, 6.

⁷³ Megginson, “Privatization,” 14.

⁷⁴ Feigenbaum and Henig, “The Political Underpinnings of Privatization,” 185-186.

⁷⁵ *Ibid*, 187.

to meet the task of efficiency.⁷⁶ Such administrators realize that governments may not always provide the most efficient type of social good for citizens; thus for these individuals, privatization represents an option for improving government service – in essence, these administrators are embracing a proactive response to inefficiency.

Privatization's economic perspective, on the other hand, stands in stark contrast to the administrative outlook, as it presents privatization as "the inevitable consequence of neoclassical truths that dictate the retraction of a bulky, intrusive, and parasitic welfare state."⁷⁷ Within this perspective, privatization is the only remedy for the self-interested behavior of government officials and lobbyists, as both are groups of individuals "who gain more in their role as beneficiaries than they lose in their role as taxpayers."⁷⁸ The economic approach characterizes state governments as composed of selfish individuals who pursue personal gains, rather than considering the common good of the people at large, and this self-interested behavior creates inefficiency in the production and allocation of assets. Economically speaking, then, the act of privatization represents a reactionary response to an inefficient government bureaucracy.⁷⁹

Some scholars, however, believe it ill-advised to divide privatization into an administrative and economic perspective, and instead suggest that acts of privatization are better addressed as individual strategies, the use of which may help to achieve some sort of social objective that can "realign institutions and decision-making processes so as to privilege the goals of some groups over the competing aspirations of other groups."⁸⁰

⁷⁶ Feigenbaum and Henig, "The Political Underpinnings of Privatization," 187.

⁷⁷ Becker, "Surprises in a World According to Adam Smith," 18.

⁷⁸ Feigenbaum and Henig, "The Political Underpinnings of Privatization," 188.

⁷⁹ *Ibid.*

⁸⁰ *Ibid.*, 191.

Such strategies may be broken down into three categories -- pragmatic, tactical, and systemic privatizations.

Similar to the aforementioned administrative perspective, pragmatic privatizations involve bureaucratic officials attempting to access a tool that can enable government to function more efficiently. A key distinction, however, exists between the two, as theory suggests that *all* actors within the administrative perspective champion privatization regardless of their political connections, while the pragmatic strategy holds that **only** insulated bureaucrats can employ such a strategy. In other words, political ideology plays almost no role in pragmatic privatization, and pragmatic bureaucrats give very little thought to ideological uniformity or the potential political consequences of violating such uniformity.⁸¹ By contrast, tactical privatizations are meant to achieve specific political goals for particular parties, politicians, or interest groups. Actors employing this strategy see privatization as a means of “alter[ing] the balance of power by attracting allies and rewarding supporters.”⁸² The third type of privatization strategy – systemic privatization-- is more politically macro-level in nature, since actors utilizing systemic strategies intend for privatization to fundamentally reshape societal expectations of government in three ways – (1) by altering ideas regarding for what governments can and should be held responsible, (2) by reducing the government’s involvement in asset allocation and infrastructure creation, and (3) by transforming “the interest group landscape to make it less supportive of governmental growth.”⁸³

Ultimately, regardless of typology or strategy, not all industries are ripe for total privatization, especially industries involving natural monopolies, such as water,

⁸¹ Feigenbaum and Henig, “The Political Underpinnings of Privatization,” 191-192.

⁸² *Ibid.*, 192.

⁸³ *Ibid.*, 193.

electricity, and gas. A naturally monopolistic industry occurs when supply by one firm involves lower costs than supply by more than one firm.⁸⁴ State ownership of this type of industry rests on the idea that natural resource allocation involves national distribution grids, and these grids require coordination between the various producers of the resource. Coordination, in turn, “create[s] a monopoly which justify[s] public ownership,” as one cannot easily introduce competition into an industry that involves an interlinked distribution grid.⁸⁵ Additionally, natural resource distribution often involves price controls in order to assure the availability of the asset to as many people as possible, and states have traditionally been the provider in these instances, as a privatized company will be less willing to provide “uneconomic services,” meaning services that are not always priced to market levels.⁸⁶ Accordingly, a privatized company providing a natural resource may be tempted to raise prices and/or reduce services, which may disadvantage or exclude certain sets of consumers not able to pay for a more expensive product.⁸⁷

The purveyors of privatization argue, however, that even if an industry is naturally monopolistic, portions of that industry can and should be privatized. Consider the case of water provision, for instance. The water industry represents a classic instance of a natural monopoly, as the water supply process involves the abstraction of water from underground and surface sources, the treating of this water at a central treatment plant to remove pollutants, and the distribution of the water via a network of pipes to the consumer.⁸⁸ Interestingly, although duplicating the water distribution network (pipes, mains, and sewers) is generally inefficient, there can still be market rivalry for the

⁸⁴ Cowan, “Privatization and Regulation of the Water Industry in England and Wales,” 113-114.

⁸⁵ Bishop, Kay, and Mayer, eds., *Privatization and Economic Performance*, 9.

⁸⁶ Beesely and Littlechild, “Privatization: Principles, Problems, and Priorities,” 18.

⁸⁷ Ibid.

⁸⁸ Cowan, “Privatization and Regulation of the Water Industry in England and Wales,” 112.

provision of the product itself.⁸⁹ As one scholar puts it, “competition in the provision of bus and coach services is possible even where competition in the provision of terminals is not.”⁹⁰

Unfortunately, this type of privatization in general, and water privatization specifically, holds a questionable record of success especially in the developing world, and such privatization efforts have often fallen victim to companies unwilling to ensure that certain prices or services are maintained in the face of market competition. Monterrey, Mexico is only one example of such a failure. In the early 20th century, the Monterrey city government privatized its water system and appointed Mackenzie, Mann, and Company, of Toronto, Canada as Monterrey’s water managers. Unfortunately, Mackenzie Company never altered the water supply per capita, and even as Monterrey’s per capita needs grew throughout the years with a burgeoning population, Mackenzie did not remain faithful to the contract calling for increased water service in proportion to the city’s growth. By 1940, only half of Monterrey’s population received water from the municipal system, and Monterrey found itself in a water crisis. The Mexican government was eventually forced to buy back the water contract from Mackenzie and deemed privatization a complete failure.⁹¹

The story of Cochabamba, Bolivia stands as a more modern, albeit still unsuccessful, attempt at water privatization. In 1999, the government of Bolivia chose to privatize Cochabamba’s water service and awarded a forty-year concession to a subsidiary of U.S. multinational corporation Bechtel. The privatization problems became apparent quickly, though, with the elimination of subsidies and the subsequent 300%

⁸⁹ Cowan, “Privatization and Regulation of the Water Industry in England and Wales,” 114.

⁹⁰ Bishop, et al., *Privatization and Economic Performance*, 9.

⁹¹ Bennett, *The Politics of Water*, 182.

increase in the price of water. One can imagine that in Bolivia, where 70% of the population lives below the poverty line, “increases in the price of water...have a serious impact.”⁹² In response to the perceived injustice, many of Cochabamba’s citizens formed an opposition group called “The Coalition in Defense of Water and Life.” This group shut down the city of Cochabamba for four days with strikes and mass mobilization techniques. The peaceful protests soon turned violent, several protestors were killed, and the Bolivian government declared martial law. Soon after the protests, Bechtel pulled out of Bolivia and the government repealed its water privatization legislation.⁹³

As these cases illustrate, developing states may face additional hurdles in the privatization of natural resources, and there are several reasons for this circumstance. For instance, the allocative role of the state is still valid in many developing economies. Such economies often classify objectives such as the creation of high-tech industries, the control of natural resources, employment generation, and balanced development as high priorities, making the argument for private industrial ownership within certain borders somewhat irrelevant.⁹⁴ That is not to say that privatization cannot benefit these countries, but there are qualifications before such states can realize the benefit of private industry. Indeed, the literature suggests that privatizing water and the provision of other natural resources might enhance the participation of the poor and the underprivileged if the act of privatization is implemented within a framework that enhances individual participation in decision-making and ownership for people normally excluded from the marketplace.⁹⁵ If local individuals retain decision-making input to the degree that they are affected by the

⁹² Levy and Newell, eds., *The Business of Global Environmental Governance*, 287.

⁹³ *Ibid.*, 286-289.

⁹⁴ Abu Shair, *Privatization and Development*, 62.

⁹⁵ *Ibid.*, 123-124.

outcome of the privatization decision, such grassroots organization might enhance accountability.⁹⁶

If, however, the privatization of water relies on the notion of property rights (as is more traditional), rather than participation, the “dominance of the private property concept will reduce, if not diminish, any interest in community projects and result in low participation in decision-making, on which the choice concept stands.”⁹⁷ Thus, privatization, if not handled correctly, can promote a “culture of silence.”⁹⁸ Although the literature fails to provide a basic plan and framework for local ownership of natural resource provision, it certainly seems to suggest that private property rights do not mesh well with the idea of local accountability and interest in safeguarding natural resources. This is an interesting finding given the fact that the concept of personal property rights is central to the notion of common-pool resources, a classification to which water belongs.

Perhaps even more importantly, the developing world requires a strong regulatory framework to accompany the privatization of natural resource provision.⁹⁹ Collaboration among private companies, government, civil society, and other stakeholders is fundamentally important in monitoring a company’s fulfillment of its contractual obligations and its responsibility to provide the resource to all who require it.¹⁰⁰ This simply means that after the government sells a firm, it cannot just “wash its hands and walk away.”¹⁰¹ Instead, the state must move from being the provider of resources to the overseer of private provision, and governments should establish public control over such

⁹⁶ Abu Shair, *Privatization and Development*, 62.

⁹⁷ *Ibid.*

⁹⁸ *Ibid.*

⁹⁹ Lovei and Gentry, *The Environmental Implications of Privatization*, 7.

¹⁰⁰ *Ibid.*, 5.

¹⁰¹ *Ibid.*, 45.

resources because the “social goods” aspect of natural resource provision cannot be protected if ownership of these resources is entirely private.¹⁰² Moreover, in the developing world, many states still feature governments with “weak democratic and legal foundations, cronyism and out-right corruption.”¹⁰³ Natural resource provision in states with weaker governments, then, may prove exceedingly difficult to regulate.¹⁰⁴ If, as the literature suggests, “neither public nor private sector managers always work to the best interest of the consumer,” then both groups need incentives or regulations to ensure the most efficient service, while also providing for individual social welfare.¹⁰⁵ Unfortunately, in its current state, IWRM fails to provide a viable regulatory blueprint for achieving these dual ambitions.

HUMAN RIGHTS AND NORM DIFFUSION

The privatization picture becomes further muddled when one reflects on a fundamental goal of the UN – the idea of water as a fundamental human right. The notion of unfettered water access for all is, at its core, a normative judgment, and in order to accept this principle’s legitimacy, one must consider how such norms are internationally diffused and accepted. If water access is truly a human right, on par with the other rights elucidated within the 1948 United Nations Covenant on Civil and Political Rights, then this emergent norm should have found widespread adoption among state governments around the world, as states are ultimately the actors tasked with providing water resources to their citizenry. While an observer might question the

¹⁰² Gleick, et al., *The World’s Water, 2004-2005*, 60.

¹⁰³ Parker, “Privatization and Regulation of Public Utilities: Problems and Challenges for Developing Economies,” 550.

¹⁰⁴ Ibid.

¹⁰⁵ Bennett, *The Politics of Water*, 181.

appropriateness of water access as a human rights norm rather than an environmental one, the majority of the literature emphasizes this issue in tandem with a human rights framework.

Although the same argument cannot be made for all areas of environmental protection, in the case of water, the literature implies that human rights regimes are synergistic with environmental law, since laws intended to engender environmental protection seek to “protect and preserve the basic living and nonliving resources and ecological processes on which all life depends.”¹⁰⁶ Theoretically, then, water management policy enhances and protects human rights, since the implementation of such regulations protects the natural world from deterioration to the point where internationally guaranteed human rights become seriously endangered. Thus, water policy is ultimately a means to ensuring human rights, but not an end in itself.¹⁰⁷

How, then, does the human right to water, and indeed any normative goal, become socialized into the fabric of international society and then enforced and upheld within international regimes? The United Nations, as the world’s most influential intergovernmental organization is a major part of this process, and arguably much of the UN’s value in the modern world is as an arbiter of international norms, whether the origin of those norms is based within the areas of security, environmental protection, or human rights. Moreover, the human rights goals espoused by the UN not only serve as “guidance devices,” but also engender cooperation, as the UN provides a forum for

¹⁰⁶ Shelton, “The Environmental Jurisprudence of International Human Rights Tribunals,” 22.

¹⁰⁷ Ibid.

people to “pursue goals, share meanings, communicate with each other, criticize assertions, and justify actions” on particular normative issues.¹⁰⁸

The UN’s IWRM regime should serve such a purpose, as it, like other UN regimes “seeks to uphold state obligations and state responsibility toward individuals and groups within its own domestic jurisdiction,” while also defining an extensive and consistent set of norms regarding freshwater access.¹⁰⁹ Fundamentally, then, the proposed IWRM regime acts as a constitutive norm, by attempting to “create new actors, interests, or categories of actions,” and establishing a governing regime that is organized around a previously unrecognized combination of principles.¹¹⁰ Indeed, the proposed IWRM regime blends a set of variant principles to create an innovative method of global water management and then advocates that method within an international setting. Further, this emergent constitutive norm contains prescriptive norms within its body of logic, or norms that recommend behavior or have a sense of “oughtness” about them. For instance, the idea that a state should strive to provide clean water for all its citizens at low or no cost amounts to a prescriptive norm, and many of the principles espoused by IWRM, are prescriptive norms, as they suggest (rather than enforce or incentivize) that states subscribe to certain normative goals in their water management policies.¹¹¹ As the overall point of this study is to analyze the implementation contradictions within the IWRM regime, an examination of the theoretical literature explaining the diffusion of norms, the very form and function of IWRM, becomes essential.

¹⁰⁸ Schmitz, *Transnational Mobilization and Domestic Regime Change*, 16.

¹⁰⁹ Moravcsik, “The Origins of Human Rights Regimes: Democratic Delegation in Postwar Europe,” 217.

¹¹⁰ Finnemore and Sikkink, “International Norm Dynamics and Political Change,” 891-892.

¹¹¹ *Ibid.*

On that point, the literature clearly suggests that an understanding of the materialization and adoption of emergent norms requires an examination of the role of civil society in advancing such ‘novel’ ideas. Today, international civil society (mainly comprised of NGOs, faith-based institutions, community organizations, unions, etc...) plays a fundamental part in the diffusion of norms and values across various cultural contexts, but this was not always the case. Prior to the eighteenth century, the term ‘civil society’ was synonymous with a code of laws and regulations through which citizens framed their interactions with each other. In turn, a broader set of societal norms and values supported and justified this legal code. Historically, then, civil society was a complex mixture of complementary social and legal norms.¹¹²

Modernity, however, understands “civil society” to mean something quite different from its previous incarnation, and today, theorists consider civil society to be a distinct entity from legal codes enforced by the state. At present, theorists recognize civil society as the tier of activity existing above the individual level, but below the level of the state. In essence, “complex networks based on interest, ideology, family, and cultural affinity” comprise civil society, and individuals use these relational networks to pursue various normative aims.¹¹³ Additionally, civil society also retains a political dimension in the modern age, as many of the organizations that exist between the individual and the state “directly shape widespread behavior in matters of public concern and involvement.”¹¹⁴ Modern civil society can also both instigate and be the target of political action due to its function as an intermediary between states and their citizens.¹¹⁵

¹¹² Wapner, “Governance in Global Civil Society,” 68.

¹¹³ *Ibid.*, 65.

¹¹⁴ *Ibid.*, 66.

¹¹⁵ Brysk, *Human Rights and Private Wrongs*, 16.

Perhaps most importantly, civil society has become an increasingly transnational force in international politics, as its relevant norms and institutions “regulate a vast array of functions previously within the domain of nation-states.”¹¹⁶

While there are scholars that believe the agents of civil society, most specifically NGOs, “create the worldwide constructs and principles that shape the form and function of actors and purposes,” that is an alternative interpretation, as the vast majority of international relations literature views NGOs as promoters of emergent norms, not necessarily the agents that create the normative structure within which all actors operate.¹¹⁷ Instead, the mainstream literature emphasizes “relatively small, interacting, self-conscious critical communities,” as the creators of new normative ideas.¹¹⁸ These epistemic communities create new social values, which are then diffused among a wider public audience by civil society advocates.¹¹⁹ Generally speaking, the literature defines these emergent norms (or new social values) as standards of appropriate behavior for actors with a given identity.¹²⁰ These new norms must identify an existent problem, name the cause of the problem, and politicize the problem by arguing that a particular corrective action will right the situation.¹²¹

One of these emergent norms only becomes commonly accepted among a given population when it fulfills its life cycle, or reaches a critical mass that leads to the widespread adoption of the norm in question.¹²² Prevailing scholarship explains such norm influence as a three-stage process. The first stage is “norm emergence,” or

¹¹⁶ Klotz, “Transnational Activism and Global Transformations,” 49.

¹¹⁷ Boli and Thomas, eds., *Constructing World Culture*, 1-48.

¹¹⁸ Rochon, *Culture Moves: Ideas, Activism, and Changing Values*, 57.

¹¹⁹ Haas, *When Knowledge is Power*, 40.

¹²⁰ Finnemore and Sikkink, “International Norm Dynamics and Political Change,” 891.

¹²¹ Brysk, *Human Rights and Private Wrongs*, 22.

¹²² *Ibid.*, 892.

persuasion by norm entrepreneurs (generally members of civil society). These norm entrepreneurs decide on the validity of a new norm, and then attempt to convince others of the norm's worth. Norm entrepreneurs are most likely to succeed in this task when their "ethical agendas mesh or 'nest' well with other normative agendas."¹²³ In other words, norm entrepreneurs must appropriately frame the norms they advocate, meaning they must link their normative goals to the structure of an already accepted value foundation.¹²⁴ In terms of water policy, one might argue that portraying access to water as a human rights issue rather than an environmental issue represents an attempt to link this emergent norm to the more widely accepted value frameworks espoused and supported by international human rights regimes. This framing is fundamentally important because any presentation of a new value will always be examined in light of those values already held by the targeted population.¹²⁵

Once the new norm has reached acceptance in a "critical mass of relevant actors," it has reached its "tipping point."¹²⁶ In terms of human rights regimes, and indeed most types of international regimes, states are the relevant actors that must accept and abide by the rules of the regime, as they are the actors tasked with safeguarding the human rights of their citizens. Although states, due to their varying capabilities, influence levels, and populations, have different weights in terms of 'tipping,' successful tipping generally requires at least one-third of the total states in the system to have adopted the norm.¹²⁷ Once the tipping point has been reached, the norm will "cascade" through the rest of the population, meaning it should be accepted by even larger numbers as a valid new method

¹²³ Klotz, "Transnational Activism and Global Transformations," 69.

¹²⁴ Acharya, "How Ideas Spread: Whose Norms Matter?," 243.

¹²⁵ Rochon, *Culture Moves*, 54.

¹²⁶ Finnemore and Sikkink, "International Norm Dynamics and Political Change," 895.

¹²⁷ *Ibid.*

of behavior. Interestingly, many states within the developed world have fought the acceptance of the human right to water, sometimes even equating it to a hindrance to free trade.¹²⁸ Within much of the developed world, then, it is certainly questionable whether IWRM as a constitutive norm, or indeed, the human right to water as a prescriptive norm, have reached their tipping points.

With the developing world, however, the human right to water has taken more of a foothold, and a number of states have even codified this norm within their bodies of law.¹²⁹ For these states, then, IWRM seems to have survived the stages of emergence and cascade and entered the third and final stage, that of internalization. Internalization occurs when “norms acquire a taken-for-granted quality and are no longer a matter of broad public debate.”¹³⁰ In other words, a norm becomes internalized when enforcement is no longer necessary to ensure compliance.¹³¹ While inter-governmental organizations, such as the United Nations, play an enormous role in the internationalization of emergent human rights norms in terms of monitoring and enforcement, state governments play an even larger role in internalization, as they are primarily responsible for operationalizing the norm within their borders.

State governments internalize norms through what the literature refers to as “a boomerang pattern nested within a spiral model.”¹³² This boomerang pattern occurs when domestic groups opposing an action of their government bypass a direct protest of that government, and instead ask international allies, in the form of civil society and intergovernmental organizations, to pressure the offending state government. These

¹²⁸ Diebel, “Canada Foils UN Water Plan,” April 2, 2008.

¹²⁹ Gleick, et al., *The World's Water, 2004-2005*, 60.

¹³⁰ Finnemore and Sikkink, “International Norm Dynamics and Political Change,” 895.

¹³¹ Risse and Sikkink, “The Socialization of International Human Rights Norms,” 11.

¹³² *Ibid.*, 18.

actions “crucially depend on the sustainability of networks among domestic and transnational actors who manage to link up with international regimes.”¹³³ These civil society networks provide access, information, and financial support to struggling domestic groups, and give their issues international exposure, which then “amplifies the demands of domestic groups...and...echoes these demands back into the domestic arena.”¹³⁴ Thus, the boomerang effect is the process of a domestic opposition group throwing its opposition out into international society, only to have transnational networks redirect opposition back onto the offending state.

Not every domestic opposition group is able to garner international support, however, and those that are most successful at motivating transnational society to work on their behalf are groups with “significant material resources, preexisting linkages to international actors, skill at international public relations, organizational cohesiveness, and leadership charisma.”¹³⁵ Moreover, human rights-based transnational networks tend to support causes whose complaints can be described as violations of the 1948 International Covenant on Civil and Political Rights. Opposition groups suffering abuses that fit into the categories defined by the Covenant have a better chance of gaining international support than groups suffering other forms of repression. Indeed, groups that are able to “match” their grievances to recognized abuses by reframing them in internationally recognized jargon, are most successful at garnering international advocacy for their cause.¹³⁶

¹³³ Risse and Sikink, “The Socialization of International Human Rights Norms,” 5.

¹³⁴ Ibid., 18.

¹³⁵ Bob, “Globalization and the Social Construction of Human Rights Campaigns,” 134.

¹³⁶ Ibid., 134.136.

When a domestic opposition group is able to rally transnational society, the informational and advocacy networks employed serve three main purposes during the boomerang process. First, they identify and criticize norm-violating states in front of an international audience, and second, they support and help legitimate the claims of domestic opposition groups against norm-violating states; thus “they are crucial in mobilizing domestic opposition, social movements, and non-governmental organizations in target countries.”¹³⁷ Third, transnational norm diffusers attempt to force governments to change their policies by applying pressure from the international community and from their own domestic citizenry.

This boomerang process, however, does not always lead to a uniform adoption of norms across state governments. What then accounts for the variation in the domestic effects of international norms? To answer this question, the literature identifies a “spiral model” which consists of several boomerang throws, with each throw having a different level of effect dependent upon its target country.¹³⁸ The effect of change depends upon four factors: the strength of the civil society/governmental network and communication, the strength of the domestic society in the norm-violating state; the depth of the civil society connection with the target state’s domestic society, and the national government of the norm-violating state, in that the transparency of the regime involved and its capacity to block transnational communication strongly affect the domestic opposition’s ability to garner international support.¹³⁹ The spiral model, then, is a “dance with many

¹³⁷ Risse, Ropp, and Sikkink, eds., *The Power of Human Rights*, 5.

¹³⁸ *Ibid.*, 18.

¹³⁹ Bob, “Globalization and the Social Construction of Human Rights Campaigns,” 137.

partners,” including transnational civil society, intergovernmental organizations, and national governments.¹⁴⁰

Part of the IWRM puzzle, then, may hinge upon the success of the spiral model in internalizing the human right to water within the developed and developing worlds. On the one hand, the developed world has, by and large, failed to internalize the human right to water, but has experienced a high level of success with IWRM, which, incidentally, is a policy framework which also fails to advocate the notion of water as a human right. In contrast, many of the developing states that have internalized, and even institutionalized, the human right to water have failed to successfully implement IWRM principles, a fact which seems to suggest that IWRM principles and the notion of water as a human right may be mutually exclusive ideals.

¹⁴⁰ Risse, “The Power of Norms versus the Norms of Power,” 191.

CHAPTER III

RESEARCH DESIGN

In an age when man has forgotten his origins and is blind even to his most essential needs for survival, water along with other resources has become the victim of his indifference.

-Rachel Carson, *Silent Spring*

World population has risen 300% over the past 50 years, and as a result, current freshwater resources cannot satiate the growing global thirst for water.¹ The international policy community seems cognizant of the need for a highly coordinated approach to global water management and has been attempting to implement such a comprehensive water strategy since the early 1990s, under the guise of various United Nations' conferences and procedural meetings. The 1992 United Nations International Conference on Water and the Environment in Dublin, Ireland and, to an even greater extent, the Conference on Environment and Development (Earth Summit) in Rio de Janeiro, Brazil that same year served as watershed events in environmental policy, and both conferences saw the introduction of Integrated Water Resources Management (IWRM) as a potential solution for a diminishing interdependent water resource network.

In theory, IWRM combines the efforts and voices of civil society, donor, private sector, and international and national government organizations in a holistic approach that considers the interests of all world populations regarding water scarcity and supply. The principles contained within IWRM address four variant policy dimensions –social equity, economic management, political transparency and decentralization, and

¹ Soncini-Sessa, et al., *Integrated and Participatory Water Resources Management*, xiii.

environmental sustainability. The social dimension emphasizes the equitable use of water resources, underscoring access to clean freshwater for people at the world's lowest socio-economic levels, while IWRM's financial component "draws attention to the efficient use of water resources and the role of water in overall economic growth," with a significance placed on water pricing and demand management.² The third dimension of water governance, that of political decentralization, stresses the primacy of individual stakeholders in the process of water policy formulation, assuming that individuals involved in creating policies specific to their own localized conditions will be more likely to abide by those policies as opposed to regulations that are imposed by a more distant centralized governing power. Finally, the fourth and final dimension of IWRM focuses on water treatment and conservation, in order to assure that freshwater resources remain free of pollutants and are used in a manner that allows for the future sustainability of the resource.³

The United Nations remains one of IWRM's most dedicated proponents on the international stage, as it continues to support and promote the idea that IWRM's four policy dimensions create a comprehensive and impartial framework for the mitigation of water scarcity in the 21st century. Translating the UN's IWRM rhetoric into reality, though, has proven to be quite a challenge within certain states, especially within the developing world. Those particular governments seem to struggle with the adaptation of IWRM's principles, including the enforcement of new water laws, the reorganization of water resources into differing units of spatial analysis, the creation of pricing mechanisms and the privatization of water supply, and the participation of all stakeholders in the

² United Nations, *World Water Development Report 2*, 46.

³ *Ibid.*, 47.

decision-making process. It seems, then, that certain states are finding it exceedingly difficult to achieve a workable policy synergy between all of IWRM's goals.

IWRM FROM AN IR PERSPECTIVE

Although the United Nations has been advocating IWRM as a viable environmental policy framework for the past fifteen years, academics in the field of international relations have shown little to no interest in studying such a policy regime. Indeed, the vast majority of existing IWRM-related scholarship approaches the subject from a distinctly scientific perspective, and one that rests on the technical analysis of various pollutant, climate, and hydrologic models. Although useful, this scientific viewpoint fails to address central questions regarding the efficacy of IWRM within the international policy community. Thus, very little scholarship exists to answer a seemingly obvious question – why is there a contradiction gap between the UN's IWRM rhetoric and the actual implementation of IWRM policy across states? This analysis attempts to answer that question by considering it from the perspectives of four relevant theoretical literatures – those on regime creation and collective action, common-pool resources, the privatization of water resources, and the construction and diffusion of normative ideas regarding water rights across societies.

Ideally, an analysis would consider instances of IWRM successes and failures in the developed and developing worlds within the context of each theoretical perspective and compare those cases to instances in which IWRM had no effect, meaning a state had not yet changed its water policy to reflect the characteristics of IWRM. Such a research design proves virtually impossible, however, as the 1992 Rio Declaration, the international agreement which introduced IWRM principles on a global scale, has 155

signatories.⁴ This high level of state participation suggests that the majority of state actors have agreed that their environmental policy will pay at least minimal attention to IWRM precepts, a condition which precludes the identification of non-participatory states.

Fortunately, an alternative analytical approach exists, as the evidence suggests that states seem to experience success and failure with their IWRM policies at different governance levels - either at the state/national level or at the interstate level. Consequently, this study examines cases of IWRM implementation success and failure at both the transboundary and national levels, an approach which allows for two controlled comparisons of IWRM policy execution. To that end, the following analysis will evaluate the cases of Germany and India, respectively, as examples of IWRM success and failure at the interstate level of water governance. Certainly, there is perhaps no more potent symbol of water interdependence between states than a shared river basin. Since environmental ecosystem issues such as water allocation and pollution levels transcend national boundaries and affect multiple stakeholders across state lines, interstate communication over river basin management can indeed represent cooperation and/or conflict between states. Both India and Germany, as chief stakeholders in two of the world's major river basins, have applied IWRM's water management prescriptions to their respective regions, but these two states have experienced widely divergent levels of success in those implementation endeavors, with Germany serving as an IWRM model for the world, while India has struggled to achieve the same.

Alternately, the cases of Canada and South Africa will allow for a scrutiny of IWRM success and failure at the state level. Issues salient at the interstate level also hold

⁴ United Nations General Assembly, *Rio Declaration on Environment and Sustainability*, June 1992.

sway at the state level, where variables such as water pricing, allowable pollution levels, and stakeholder involvement can affect the health of national freshwater resources.

Canada, for its part, has institutionalized IWRM principles within its national water policy legislation for the past several decades to the extent that, today, the international community often cites Canada as a water policy leader for the world. South Africa, however, has strained to throw off its mantle of apartheid in order to create an effective water policy that addresses the country's unique water needs, including the provision of water to millions of South Africans in the context of ever-increasing water scarcity. Under these trying conditions, the South African government has struggled to implement IWRM's core principles in an efficacious manner.

Methodologically speaking, the selection of these four cases controls for macro hydrologic characteristics, geographic diversity, democracy, federalism, and good governance, as operationalized by World Bank data regarding a state's citizen participation and political accountability, government effectiveness, and rule of law. Indeed, each of the four states surveyed here fall within the 50-75 percentiles or above in terms of these particular governance indicators.⁵ At the same time, such a research design allows the level of development in each state to vary; thus development stands as a key independent variable since the United Nations claims that IWRM will succeed within any developmental and/or economic context.

Moreover, this study accounts for longitudinal considerations, as it reflects on the present success and/or failure of IWRM-influenced policies and compares such success and failure against pre-IWRM water policies. In terms of measuring the characteristics

⁵ Kaufmann, Kraay, and Mastruzzi, 2009: *Governance Matters VIII: Governance Indicators for 1996-2008*.

that constitute an IWRM “success” or “failure,” the fluidity of the policy framework itself allows one to apply both qualitative and quantitative measures of success to the execution of its components. Specifically, this study will evaluate the effectiveness of IWRM based upon the answers to several queries. First, did water quality and/or availability improve in a quantitative sense in the years following the implementation of IWRM-related laws? The World Development Indicators’ water metrics, which evaluate such variables as organic water pollution levels in each state, will provide the data necessary to assess any quantitative improvement in this regard. Second, has a state formalized IWRM components within relevant legislation? If so, has that state met the IWRM objectives it set for itself in the time in which it specified? Finally, do third-parties perceive a state’s IWRM implementation to be a successful template for the framework’s execution in other regions of the world? Measurements such as the Water Poverty Index -- a metric using an amalgamation of a country’s total amount of water resources, capacity for water provision, and ecological legislative protection of water as the barometer of its success will prove useful in assessing the international community’s perception of a state’s water policy effectiveness.⁶

After a careful consideration of IWRM implementation in Germany, India, Canada, and South Africa using the methodology outlined above, it becomes evident that the success of IWRM policies varies quite a bit depending upon conditions within each particular state, and a polarity between the developed and developing world characterizes this variable success rate, both on the state and interstate level. Certainly, the literatures on regimes and collective action, common-pool resources, privatization, and the normative dimensions of human rights can help to answer the question of why such a

⁶ Lawrence, et al., “The Water Poverty Index,” 11.

chasm exists between the UN's rhetoric of IWRM success and the actual performance of IWRM policies across differing contexts. All told, these four cases, a theoretical examination of these four cases will help to illuminate reasons why the UN's IWRM policy framework seems to find success in the developed world, while facing more of an implementation challenge in developing states. The answers to this policy puzzle have never been more necessary, as a future of water scarcity looms large on the global horizon.

CHAPTER IV

GERMANY, THE RHINE RIVER, AND IWRM

*In Köln, a town of monks and bones, And pavements
fang'd with murderous stones, And rags, and hags, and
hideous wenches; I counted two and seventy stenches,
All well-defined, and several stinks! Ye Nymphs that
reign o'er sewers and sinks, The river Rhine, it is well
known, Doth wash your city of Cologne; But tell me,
Nymphs, what power divine, Shall henceforth wash that
river Rhine?*

- Samuel Taylor Coleridge, 1834

Rivers are, by their very geographic nature, transboundary resources, and as such, they can serve as a source of conflict between state actors, engendering political struggles over issues like water allocation or the migration of current-driven pollution from one state to another. The conflictive nature of such resources is not a static condition, however, and given the right set of circumstances, river management can actually engender cooperation rather than conflict. As a case in point, the story of Western Europe's Rhine River provides an illustrative model of stakeholder collaboration that has allowed for the successful implementation of Integrated Water Resources Management (IWRM), a policy framework that attempts to democratize water governance, value water as an economic good, safeguard the sustainability of water resources, and allocate water equitably to all socio-economic levels.

Although the Rhine's stakeholders have actively promoted the health of the river over the latter half of the 20th century, it is really during the last ten years, with the introduction of the European Union's Water Framework Directive (WFD), that this

support has coalesced into a successful implementation of IWRM principles, despite some significant legislative hurdles within Germany, the Rhine's largest stakeholder. The Rhine's effective management scheme hinges on several elements, two of which predate the introduction of IWRM entirely. Those elements include the legacy left by the Rhine's historical administrative organizations, the aftereffects of an environmental disaster on the river, and the strength of the European Union as a governing institution in the Rhine region.

More specifically, the success of the Rhine's current IWRM-based regime is due to the historical orientation of its previous management regimes, which initially framed the Rhine's meandering geography as a hindrance in the free trade of goods between local stakeholders. Facing this 'commercial' issue, the river's earliest managers attempted to solve the problem by regulating the Rhine's commerce through increasing its ease of navigability, paying no mind to the environmental effects of the river's re-engineering. An industrial-related environmental tragedy in the late 20th century, however, catalyzed the Rhine's modern stakeholders into adapting the previous commerce-related regime to include a focus on improving the river's ecological integrity. In turn, stakeholder memberships in the European Union further supported and operationalized this new focus on the Rhine's environmental health. The additional element of power and legitimacy provided by the EU's dense institutional network and its concomitant support of IWRM enabled the Rhine's riparian states to consistently apply the WFD's mandates. In fact, the Federal Republic of Germany (FRG) actually amended its constitution to allow for, among other things, an easier application of the EU's Water

Framework Directive, suggesting that international regimes can contain the power to reshape state constitutions.

In a theoretic sense, then, an analysis of the Rhine's experience indicates that the related literatures on common pool resources and collective action inform the following analysis, as they suggest that the Rhine's success is largely due to the form and function of its historic management regimes. These pre-existing regimes, with their foci on commercial concerns and later, environmental sustainability, marginalized water's economic valuation and completely disregarded the human right to water. Since these concerns were never framed as fundamentally important issues within the Rhine River basin, the literatures on water privatization and norm diffusion have little to no applicability regarding the Rhine situation.

RHINE RIVER HISTORY

The Rhine River rises in the Swiss Alps and continues on its meandering path 825 miles through Germany, France, and the Netherlands, eventually emptying its waters into the North Sea. Traditional nomenclature separates this storied waterway into several sections including the *High Rhine* (from Lake Constance to Basel, Switzerland), the *Upper Rhine* (Basel to Bingen, Germany), the *Middle Rhine* (from Bingen to Bonn, Germany), the *Lower Rhine* (from Bonn to Lobith, Netherlands), and the *Delta* area (from Lobith to Rotterdam, Netherlands). All of these segments combine to create one of modern Europe's most vitally important water sources, as the Rhine provides power, drinking water, irrigation, and recreation for approximately 50 million people. Although Germany, France, Switzerland, and the Netherlands comprise the Rhine's riparian states, Germany plays perhaps the most central role in the river's development and maintenance

since German soil houses approximately 60% of the length of the Rhine waterway.¹ These riparian states, however, are not the river's only stakeholders, and other interested parties include the states of Austria, Luxembourg, Belgium, and Liechtenstein, which still benefit from the power and drinking water that the Rhine provides, even though these state actors collectively share less than 5% of the river's basin area.²

One cannot fully appreciate the success of IWRM implementation in the Rhine basin without first understanding the river's historical development and that development's role as a contributing force to the river's current pollution woes. Recorded Rhine river history stretches back over 12,000 years, with Ice Age hunters acting as the first boatmen on the Rhine as they traveled the river in search of food. Over the next several thousand years, the Rhine not only provided sustenance to local people with its accompanying abundance of flora and fauna, but also aided in the advancement of civilizations, a function most realized by the Celts and the Romans. These two societies decided to utilize the Rhine's winding waterway as a trade route, primarily using the river for the transport of timber. The Rhine's trade role increased exponentially from that point on, with sailing vessels giving way steam vessels during the early part of the 19th century. At the turn of the 20th century, steam vessels transformed into motorized vessels, each of which was capable of transporting several thousand tons of freight, and this type of craft still dominates the modern Rhine. Today, some 200,000 ships cross the Rhine at the German-Dutch border each year, and these vessels transport roughly 200 million tons of goods, including construction materials, petrochemical

¹ ICPR, *The Rhine Atlas*, 2.

² Vajpeyi, *Water Resource Management*, 131.

products, ore, charcoal, and manufacturing containers, all on route to North Sea ports.³ Thus, in early the 21st century, the Rhine is one of the world's greatest commercial waterways as measured by volume of traffic, second only to the Mississippi River in the United States.⁴

Not surprisingly, the Rhine's high level of industrial development engendered environmental consequences, as engineers began to reroute the course of the river during the 19th century to placate the demands of a growing European industrial community wishing for increased ease of ship navigation. To this end, the Congress of Vienna enacted the first international regime to encompass the management of the Rhine in 1815, and this regime was designed to accelerate the free flow of trade. Accordingly, the Congress established the Central Commission for Rhine Navigation (the Rhine Commission) and tasked it with eliminating any of the river's chokepoints hindering commercial traffic -- both anthropogenic chokepoints, like tolls and border checks, and natural chokepoints, such as reefs and waterfalls. Through this rerouting of the river's banks, the Rhine Commission succeeded at its central mission, as it managed to open up the river's navigability, subsequently stimulating the region's economic growth through commerce.

The legacy of the Rhine Commission, then, is one of trade-related river transformation. Consequently, engineers eventually replaced meandering streams and a multitude of small river branches between Basel in Switzerland and Karlsruhe in Germany with a single river channel. In the process, however, the Commission overlooked the river's environmental needs, as it virtually ignored the effects that the

³ ICPR, *The Rhine: A River and its Relations*, 5.

⁴ Hutzinger, ed., "The Recovered Rhine and its History," 50.

river's increased navigability had on the region's flood control and ecology.⁵ The alteration of the river bed, for instance, produced the unfortunate side effect of catastrophic flooding. Areas that had previously served the function of absorbing water overflows were cut off from the river and replaced by concrete embankments to improve navigability. Over time, developers even used the dried marshlands created by this process for residential and industrial expansion. Eventually, such development reclaimed 90% of the river's wetlands, which exacerbated the Rhine's propensity to flood.⁶

Population pressures also helped to alter the Rhine's natural route, as resident numbers grew in tandem with industrial activity, requiring the construction of additional hydroelectric power plants. Over a period of several decades beginning in 1928, Rhine stakeholders built numerous hydroelectric power stations in canals parallel to the Rhine, which served to severely deplete water levels in the original bed of the river. Later, in the 1970s, two additional power plants were built on the Rhine itself, in Gambenheim, France and Iffesheim, Germany. These hydroelectric plants, and the subsequent damming of the river as a function of their construction, altered the ecology of the Rhine's fauna, especially in terms of migratory fish species such as salmon, which could not traverse the newly-created dams in order to migrate and spawn.

As a result, by the late 20th century the Rhine contained only half of the 47 fish species that swam there in the year 1800, and many of those survived only because of human intervention in the form of fish hatcheries. Salmon, shad, and sturgeon, the three most important commercial species in the Rhine, all but vanished.⁷ Meanwhile, several new fish species migrated to the Rhine or were transported there in the intervening years,

⁵ Hutzinger, ed., "The Recovered Rhine and its History," 50.

⁶ Vajpevi, *Water Resource Management*, 131.

⁷ Hutzinger, ed., "The Recovered Rhine and its History," 59.

but tellingly, all of the new species were highly adaptable and, therefore, less dependent on the ecological benefits of uncontaminated water, flood-plains, natural riverbanks, and meadowlands than their predecessors. The Rhine also lost invertebrate macro-fauna (small animals that burrow in soil and/or eat decaying organic material like snails and aquatic insects) during this period of time. Again, this was indicative of the Rhine's ecological decline, as these organisms generally serve as key indicators of water quality. In 1915, for example, the Rhine contained 80 known indigenous species of macro-fauna, by 1956 that number stood at 42, and by 1971, only 27 species of macro-fauna remained. Additionally, dozens of bird species that had relied on the fish and macro-fauna of the Rhine for food sources disappeared as well.⁸

The rerouting of the river and its negative environmental consequences were not the only problems faced by Rhine stakeholders, as the second half of the 19th century saw the Rhine become a dumping ground for industrial offal and raw sewage from growing local populations. Indeed, the German government took note of the river's growing stench in 1901, when the Reichstag addressed the issue of the Rhine's transformation into a "sewer" and ordered its bureaucracy to canvas the Rhine for all sources of pollution. The results of the canvas found the following: a red sewage plume between Ludwigshafen "as far as Worms," "dirty waters carrying a medley of floating rests of dirt" near Frankenthul, and a pollutive Mannheim paper pulp industry adding "yellow water" to the body of the Rhine.⁹ Such pollution levels continued to increase unabated over time, and by 1980, the Rhine's water was so contaminated with both sewage and pollutants -- including salts, cadmium, mercury, lead, nickel, antimony, chromium, zinc,

⁸ Hutzinger, ed., "The Recovered Rhine and its History," 59.

⁹ ICPR, *The Rhine: A River and its Relations*, 7.

phenols, and pesticides -- that no stakeholder could use the water in the river for any purpose without exorbitantly expensive treatment.¹⁰

THE ILLS OF THE RHINE

By the mid-20th century, conditions in the Rhine had deteriorated to such a low point that riparian states began to suffer consequences related to the Rhine's heightened pollution level, its flooding issues, and the disappearance of its fauna. At that point, the river's stakeholders collectively acknowledged that the river "could not function as a conduit for industrial and agricultural wastes and still provide clean water to cities; it could not support endless urban sprawl and still be a favored destination for tourists; and it could not offer safety to anyone as long as it repeatedly flooded its artificial banks."¹¹ The degradation of the Rhine, then, embodied a tragedy of the commons situation, as its stakeholders finally recognized that each individual input into the river, such as run-off from industrial development or sewage waste, while perhaps making sense from an individual point of view, actually degraded the overall quality of the river for all relevant users.¹² Certainly, the literature is illustrative on this point, as it indicates that common-pool resources (CPRs) often suffer from such 'tragedies.' Certainly, the Rhine is a true CPR as it, like other bodies of water, is subtractable in nature, in that the appropriation of water by one party means less water is available to others downstream, but it is also non-excludable simply due to its length. As a practical matter, no stakeholder can realistically fence off a 3,220 kilometer length river that traverses several states, and indeed, there has been no attempt to do so over the years. This lack of excludability seems logical when

¹⁰ Hutzinger, ed., "The Recovered Rhine and its History," 58.

¹¹ Ibid., 59.

¹² Hardin, "The Tragedy of the Commons," 1244.

one considers that the Rhine Commission, the river's initial management regime, focused on opening up the river for the purpose of commercial trade rather than allowing individual stakeholders the leeway to set their own policies regarding the river's use.

Conventionally, CPR resources can suffer from appropriation or provision issues regarding the allocation of water, but as the Rhine never suffered from a depleted water stock, the river's stakeholders never had to deal with allocation issues, meaning they did not have to find a way to spread an insufficient amount of water amongst many users. Although the Rhine's water was certainly polluted, a sufficient quantity of water for all stakeholders was always available to those who were willing and able to exercise expensive treatment options. The literature suggests, however, that provision problems are not only caused by depleted water resources, but can also consist of "avoiding the destruction of the resource," a state of affairs that certainly applied to the Rhine.¹³ Accordingly, river pollution and the ancillary matter of flora and fauna degradation comprised the main issues concerning the Rhine's riparian states. Thus, Rhine stakeholders, by the mid-20th century, were indeed facing a problem of provision familiar to CPRs due to their failure to mitigate the severe pollution issues that plagued the river.

A HISTORY OF RHINE-RELATED REGIMES

With the Rhine's pollution constituting a CPR issue, the literature proposes a very specific type of regime as a potential solution; thus, an in-depth look at the form and function of Rhine-related regimes is necessary in order to assess their theoretical implications regarding IWRM implementation. Indeed, the history of such Rhine regimes is comprehensive. When confronted with the Rhine's pollution-related provision

¹³ Young, *International Cooperation*, 13.

issues, the river's stakeholders decided to create a new regime, the International Commission for the Protection of the Rhine (ICPR) in 1963, to work separately from the Rhine Commission (whose main concern was trade). The Rhine's riparian states charged the newly created ICPR with the mission of restoring the river's health, and to achieve that end, the ICPR identified three major objectives to aid in its task: 1) researching the extent of pollution in the river and identifying its sources, 2) mitigating those sources of pollution, and 3) preparing corresponding international agreements to support those goals. To further its agenda, the ICPR spearheaded a convention to protect the Rhine against chemical pollution in 1976, and this convention established hazardous waste limits in the river, created a system to warn all stakeholder states about toxic waste spills, and established international water quality monitoring stations.¹⁴

Despite such attempts at progress, more talk than action characterized the first two decades of the ICPR's existence. On November 1, 1986, that static condition ended with the Sandoz A.G. warehouse fire and subsequent chemical spill in Schweizerhalle, near Basel, Switzerland. Due to the Sandoz fire, the run-off from the firefighters' extinguishing water flowed straight into the Rhine, and as a result, approximately 30 tons of highly toxic pesticides entered the river and killed almost all of the river's fish and plant life as far downstream as Koblenz, a distance of approximately 400 kilometers. The high level of river pesticides also required that the public along the banks of the Rhine, all the way to the Netherlands (almost 1,000 kilometers from the accident site), refrain from acquiring drinking water from the river for several days after the accident.¹⁵

¹⁴ Vajpevi, *Water Resource Management*, 133.

¹⁵ Tuohy, "4 Nations Try to Cope as River Spreads Spilled Chemicals," November 13, 1986.

The consequences of this acute crisis deeply shocked the Western European public, mobilizing it to apply pressure to its respective governments to clean up the Rhine. The focus of the abatement effort not only resulted in pressure to mitigate the chemical spill, but also centered on obliterating the image of the Rhine as Western Europe's sewer. The ICPR, as the relevant and already extant agency in this field, found itself spurred into action by the public pressure, and shortly after the accident, drafted a plan to clean up 'Father Rhine.' That draft plan came to fruition in 1987, as the ICPR approved the Rhine Action Program (RAP). The ICPR intended the RAP to achieve the following targets by the year 2000: the return of native fauna species to the Rhine (most importantly, salmon); the reduction of the pollutant contents of river sediments, the acceleration of a reduction in permanent pollution from point and non-point sources, the reduction of accident risk (no doubt a direct consequence of the Sandoz chemical spill), and the improvement of hydrological, biological, and morphological conditions within the river.¹⁶

At its core, then, and true to the earlier stated objectives of the ICPR, the RAP focused on pollution mitigation, but the specter of an additional problem appeared during the winters of 1993 and 1994 and forced the evolution of the RAP. Severe flooding on the banks of the Rhine during those years caused the deaths of four people and resulted in large scale evacuations of Rhine-adjacent populations. In the wake of these calamities, ICPR stakeholders realized that the anthropogenic rerouting of the river was at least partially responsible for the severity of the flooding and vowed to address that situation by merging pollution control solutions with flood control measures via the RAP.¹⁷ In

¹⁶ Hutzinger, ed., "The Recovered Rhine and its History," 69.

¹⁷ Vajpevi, *Water Resource Management*, 133.

terms of meeting these stated objectives, the RAP was more successful at improving the Rhine's water quality than alleviating its flooding issues. In particular, by the year 2000, actions taken under the guise of the RAP had reduced the level of hazardous wastes in the river by at least 70%, and the river's water contained more oxygen and a greater diversity of species than it did at the start of the RAP in 1986.¹⁸

THE EUROPEAN WATER FRAMEWORK DIRECTIVE

With its primary focus on pollution mitigation and its virtual disregard of social equity, economic water management, and participatory transparency, the Rhine Action Plan did not incorporate the policy ideals of Integrated Water Resources Management (IWRM). This omission seems logical when one considers that the RAP was created long before the international recognition of IWRM in the early 1990s. This all changed in the year 2000, however, when the European Union adopted the Water Framework Directive (WFD), a comprehensive policy intended to provide legislative cohesion regarding the region's water management. The most significant aspect of this legislative adjustment was that it altered future Rhine policy through its inclusion and support of IWRM principles. As such, a discussion of the WFD is certainly central to the question of whether IWRM implementation has succeeded in the Rhine River basin, as the WFD operationalized certain tenets of IWRM within a European agenda.

While the WFD does not explicitly mention IWRM by name, IWRM's core concepts comprise its organizing pillars, in effect constituting an implicit endorsement. Specifically, with regard to IWRM, the WFD calls for lower pollution levels as an element of environmental sustainability (Article 16), public participation in the formation

¹⁸ Hutzinger, ed., "The Recovered Rhine and its History," 71.

of river management strategies (Article 14), and to a lesser extent, strategic water pricing as an incentive for the sustainable use of water resources (Article 9).¹⁹ The WFD fails, however, to focus on the fourth component of IWRM, that of social equity. This exclusion is perhaps due to the relative wealth of the EU states and their populations' widespread connectivity to water sources, a situation which would render the social equity component seemingly unnecessary within the Western European context.

As a piece of legislation, the WFD was meant to fuse the many disparate mechanisms of European water management into a one unified policy for application across all transboundary EU water resources, including the Rhine River. Such a consolidation rests upon a secondary recommendation of IWRM – that of using the river basin as the primary unit of water management analysis. To that end, the WFD directs that an EU state must identify each river or water source located within its territory and then assign that water source to a river basin district (RBD). Additionally, this assignment must include coastal waters, which should be appointed to the nearest or most appropriate RBD.²⁰

After the identification of river basin districts, each state must identify the “appropriate competent authority” charged with the implementation of the WFD in all territorial RBDs.²¹ National RBDs, however, are not the only important consideration, as the WFD also addresses transboundary cooperation regarding this issue by prescribing the establishment of international river basin districts (IRBDs), a designation to which the Rhine River belongs. Member states must ensure that a river basin located in the territory of more than one state is designated as an IRBD, and IRBDs must have an appropriate

¹⁹ European Union, *Directive 2000/60/EC*, October 23, 2000.

²⁰ Louka, *Water Law & Policy*, 52.

²¹ *Ibid.*

implementation authority assigned as well. For practicality's sake, member states are allowed to utilize already existent international administrative organizations for the WFD's implementation. In the case of the Rhine River district, the river's stakeholders appointed the ICPR as the overseer of the WFD's implementation.²²

To guide the management of both national and international RBDs, the WFD requires EU states to produce river basin management plans (RBMPs) for all RBDs to which waters within a state belong.²³ The RBMP is central to river basin planning, and states are to produce their first such plan in 2009, with a subsequent update of that plan every fifteen years. The RBMPs must include, on a variable deadline schedule, a summary of the RBD's health in terms of pollution and ecological sustainability, an account of pollution abatement measures, an economic analysis of water use and pricing, and a summary of the stakeholder consultation process. Future updates of RBMPs should assess any progress made in achieving pollution abatement objectives, account for any objectives that are not yet achieved and explain that failure of achievement, while also evaluating the future of the RBD. Thus, the RBMPs assume "the function of a scorecard," as they track the status of each RBD over time.²⁴

Finally, the WFD provides clear deadlines for all measures listed above. For instance, it required states to establish RBDs and competent coordination authorities by 2003. By 2004, states had to provide an analysis of the characteristics and pollution levels within each RBD, and by 2006, states had to establish a monitoring mechanism for RBD progress. Furthermore, states had to present a draft RBMP to the public and all interested stakeholders by the end of 2008, and by December 2009, states must submit a

²² Oberthür and Gehring, eds., *Institutional Interaction in Global Environmental Governance*, 207.

²³ Louka, *Water Law & Policy*, 54.

²⁴ *Ibid.*, 56.

final draft of each RBMP to which its waters belong. Ultimately, by 2015, each EU water source must meet all environmental objectives laid out in their respective RBMPs, at which point the EU expects the evaluation process to begin anew for a second cycle.²⁵

THE WFD AND GERMANY

A discussion of the German legal framework and its integration with the WFD exemplifies the struggle some states within the EU have experienced with IWRM implementation. Germany's adherence to the WFD has been fraught with legislative difficulty, as on its inception, the WFD required the Federal Republic of Germany (FRG) to change aspects of its prevailing model of water management to comply with several tenets of IWRM philosophy. Prior to the WFD requirements, for instance, Germany did not classify its water sources as part of transboundary "river basin districts," instead allowing local, rather than national or international bodies, to manage the health of its waters.²⁶ The WFD has transformed this practice, though, in essence forcing the FRG to terra-form its water sources into ten river basin districts, including the Danube, Rhine, Maas, Ems, Weser, Elbe, Eider, Oder, Schlei/Trave and Warnow/Peene districts.

Additionally, the WFD (owing to the IWRM policy component of sustainability) requires Germany to monitor the Rhine in terms of its biological and ecological integrity -- essentially tracking the health of the Rhine's flora and fauna. Previously, the FRG only monitored the Rhine for its quality of potable water, but Germany has adapted its policy in order to follow IWRM mandates. Today, the German government routinely releases the results of these chemical and biological studies to the public, heralding a further evolution of German water management and additional adherence to the WFD,

²⁵ Louka, *Water Law & Policy*, 57-58.

²⁶ Unnerstall and Köck, "The Implementation of the EU Water Framework Directive," 208.

which requires states to maintain legislative transparency by informing the public regarding all water management-related decisions.

Thus, Germany has made significant inroads with its IWRM implementation as envisioned by the WFD. The legislative synergy necessary for such success did not come easily however, because the WFD required EU states to harmonize their national laws for adherence to the policy focus of the WFD. In Germany's case, this harmonization entailed a highly complex legislative process. Upon the WFD's adoption in the year 2000, Germany's constitution granted its federal government very limited powers over water-related issues, meaning that the government was authorized to enact only framework legislation rather than directive legislation regarding water management.²⁷

Framework legislation, according to the German Basic Law at the time, indicated that the federal government could only issue water management laws as guidelines, much like a list of suggestions that were then meant to be operationalized by the federal states (Länder) within Germany. This particular legislative arrangement was based upon a 1994 constitutional reform, which shifted the power for the interpretation of framework legislation to German states and regions rather than the German federal government (Art. 75 GG, Basic Law).²⁸

Given these constraints, the early legal implementation of the WFD within the Rhine River basin rested upon the German's government 7th amendment to its Federal Water Act in 2002, an amendment which adopted the WFD's terminology and promoted the assignation of river basin districts.²⁹ Certainly, this revision represented the extent of the German federal government's power on the issue. The purpose of the amendment

²⁷ Unnerstall and Köck, "The Implementation of the EU Water Framework Directive," 212.

²⁸ Ibid.

²⁹ Ibid., 213.

was to provide a legislative framework which the Länder could then use to format implementation regulations.³⁰ This two-level implementation scheme, however, seemed to cause governmental torpor, as the German Federal Water Act had no real enforcement power over the Länders' water management policies. In fact, the full acceptance of the WFD into German law required the creation and/or amendment of a total of 33 regionally-based water laws; thus, the extent of the required legislative changes presented an incredible challenge for the Länder, attested to by the fact that the 2003 EU deadline regarding WFD adherence witnessed the formation of only seven of those 33 laws.³¹ The German experience suggests, then, that the WFD's implementation within Germany was one of caution, where each region's autonomy took precedence over a cohesive national/international water policy.³²

Nonetheless, due to Germany's prior commitment to and involvement with the ICPR, the legislative paralysis hindering Germany's WFD implementation did not signify complete inactivity regarding IWRM's presence in the Rhine River region. As previously stated, the WFD allowed for states to determine which administrative bodies would oversee its implementation, and the role of extant organizations was crucial to this fact. As such, Germany and other Rhine stakeholders agreed in 1999, with their accession to the Convention on the Protection of the Rhine, that the already existent ICPR stood as the organization best poised to implement the WFD within the Rhine region.³³ Then, in 2001, despite the German legislative dissonance on the issue, the ICPR was able to successfully transition its efforts into adapting the Rhine Action Program into

³⁰ Länderarbeitsgemeinschaft Wasser, "*Working Paper – German Guidance Document for the Implementation of the EC Water Framework Directive.*"

³¹ Unnerstall and Köck, "The Implementation of the EU Water Framework Directive," 213.

³² *Ibid.*, 217.

³³ European Union, *Council Decision 2000/706/EC*, November 7, 2000.

a more IWRM/WFD-friendly management system entitled Rhine 2020. The Rhine 2020 program exists as the ICPR's operationalization of the WFD, as it attempts to implement IWRM principles in support of the Rhine's sustainable development. The targets of Rhine 2020 include the continued improvement of ecological sustainability within the Rhine watershed, specifically incorporating the reintroduction of salmon into the Rhine, the improvement of flood prevention, the improvement of water quality and groundwater protection, and the continued surveillance of the Rhine River for the maintenance of its integrity.³⁴

To meet these new Rhine 2020 goals, the ICPR created a Coordinating Committee (CC) consisting of representatives from Germany, France, the Netherlands, Austria, Switzerland, Belgium, Luxembourg, Liechtenstein, and Italy. Indicative of the torpidity of the German legislative system regarding the WFD's implementation, each of the sixteen Länder became members of the CC by virtue of their membership in the LAWA (*Länderarbeitsgemeinschaft Wasser*), a German organization that provides a forum for collaboration, as it enables each German state to organize water management policy among its contemporaries and then apply that cooperation to the international level of freshwater management in coordination with other Rhine stakeholders.³⁵ The presence of LAWA members on the CC, however, meant that Germany had more representatives on the CC than all other Rhine riparian states put together. It is, therefore, not surprising that members of the CC, at times, have complained that the number of competent authorities involved in the CC increases the complexity of decision-making, a fact which

³⁴ICPR. *Rhine 2020: Program on the Sustainable Development of the Rhine*.

³⁵Bund/Länderarbeitsgemeinschaft Wasser. "Information about the LAWA."

is largely due to the federal structure of Germany and the fact that each Länder, with its own priorities and needs, is a separate member.³⁶

To its credit, the German state has recently addressed this problem by attempting to adapt its legislative structure to be more welcoming to EU mandates like the WFD. In fact, the last two decades saw the German public, as well as actors within the federal government, voice their dissatisfaction with the constitutional power of the Länder, blaming that power for legislative paralysis within many areas of the German government, including, but not limited to, water management. By 2006, the German government acted on this public dissatisfaction and adopted a series of constitutional reforms aimed at separating the overlapping responsibilities of the federal government and the 16 Länder by restricting the power of the Bundesrat, or upper legislative house, which represents the Länder's interests. Originally created after WWII, the constitutional designers intended the Bundesrat to serve as a check on federal power, but in recent years, the German public began to view the power of the Bundesrat as a hindrance to timely decision-making, since it could veto 60 percent of all bills put through the legislative branch, granting it the power to slow down or completely block key proposals.³⁷

This "mother of all reforms," as it was dubbed by the German media, eliminated framework legislation and added natural resource management as a concurrent federal power, or a power which is within the jurisdiction of both the federal government and the Länder, but over which the federal government retains priority. Most importantly, this new constitutional arrangement more clearly defined the legislative power of the federal

³⁶ Louka, *Water Law & Policy*, 318.

³⁷ *Deutsche Welle*. "German States Agree to Reform of Federal Constitution." March 7, 2006.

government versus the Länder, and in doing so, allowed the German federal government the authority and the flexibility to adhere to the European Union's mandates in a more timely and efficient fashion.³⁸ Although it is still too early to judge the outcome of this constitutional revision in terms of the Rhine River basin, over the next several years this restriction of Länder power should allow for the harmonization of the previously fragmented German approach to the WFD through its expansion of federal powers in the field of water legislation.

IWRM IMPLEMENTATION AND THE RHINE

Thus, the future should see more cohesive German participation in terms of Rhine management, but despite the previous incompatibility of the German legislative structure with the WFD, the strength of the Rhine region's pre-existing management regime, the ICPR, allowed that organization to circumvent most of Germany's policy dissonance and successfully apply IWRM principles to the Rhine River basin, in keeping with the legislative mandate of the WFD.³⁹ As evidence of its success, the ICPR has complied fully with all WFD requirements and deadlines in the Rhine region since the inception of the law in the year 2000.⁴⁰ Moreover, the WFD directs that public participation in water management is crucially important, and the ICPR has complied with that ideal by posting all relevant documentation on its internet site, as well as holding regularly scheduled public hearings on the Rhine's health.⁴¹ An ICPR-related LAWA paper from Germany encapsulates the organization's philosophy toward public participation, stating that the

³⁸ Gunlicks, "Developments: German Federalism Reform, Part I," 123.

³⁹ ICPR, "*Bericht über die Koordinierung der Überblicksüberwachungsprogrammagem. Artikel 8 und Artikel 15 Abs. 2.*"

⁴⁰ ICPR, Rhine, *Bewirtschaftungsplan für die internationale Flussgebietseinheit Rhein.*

⁴¹ ICPR *Public Relations Work.*

“early involvement of the public in the implementation of the WFD should be understood as an instrument for improving the decision-making process.”⁴² Accordingly, the ICPR’s focus on public participation also allows for “transparency of the implementation process, acceptance of the measures to be taken, especially among the associations and groups affected, confidence building ...and raising awareness of water protection issues among the public.”⁴³

On more quantitative basis, the IWRM-inspired Rhine 2020 program has experienced success as well, although it is difficult to gauge whether these accomplishments occurred solely as a result of the WFD or are a continuation of successes achieved with the help of the Rhine basin’s pre-existing regimes. In any case, the water quality of the Rhine has continued to improve over the last eight years, and at present, the ICPR claims that the oxygen content of Rhine water is at an optimal level.⁴⁴ In addition, 50% fewer toxic pollutants, as classified by the WFD, enter the Rhine today than entered the water stream ten years ago. Such improvements, while indicative of IWRM success, do not imply that all pollution has disappeared from ‘Father Rhine,’ and the ICPR readily acknowledges this fact. In a sign of progress, however, the Rhine’s remaining pollution no longer consists of primarily industrial effluent or sewage, but instead is comprised of non-point source pollution, chiefly organic material of an agricultural nature and residual pharmaceuticals.⁴⁵

The fauna of the Rhine has also improved over the last two decades, and the results of the migratory fish reintroduction into the Rhine river system (a component of

⁴² Länderarbeitsgemeinschaft Wasser (LAWA), “*Working Paper – German Guidance Document*, 86. <http://www.lawa.de/Publications.html> (accessed September 20, 2009).

⁴³ Ibid.

⁴⁴ ICPR, *The Rhine: A River and its Relations*, 21.

⁴⁵ Vajpevi, *Water Resource Management*, 134.

the “Rhine 2020” program) speak to this advancement. Since 1990, more than 5,000 adult salmon have returned from the North Sea and migrated upstream, but importantly, much of that progress has occurred within the last nine years due to the construction of fish passages at several of the Rhine’s hydroelectric dam sites. Thanks to joint German and French efforts, the Iffezheim fish passage, a migratory route bypassing a hydroelectric dam, was opened in 2000, and between 2001 and 2004, three new fish passages were created in other areas of the Rhine delta. Additionally, in 2006, Germany and France again collaborated and opened the Gamsheim fish passage on the Upper Rhine. Despite these successes, however, the ICPR recognizes that the Rhine’s fish reintroduction still holds room for improvement, as the four dams at Strasbourg, Gerstheim, Rhinau and Marckolsheim continue to block fish from migrating upstream in those respective areas.⁴⁶

THE LEGACY OF HISTORICAL REGIME CREATION

In terms of deadline adherence, pollution levels, and species reintroduction, the ICPR has successfully implemented aspects of IWRM into the Rhine River Basin, despite any hindrance created by a lethargic German legislative process. Certainly, the theoretical literatures on CPR and regime creation are enlightening in this respect, as they help to illuminate some key factors underlying these accomplishments. The salient literature suggests that a spontaneous regime is the best option for a solution of a CPR issue, as long as that regime includes a focus on regionalization (the nested enterprises concept). In contrast, formalized and imposed regimes, like the current incarnation of the WFD, are less helpful when dealing with environmental issues because they often

⁴⁶ ICPR, *The Rhine: A River and its Relations*, 22.

incorporate a focus on compliance, which prevents stakeholders from building trust before holding each other accountable for breaches of agreement.⁴⁷

In a seemingly synergistic series of occurrences, then, the ICPR and the history of its Rhine River regime actually incorporates or speaks to the efficacy of both spontaneous and formalized regimes regarding environmental issues. The creation of the ICPR in 1950 was more of a spontaneous process, by which “appropriators eventually reach[ed] and maintain[ed] a set of individual strategies that increase[d] joint payoffs relative to problematic outcomes.”⁴⁸ At that point in time, the Rhine stakeholders agreed, without coercion, to form an organization that would reframe the Rhine’s major issue from one of commerce to one of ecology, and in this vein, the ICPR committed itself to mitigating pollution in the river. The first incarnation of the ICPR was very informal, however, and failed to accomplish very much in terms of decreasing Rhine contamination during its first two decades in existence.

The first hint of the ICPR’s evolution into a more formalized regime occurred after a major environmental crisis, the Sandoz incident, and is evidenced by the creation of the Rhine Action Plan, a voluntary mitigation blueprint that contained very definite goals, but lacked any enforcement component. Finally, with the EU’s adoption of the WFD, the ICPR transformed into a very formal regime, which accepted and became reliant on the “monitoring and sanctioning” of interested stakeholders.⁴⁹ Such a formalized or imposed (top-down) regime, which creates rules that regulate actor behavior, has managed to generate uniform expectations regarding European water management. Moreover, the “monitoring and sanctioning” inherent in this more formal

⁴⁷ Young, *International Cooperation*, 93.

⁴⁸ Ostrom, Gardner, and Walker, *Rules, Games, and Common Pool Resources*, 16.

⁴⁹ *Ibid.*, 16-17.

regime exists due to the power of the European Union as the ultimate arbiter of the WFD's tenets; thus, this regime demonstrates that "power factors can also play a role in enforcing compliance to a regime's objectives," as "enforcement can only be supplied if there is authority backed by coercive resources."⁵⁰ Countries that fail to comply with the WFD face the risk of considerable daily financial penalties. Such coercion has, in fact, already occurred, as the European Commission has referred a number of countries, including Belgium, Luxembourg and Italy, to the European Court of Justice for just this type of infraction.⁵¹

The ICPR, then, as a spontaneous regime, was eventually affected by the creation of an imposed regime (the European Union's WFD), which then forced the ICPR to become explicitly negotiated with a "formal accounting of results."⁵² Upon the creation of the WFD, the ICPR functioned as a 'nested enterprise' to help compensate for the difficulties in cooperation presented by the larger number of participants within the EU as a whole.⁵³ Therefore, the ICPR's success with its IWRM implementation suggests that an exact sequencing of regime creation may be important for policy effectiveness, meaning that regimes created to govern environmental issues must arise spontaneously through the interests of all relevant stakeholders, and over time, evolve into a system governed by an explicit set of rules and characterized by definitions of and penalties for non-compliance. These regimes cannot succeed, however, unless they allow for smaller

⁵⁰ Keohane, "The Demand for International Regimes," 344.

⁵¹ The Chartered Institution of Water and Environmental Management, *Water Framework Directive*.

⁵² Young, *International Cooperation*," 84-88.

⁵³ Keohane and Ostrom, eds., *Local Commons and Global Interdependence*, 22.

units of cohesion to exist within the whole, and the literature supports the importance of ‘nested enterprises’ in this respect.⁵⁴

ECONOMIC VALUATION AND SOCIAL EQUITY

Certainly, the CPR and regime/collective action literatures manage to provide some insight into an analysis of the success of IWRM implementation in the Rhine River basin, but related research on water privatization and norm diffusion are not as applicable to the case of the Rhine, simply because both the WFD and the ICPR prize environmental sustainability and public participation over the IWRM policy components of water valuation and social equity. In terms of the economic valuation of water, the WFD does mention the importance of sustainable water pricing as a tenet of its legislation, but this emphasis seems somewhat insincere, as various factors speak to water pricing’s secondary importance within the WFD framework. First, and rather tellingly, the legislative deadline for addressing water pricing practices in each river basin is scheduled for 2010, occurring after all other deadlines regarding environmental sustainability and public participation. Indeed, the deadline addressing the economic valuation of water is one of the last goals set by the WFD, and the 2010 deadline requires only that an *analysis* of regional water pricing be completed by that date; there is no subsequent mention of a set deadline for an *actual* adjustment of water pricing.

Second, the derivative importance of water’s economic valuation is evident when one considers Germany’s current water pricing practices in light of the WFD advocacy of the “polluter pays” principle as a method for recovering the environmental costs of water usage. Polluter pays traditionally indicates that the industries or farms that serve as

⁵⁴ Keohane and Ostrom, eds., *Local Commons and Global Interdependence*, 22.

point and non-point sources of water pollution must pay an extra surcharge in order to compensate for the treatment costs of the water that their pollution engenders. In practice, however, Germany, as the major stakeholder in the Rhine River basin, actually violates this tenet of the WFD, with little to no repercussions for doing so. Individual water users in Germany, through an elevated water price, pay or incentivize the polluters for practicing non-polluting or low-polluting methods of agricultural or industry, turning the “polluter pays” principle on its head. The German government claims that this practice is in the interest of efficiency, because it is much more costly to treat and clean drinking water than to pay to reduce pollution at its origin.⁵⁵ One may concede the veracity of this statement, but the salient point in terms of this analysis is that the German government is actively violating one of the major tenets of the WFD with no consequence, which provides further evidence of the EU’s low prioritization of this IWRM principle. Arguably, the framing legacy of Rhine river regimes plays a central role in the marginalization of such a central IWRM component. As previously mentioned, the Rhine’s historical regime ideology has followed a trajectory ranging from commercial interests to fixing the ecology harmed by those commercial interests, and these pre-existing regimes never concerned themselves with water pricing or the economic valuation of water. The ICPR has never given this issue any attention nor does it seem interested in enforcing related mandates, thus supporting the idea that historical issue framing continues to set the modern water management agenda in the Rhine region.

The same idea holds regarding the literature on the normative diffusion of the human right to water. Although one can certainly argue that IWRM itself has developed into as a constitutive norm within the EU, as evidenced by the WFD’s operationalization

⁵⁵ Kraemer, Pielen, and de Roo, “Regulation of Water Supply in Germany,” 21-24.

and institutionalization of said norm, the human right to water garners nary a mention within the WFD's tenets, disproving the human rights literature in this case, since the WFD and all pre-existing Rhine river regimes disregard the importance of social equity in the provision of water. The human right to water was never considered an important issue within the region, perhaps because the Rhine has always offered sufficient water volume to serve its neighboring population or perhaps due to the relative wealth of the EU states and their populations' widespread connectivity to water sources, both situations which would render the social equity component seemingly unnecessary within the Western European context. As such, the pre-existing Rhine regimes never addressed the connection between human rights and water access, and the historical discounting of this issue carries over into the modern ICPR regime, in a sense legitimizing its disregard of one of the main IWRM policy components.

A MODEL FOR THE FUTURE

Today, the Rhine River serves as a heartbeat for Western Europe, supporting the populous by providing drinking water, as well as serving as a juggernaut of industrial activity. During the last century, however, that heartbeat slowed to a crawl because of a growth in both industry and population that polluted the Rhine with carcinogenic industrial effluent and raw sewage. It seemed in keeping with the Rhine's status, then, when General George Patton publicly urinated in the river in March of 1945 to display his contempt for Nazi Germany.

To their credit, by the mid-20th century, the Rhine's riparian states recognized the decline of the river's health and decided to create the ICPR to mitigate the Rhine's pollution. Although the loose affiliations of the stakeholders within the ICPR hindered

the organization from producing many tangible advancements for several decades, the ICPR did succeed in garnering public support for the idea that the Rhine was “not just a geological entity – a construct of plate tectonics, volcanic activity, climatic variation, soil erosion, and other natural processes,” but was also “a human artifact, a techno-river, [and] a thoroughly anthropomorphized stream in Europe.”⁵⁶ Over time, that first spontaneous regime grew to encompass a formalized set of rules and regulations, overseen by the ICPR, but institutionalized through the European Union’s Water Framework Directive. The WFD enabled the ICPR to apply IWRM within the Rhine region, as a coherent, holistic approach to water resource management tailored specifically to the Rhine region, while still adhering to the larger vision governing all EU water sources.⁵⁷

The relationship between theory and practice in the case of the Rhine hinges on a number of dynamics: the role and orientation of the river’s historical regimes, catalytic environmental disaster(s), and the intervention of a strong institutional network. Indeed, the Rhine is not the only European river to follow this implementation model, as the European Commission acknowledges that the Danube IRBD has seen more success than most of its counterparts as well. Since the Danube, like the Rhine, was governed by an evolutionary series of spontaneous to formal regimes over the past 150 years, the modern goals of which were influenced by the legacy of its previous regimes, the failure of other IRDB regimes within Europe supports the idea that the complex amalgamation of factors at work in the Rhine region may be necessary for IWRM implementation success.⁵⁸

⁵⁶ Hutzinger, ed., “The Recovered Rhine and its History,” 51.

⁵⁷ Global Water Partnership, *Integrated Water Resources Management*, Technical Committee, TEC Paper 4.

⁵⁸ Water Information System for Europe, *Water Note 1: Joining Forces for Europe’s Shared Water*, 4.

Moreover, the case of the Rhine, and the role of the ICPR, confirms the literature's advocacy of 'nested enterprises,' or the necessity of small working groups within a larger entity as a precursor to a successful mitigation of common-pool resource issues.

Certain elements of the theoretical literature, then, speak to the success of the Rhine's stakeholders, although as a practical matter, those stakeholders freely acknowledge that the overall health of the river is still far from optimal. Their significant progress in terms of reaching quantitative benchmarks in the river's improvement over the last decade, however, suggests that, taken as a whole, IWRM implementation has succeeded in the Rhine River basin. Under the leadership of the European Union and the WFD, these stakeholders have each relinquished a portion of their sovereignty over the river in order to mitigate a classic tragedy of the commons situation. This abdication of sovereignty exists to the extent that the Rhine's majority stakeholder, the German government, actually amended its constitution so that its legislative process would better conform to the WFD and other EU legislation, rather than continue to provide impediments to international collaboration efforts. Hence, the successful implementation of IWRM in the Rhine River basin demonstrates that water, like the cooperation it has engendered, is truly a transboundary entity, substantiating the Aristotelian adage -- "Boundaries don't protect rivers, people do."

CHAPTER V

INDIA, THE GANGES RIVER, AND IWRM

I am the wind among the purifiers, and Lord Rama among the warriors. I am the shark among the fishes, and the Ganges among the rivers.

- Bhagavad Gita (10:31)

At first glance, South Asia's crippling water scarcity and pollution issues, coupled with the region's historical emphasis on the doctrine of empowerment, position it as a welcome partner for the IWRM policy framework.¹ Despite this perceived congruity, however, IWRM's application in the Ganges River Basin has proven largely unsuccessful due to a number of factors, including India's commitment to unilateralism in water management, its hegemonic dominance over the river's other stakeholders, and, paradoxically in terms of IWRM principles, its commitment to decentralized environmental policy creation. Moreover, the aggressive nature of the region's extant water management regimes has contravened IWRM's transboundary application. Relentless bilateral conflict and infighting have characterized Ganges-related stakeholder communication over the last sixty years, and as a result, any joint attempts to manage the Ganges have been few and far between. Ultimately, it is India's categorization of Ganges degradation as a uniquely Indian problem requiring a uniquely Indian solution that has hindered the multilateral collaboration necessary for IWRM's efficacious execution.

The Ganges, unlike the Rhine, has not been governed by cooperative regimes that have existed for several hundred years. Instead, attempts to collaboratively manage the

¹ Biswas, Varis, and Tortajada, eds., *Integrated Water Resources Management in South and South-East Asia*, 17.

Ganges did not exist until the mid-20th century, and even then, those attempts were collaborative in name only, as regional powerhouse India manipulated and dominated any water management regimes with its insistence on unilateral control of Ganges water. Certainly, the transboundary application of IWRM could never work in such a context because IWRM, at its core, is a multilateral policy framework, and unilateralism mitigates the framework's impact and effectiveness. The theoretical literature provides additional insight in explaining the failure of Ganges-related water management regimes. The scholarship on common pool resources and collective action, in particular, inform the following analysis. They suggest that IWRM's failure in the Ganges River Basin is largely due to both the aggressive character of its historic management regimes and the geography of the river. The route of the Ganges natural flow, in particular, allows India the physical ability to exclude other stakeholders from accessing Ganges water, thus negating the river's existence as a common-pool resource.

Interestingly, the failure to apply IWRM principles across all Ganges' stakeholders does not suggest that such principles have been completely marginalized throughout South Asia. In fact, the opposite holds true -- IWRM as a policy model has found an advocate in India, the Ganges' most powerful and vocal stakeholder. Over the last fifteen years, India, adhering to its insistence on unilateralism, has attempted to independently implement certain IWRM precepts in the Ganges River Basin, essentially foregoing all transnational application of the framework's principles. Unfortunately for the health of the river, India's independent implementation attempts have been largely ineffective, again speaking to the significance of multilateralism in transboundary water source IWRM application. The story of the Ganges suggests ultimately that a

transboundary water source traversing more than one state requires a transboundary solution, and the unilateral implementation of such a solution is wholly insufficient for combating South Asia's 21st century water scarcity woes.

THE GANGES: A SPIRITUAL RIVER

Although the Ganges is one of three rivers comprising the massive Ganges-Brahmaputra-Meghna (GBM) river system, it is perhaps the most significant of the GBM waterways in terms of its transboundary cultural, industrial, and ecological impacts. Its physical presence, for instance, is more imposing than its neighboring rivers. The Ganges alone drains more than one million square kilometers of China, Nepal, India, and Bangladesh, an area encompassing more than half of the entire GBM basin. The Gangotri Glacier, high within the Himalayan Mountains, serves as the source of this storied river, and from that glacial plain, the Ganges begins its descent into the foothills of northern India. It then traverses the northern and eastern portions of India, winds its way into Bangladesh, and joins the Brahmaputra River at the Bangladeshi town of Goalundo. Eventually, the Ganges and the Brahmaputra, known collectively as the Padma, combine with the Meghna River before all empty into the Bay of Bengal.²

Buddhist records suggest that civilization along the Ganges began in the sixth century B.C., as hunter-gatherers colonized themselves in order to consolidate their resource bases. By the fourth century B.C., ten substantial cities had developed along the river's banks, and the Ganges continued to serve as the main watercourse for long-distance trade and transportation throughout the rise and fall of the region's dynasties

² Saravanamuttu, "South Asia: The Ganges and the Brahmaputra," 114.

over the next 1,000 years.³ Today, the population residing along the banks of the Ganges is staggering, totaling over 45 million people.⁴ The majority of those people reside in India, and it is in this country, that the Ganges assumes its most primary geographic and cultural functions. India's Ganges Basin is densely populated and holds over 37% of India's total population, while it also traverses 861,000 square kilometers, representing one-quarter of India's geographic area.⁵ The Ganges basin system effectively drains eight states of India, and approximately 47% of India's irrigated land is located within the basin's borders.⁶

The Ganges not only holds geographic significance for India, but it is credited with spiritual significance as well. The river is known to Hindus as 'Mother Ganga' and is sacred within that religious context as a "goddess, purifier, and sustainer of all life."⁷ Hindu legend explains the story of the Ganges creation as a sort of gift for the long and arduous prayers of King Bhagirathi to aid the salvation of his deceased ancestors. The king desired the celestial Ganges water to descend from heaven and cleanse the ashes of relatives who had been killed in battle, and the king's prayers and meditation eventually resulted in the river appearing to him in corporeal form and agreeing to descend to the mortal plane if someone could break her fall – a fall which would otherwise raze the earth with its power. Lord Shiva agreed to catch the river as it fell from heaven and eventually released the river from his grasp, where it took its present-day form.⁸ Today, the Ganges serves as India's river of faith and devotion. Due to its celestial origins, millions of

³ Alley, *On the Banks of the Ganga*, 54.

⁴ *Ibid.*, 51.

⁵ Das Gupta, ed., *Basin Sub-basin Inventory of Water Pollution*, 5.

⁶ Helmer and Hespanhol, eds., *Water Pollution Control*, 303.

⁷ Alley, *On the Banks of the Ganga*, 17.

⁸ Shiva, *Water Wars*, 132-133.

Hindus accept Ganges water as curative and believe the river's water to be holy because 'Mother Ganga' "absolves worldly impurities and rejuvenates the cosmos with her purificatory power."⁹

Aside from its cultural significance, the Ganges serves a practical purpose in India and other riparian states, as it is the greatest source of drinking water for the cities, towns, and villages along its banks. The river also provides a majority of the water used for industrial development in both India and its downstream neighbor Bangladesh. The demand for the river's water currently stands at more than 62 billion cubic meters per day, and that number will only increase as the population and development level of South Asia increases over the next several decades.¹⁰ Currently, the combined population of this region is approaching 1.4 billion, and experts project an increase to 1.9 billion by 2025.¹¹ Thus, the massive agglomerations of people in South Asia present a unique stress on that region's environment, and such densely placed populations, when combined with seasonal variations in the hydrologic cycle, exacerbate the already severe water scarcity issues plaguing the Ganges River.¹²

WATER ALLOCATION WOES

The water woes afflicting South Asia came to a head soon after Partition in 1948 and have led to an almost sixty-year conflict between the Ganges' main riparian actors. Indeed, the roots of this conflict begin in India and end in Bangladesh, following the flow of the river itself. Water scarcity is the first, and perhaps most pressing cause of this

⁹ Helmer and Hespanhol, eds. *Water Pollution Control*, 303.

¹⁰ Alley, *On the Banks of the Ganga*, 51.

¹¹ Biswas, Varis, and Tortajada, eds., *Integrated Water Resources Management*, 4.

¹² *Ibid.*, 9.

ongoing dispute, as the water of the Ganges depends heavily on seasonal rainfall.¹³ Precipitation comprises the main source of the river's flow, but 85% of this rainfall occurs from June to October during the monsoon season of each year. Ironically, an area deluged by rain four months of the year suffers from severe water shortage during the remaining eight. The lack of rainfall during the dry season inhibits the region's agricultural and industrial development and can even lessen the availability of electricity, as a quarter of the region's power plants are hydroelectric.¹⁴ Moreover, the uneven pattern of water allocation in both India and Bangladesh leads to recurrent flooding of the Ganges' banks; since most rainfall occurs in the four to five months of monsoon, it is often concentrated in several days of heavy storms.¹⁵

Water scarcity, then, presents the most critical problem underlying the conflict between the Ganges' riparian actors. The extremely high level of pollution in the river, however, plays a secondary, but major, role as well. The little water that flows through the river, especially during the dry season, is so degraded that it is useless without the most modern water treatment technology, a luxury which the Ganges' riparian states cannot generally afford. In this sense, the pollution levels of the Ganges exemplify a tragedy of the commons situation within India, as human beings act rationally from an individual point of view by using the river to dispose of human, animal, and industrial wastes, but those actions are to the detriment of the river's collective stakeholders.¹⁶

India's Central Pollution Control Board reports that the main sources of Ganges pollution include industrial liquid waste, surface runoff from solid waste landfills and

¹³ Uddin Ahmad, "Forgetting Political Boundaries in Identifying Water Development Potentials in the Basin-wide Approach," 181.

¹⁴ Policy Research Project, *Water Resource Challenges in the Ganges-Brahmaputra River Basin*, 1.

¹⁵ Shamsul Huda, "Integrated Water Resources Management in Bangladesh," 113.

¹⁶ Hardin, "The Tragedy of the Commons," 1442.

dump sites, and solids and liquids from religious practices such as cattle bathing and corpse immersion in the river. Sewage, however, stands as the primary form of point source pollution in the Ganges basin, as three-fourths of the river's contamination stems from the discharge of untreated municipal sewage directly into Ganges waters.¹⁷ By India's official standards, water containing more than 500 fecal coliform bacteria per 100 milliliters is considered unsafe for bathing. Unfortunately, this level is exceeded on a regular basis; for instance, in parts of Varanasi, India, where 60,000 devotees perform daily ablutions in the river, the Ganges water contains 1.5 million fecal coliform bacteria per 100 milliliters.¹⁸

Industrial pollution plays a significant role as well. The Upper Ganges Plain running through the Indian state of Uttar Pradesh is the most industrialized part of the river basin. Uttar Pradesh is home to sugar factories, leather tanneries, textile, food processing, paper and pulp industries, chemical factories, and fertilizer and rubber manufacturing units. Many of the chemical byproducts of these industrial processes find their way into the Ganges, and as a result, heavy metals and carcinogens such as cadmium, zinc, nickel, lead, chromium, and copper are concentrated in the river's water and sediment.¹⁹

Although the situation of India's share of the Ganges seems dire, the state of Bangladesh is in an even more precarious position in terms of its relationship to 'Mother Ganga.' While the Ganges does not hold the same spiritual significance for most Bangladeshis, the majority of whom are Muslim, the river's physical effects loom large over the country. As the lowest riparian state in the Ganges basin, Bangladesh lacks

¹⁷ Alley, *On the Banks of the Ganga*, 52-53.

¹⁸ *The Economist*, "India and Pollution: Up to their Necks in it," July 17, 2008.

¹⁹ Alley, *On the Banks of the Ganga*, 53.

control over 97% of its catchment area, and it has to bear the brunt of India's pollution in the form of the sediment loads, industrial effluents, agro-chemicals, and sewage that pass through her river network. To this incoming toxic soup are added locally-generated industrial and fecal pollutants. Ironically, Bangladesh's natural wetland and estuary network could mitigate these pollutants to a certain extent, but during the dry season, there simply is not enough water volume to perform these cleansing functions.²⁰

A HISTORY OF BILATERAL REGIMES

Water allocation in this region, then, is of primary importance, and ultimately, the lack of the Ganges' dry season flow, even more than the river's increasing pollution levels, lies at the heart of the decades-old dispute between the river's primary riparian actors. Even during the rainy season, the river fails to hold an adequate volume of water for the burgeoning populations of India and Bangladesh to utilize now or in future years. By 2030, according to the Center for Science and the Environment in New Delhi, India will draw eight times the amount of water from the Ganges it does today because the Indian population along the river is projected to double from present levels.²¹ Additionally, by the same year, Bangladesh's population will increase by 52 million people, making an already tenuous water-sharing situation even more dire. To their credit, India and Bangladesh have officially acknowledged the water allocation problem, but over the last sixty years, both have offered contradictory solutions to ameliorate this predicament. While Bangladesh has favored a multilateral solution, similar to the approach taken by the Rhine's stakeholders, India has advocated a bilateral solution, although that bilateralism exists in name only, as India has consistently violated the joint

²⁰ Shamsul Huda, "Integrated Water Resources Management in Bangladesh," 118-119.

²¹ Hammer, "A Prayer for the Ganges," November 2007.

treaties it has signed with Bangladesh regarding this issue.²² In reality, an Indian insistence on unilateralism has characterized its historical interactions over Ganges water allocation.

Certainly, the disputes over Ganges water distribution, as well as the management regimes they have spawned, are highly complex. The decreasing dry season flows of the Ganges first triggered a water dispute between India and Pakistan (now Bangladesh) in 1951. In that year, India announced its decision to divert water from the Ganges into the Bhagirathi-Hooghly River on which the Calcutta (now Kolkata) Port is located. India planned to achieve this water diversion through the construction of a barrage, or a low dam, across the Ganges at the town of Farakka, about 17 kilometers from the border with what was then East Pakistan. India expected that the barrage would divert 40,000 cusecs (cubic feet of water per second) out of a dry season average flow of 50,000 cusecs from the Ganges in order to reduce silt levels in Calcutta Bay. In turn, this diversion would negate the need for constant dredging of the port area and allow for increased navigability. In October of 1951, Pakistan officially protested the construction of the barrage because of its potential effects on water availability in East Pakistan, and in March of 1952, the Indian government responded that the project was only under preliminary investigation, and that any Pakistani concern regarding the barrage was "hypothetical."²³

Over the next several years, Pakistan occasionally revisited the issue with India, but each time, India failed to respond to Pakistani concerns. Pakistan tried to overcome this wall of Indian resistance by proposing that the United Nations intervene and assist in

²² Saravanamuttu, "South Asia," 114.

²³ Abbas, *The Ganges Water Dispute*, 3.

planning for the cooperative development of the Ganges. India turned down each of those proposals, though, instead insisting upon a strictly bilateral approach to transboundary water management with Pakistan.

In 1970, despite Pakistani opposition, India finally completed construction on the Farakka Barrage, although it did not begin immediately operating the dam. The Pakistani government once again vociferously protested the construction of the barrage, arguing that its eastern province needed assurance of a present and future equitable water supply. In response, India denied the transboundary nature of the Ganges, asserting that instead, the Ganges belonged to India alone, and in any case, the Farakka Barrage would not cause East Pakistan to lose additional water resources because the water problems in East Pakistan were due to the excesses of its people, rather than a genuine water scarcity.²⁴ Indeed, the river's unique geography allowed India's to compartmentalize the Ganges into mutually exclusive units, one belonging to India and the other to East Pakistan. India saw the water scarcity problem in East Pakistan as a tragedy of the commons situation within that state alone, not as a dilemma of common interest exacerbated by upstream Indian withdrawals from the river.²⁵

From 1950 to 1970, then, the conflict over the Ganges mirrored other Pakistani/Indian interactions of the time, in that it was characterized by hostility and aggression between the two states. The situation changed in 1971, as East Pakistan ceased to exist and Bangladesh arose in its place, an occurrence that led to a cessation of the earlier Indo-Pakistani hostility that had hindered any agreement on water-sharing. In a new found spirit of cooperation, the governments of India and Bangladesh agreed to

²⁴ Abbas, *The Ganges Water Dispute*, 3.

²⁵ Stein, "Coordination and Collaboration," 304.

establish the Indo-Bangladesh Joint Rivers Commission (JRC) in 1972, with the purpose of developing “the waters of the rivers common to the two countries on a cooperative basis.”²⁶ The question of the Ganges, however, was specifically excluded from this agreement because the initial mandate of the JRC prevented it from making substantive recommendations or addressing the key issue of water-sharing. Instead, the JRC was restricted to a liaison function between the two governments on flood control and other ancillary water projects.²⁷

Due to the weak mandate of the JRC, negotiations over the Ganges water flow were left to the prime ministers of India and Bangladesh, who met in New Delhi in May of 1974 to discuss the Ganges issue. At that summit meeting, the two leaders officially acknowledged the Ganges-related water scarcity affecting both states, and both prime ministers agreed that during low flow months, the volume of Ganges water would have to be increased somehow in order to meet the requirements of the two countries. Moreover, they vested the JRC with the power to determine the optimum method of augmenting Ganges flow. The JRC was then faced with competing proposals from Bangladesh and India as to how this augmentation would occur. Bangladesh favored the construction of storage dams in Nepal to capture and store excess monsoon rains, while India advocated the construction of a feeder canal that would link the Brahmaputra River to the Ganges and help supplement the flow of the latter. At that same summit, both leaders also agreed that a mutually acceptable allocation diversion amount needed to be determined before India began to officially operate the Farakka Barrage.²⁸

²⁶ Saravanamuttu, “South Asia,” 118.

²⁷ Ibid.

²⁸ Ibid., 115.

At the next ministerial-level meeting in 1975, India requested permission to run the Farakka Barrage on a trial basis while discussions continued on future augmentation amounts. Bangladesh acquiesced, and the two sides agreed to a limited 40 day operation of the barrage, with diversion levels varying between 11,000 and 16,000 cusecs over a two-month period in 1975. Without renewing or negotiating a new agreement with Bangladesh, however, India continued to divert the Ganges waters at Farakka after the trial run, and for the next two years, at 40,000 cusecs -- the full capacity of the diversion.²⁹

The consequences of India's water diversion on Bangladesh were dramatic. On March 29, 1976, the dry season flow of the Ganges in Bangladesh was reduced to a record low and as a result, the Goro River, one of the Ganges' tributaries in Bangladesh, dried up completely. In retaliation, Bangladesh tried to mobilize international support for its cause by raising the issue at the Colombo Non-Aligned Summit and the Istanbul Islamic Foreign Ministers Conference to no avail, and the Bangladeshi government was eventually forced to lodge a formal protest against India with the General Assembly of the United Nations. In response to that formal protest, the UN General Assembly adopted a consensus statement in November of 1976, encouraging the parties to meet and continue negotiations on the Ganges dispute.³⁰

Spurred by international pressure, India agreed to recommence negotiations in December of 1976, and a year later, both countries signed the Ganges Water Agreement (GWA). The GWA was a five-year water-sharing accord that provided for joint action to

²⁹ Abbas, *The Ganges Water Dispute*, 96-103.

³⁰ Saravanamuttu, "South Asia," 115.

find a long-term solution to augmentation of the river's dry season flows.³¹ Specifically, the GWA addressed allocation by stating that Bangladesh's share of Ganges water should not fall below 80% of whatever its unencumbered share of the water would be in any given season. Additionally, the JRC provided a monitoring function, with its directives regarding the supervision of water allocation levels, the provision of a constant data stream to the two governments, and the submission of an annual report on the Ganges status to both Bangladesh and India. Finally, the GWA tasked both sides with finding a long-term solution to the problem of Ganges water scarcity without providing any specifics on how to accomplish that goal.³²

At the end of the GWA's life in 1982, India and Bangladesh issued a joint communiqué in which both sides agreed not to extend the 1977 agreement, but rather to initiate fresh attempts at achieving a solution within 18 months, an objective which was not met. A state of limbo prevailed until November of 1985 when an Indo-Bangladeshi Memorandum of Understanding (MOU) was signed regarding the sharing of the Ganges dry season flow. The MOU, in essence, extended the guidelines of the 1977 agreement through 1988 and established a Joint Committee of Experts between the two states to help resolve future water-sharing issues. India's proposals in this regard still focused on linking the Brahmaputra with the Ganges, while Bangladesh's focus still centered on the creation of a series of dams along the Ganges' headwaters in Nepal. Although both the Joint Committee of Experts and the Joint Rivers Commission met regularly throughout 1986, no consensus was ever reached on a viable solution.³³

³¹ Saravanamuttu, "South Asia," 115.

³² Abbas, *The Ganges Water Dispute*, 96-103.

³³ Saravanamuttu, "South Asia," 122.

Bangladesh also asked Nepal for its input during this iteration of the negotiation process. Nepal, however, declined involvement in the Ganges dispute, due to its unrelated, but ongoing, conflicts with India. Nepal, as a land-locked state, had officially sought direct access to the sea in past years, but found that such access required cooperation from co-riparian states, along with a treaty on free navigation. Unfortunately for Nepal, India rejected the Barcelona Statute on the Regime of Navigable Waterways of International Concern in 1956, and by completing the Farakka Barrage almost two decades later, India's actions effectively blocked Nepal from achieving its sea-access goal.³⁴ Additionally, trade and transit questions had been a continuing source of tension in the Indo-Nepalese relationship. In 1988, Kathmandu claimed that in response to its arms deal with China, New Delhi shut down 13 of the 15 transit points into India which were crucial for Nepal's trade and survival. The consequences of this shutdown were so debilitating that the IMF had to grant Nepal \$9.5 billion in urgent economic relief before the trade points were eventually reopened.³⁵ For its part, Bangladesh found that such powerful Indian leverage over the Nepalese state discouraged Nepal from becoming involved in the Ganges conflict, despite its riparian status.³⁶

During all these years without an official agreement in place, the Farakka Barrage remained operational, and India refused to grant Bangladesh a minimum guaranteed water allocation flow. Finally, in December 1996, the situation seemed to resolve itself when the two states agreed to sign the Ganges River Treaty (GRT). Largely based on the principles within the 1985 MOU, the most notable change in the GRT was the establishment of a new formula for calculating water distribution levels at the Farakka

³⁴ Zamen, ed., *River Basin Development*, 104-105.

³⁵ Saravanamuttu, "South Asia," 125.

³⁶ Zamen, ed., *River Basin Development*, 104-105.

Barrage. More specifically, the GRT states that if the flows at Farakka Barrage should fall below 50,000 cusecs, the two governments will meet together to consult as to the appropriate response, all the while taking into consideration “principles of equity, fair play and no harm to either party.”³⁷ The GRT also requires Bangladesh and India to review the sharing arrangements at five-year intervals. If the parties are not able to come to an agreement at one of these intervals, India is to release no less than 90 percent of Bangladesh’s flow at Farakka until a solution is mutually agreed upon.³⁸ The treaty, however, does not contain any arbitration clause to ensure that the parties uphold its provisions, and since the signing of the GRT in 1996, Bangladesh has repeatedly accused India of failing to release the amount of water agreed upon in the accord. Moreover, the Bangladeshi government is now seeking a renegotiation of the 1996 agreement, citing the harm the Farakka Barrage continues to inflict upon its population.³⁹

Bangladesh argues that, since its construction, the Farakka Barrage has been devastatingly detrimental to Bangladesh’s people. In the rainy season, water releases from Farakka cause floods in Bangladesh, and in the dry season, the lack of freshwater in the Ganges basin allows salt-laden seawater from the Bay of Bengal to seep into Bangladesh’s soils and disrupt and destroy its agricultural production.⁴⁰ Bangladesh also contends that even in India, the barrage has had unintended negative consequences. For instance, the Farakka Barrage, like the hydroelectric dams on the Rhine River, has obstructed fish migration and led to the extinction of certain species of fish in northern India. Moreover, the barrage’s initial justification was as a solution to save the Calcutta

³⁷ Ahmad, “Forgetting Political Boundaries,” 192-193.

³⁸ Ibid.

³⁹ Pangare, et al., *Springs of Life: India’s Water Resources*, 312-313.

⁴⁰ Biswas, Varis, and Tortajada, eds., *Integrated Water Resources Management*, 5.

Port, but it has failed to reduce silt in the port area as much as expected. Consequently, the Government of West Bengal in India has made the city of Haldia the main port in that area.⁴¹ Bangladesh contends additionally that the Farakka Barrage has had a harmful effect on the overall depth of the Ganges River. In 1975, the depth of the river at the barrage was 25 meters, while in 1997 it was only four meters, with the change completely due to silt accumulation at the dam site.⁴²

Finally, recent additional unilateral actions by India promise to further exacerbate Bangladesh's myriad of water scarcity problems. Over the last several years, India has undertaken a development project known as the Rivers Interlinking Project (RIP). The RIP is India's plan to link dozens of rivers throughout India by way of aqueducts and pumping stations that will transport water from the Ganges River to parts of southern and eastern India that are prone to water scarcity. Under RIP, 46 rivers across India would be connected by 2016 through 30 major links involving 10,000 kilometers of canals and 32 dams. The Bangladeshi government is understandably disturbed by RIP's potential impact on Bangladesh, but India has, up to this point in time, refused to speak with Bangladesh regarding this issue.⁴³

SOUTH ASIA'S REGIONAL GOVERNANCE REGIMES

As its actions over the last sixty years suggests, India, as the most powerful riparian state, is well aware of its influence and impact in the Ganges River Basin. Indeed, India's insistence on bilateral negotiations, and its resultant unilateral behavior, served as an attempt to prevent a further loss of sovereignty over a river it viewed as a

⁴¹ Pangare, et al., *Springs of Life*, 312-313.

⁴² Mizanur Rahaman and Varis, "Integrated Water Management of the Brahmaputra Basin," 63.

⁴³ Pearce, "Conflict Looms over India's Colossal River Plan," February 2003.

possession of its own geographic territory: For India, the Ganges is a uniquely Indian problem that requires an Indian resolution, and as such, the cooperative aspects of transboundary IWRM application have not manifested. Unlike the involvement of the European Union in the management of the Rhine River, regional institutions have played little role in the management of the Ganges conflict, despite the constant efforts of Bangladesh to involve them. The lack of regional regime oversight is due, in large part, to the historic role played by the South Asian Association for Regional Cooperation (SAARC), the closest EU equivalent in this region.

In the Rhine region, which provides a comparable parallel since both rivers are transboundary resources that involve multiple stakeholders at the state level, international IWRM cooperation succeeds, in part, because the EU provides enforcement authority “backed by coercive resources.”⁴⁴ SAARC, however, simply cannot play the same role in South Asia, as since its inception, the regional institution has lacked the regulatory power to intercede and enforce a transboundary solution to the Ganges conflict. Although SAARC’s official discourse at its creation in 1985 tasked the organization with mitigating conflicts in the South Asian region, it was never legitimized with the institutional tools and scope to adequately enforce such collaboration.⁴⁵ The SAARC Charter provides the first evidence of its weak mandate in this respect, as it states clearly that the principle of unanimity is the only official decisions procedure; thus, the institution holds no power to process or cope with dissent and disagreement among its members. As such, SAARC’s signing members (originally Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka, and since 2005, Afghanistan) agreed on

⁴⁴Keohane, “The Demand for International Regimes,” 344.

⁴⁵ Obino, “SAARC: The Political Challenge for South Asia and Beyond,” 119.

creating an intergovernmental institution to which they relinquished none of their sovereign powers.⁴⁶ This decision was due to the regional hegemony of India, who threatened to forgo the creation of SAARC if its smaller neighbors were given the power of using a majority vote against it.⁴⁷ Given SAARC's constrictive legislative framework and lack of political will, it cannot play the same role that the EU does in the Rhine region, rendering it impotent in the alleviation of the Ganges conflict between India and Bangladesh. SAARC, at this point in time, is powerless to mitigate India's unilateralism, even though the institution has officially endorsed multilateral water management through the "creation of dynamic complementarities transcending national boundaries."⁴⁸

A UNILATERAL SOLUTION

Although the fragile bilateral/unilateral Ganges management structure does not complement IWRM implementation on a transboundary basis, India has decided to unilaterally embrace and employ IWRM principles on a national basis in an attempt to assuage increasing levels of Ganges pollution. India's legislative embrace of IWRM mandates began in 1993. Its most aggressive implementation of IWRM policy during the last fifteen years has been in the area of participatory governance, as India attempts to empower its citizens and communities in water policy decision-making. The Indian government even amended its Constitution to recognize local government as the legitimate environmental decision-maker and policy implementer. The 1993 73rd and 74th Amendments to the Indian constitution seek to strengthen local democracy and, hence, ensure decentralization of governance. Specifically, these amendments allow

⁴⁶ Obino, "SAARC: The Political Challenge for South Asia and Beyond," 119.

⁴⁷ Hagerty and Hagerty, "India's Foreign Relations," 11-48.

⁴⁸ Ahmad, "Forgetting Political Boundaries," 184.

municipalities (defined as metropolitan areas, smaller urban areas, and transitional areas between urban and rural) the power to have elected governments, to enjoy fiscal autonomy, and to manage their urban environments. Similarly, at the village level, the governance and management of the village rests on *Panchayats*, or bodies of duly elected representatives.⁴⁹

Moreover, the 1993 Twelfth Schedule of the Indian constitution lists urban planning; planning for economic and social development; public health, sanitation, conservancy and solid waste management; and protection of the environment among the powers of local authorities, and as such, further strengthens the impetus for community environmental governance.⁵⁰ By 1997, all of India's states had amended their Municipal Acts to ensure the implementation of these constitutional provisions, and most municipalities held elections for their local governing bodies.⁵¹ Theoretically, these amendments allow citizens of local municipalities to develop programs and legislation to meet their own environmental needs, a task that was impossible in a centralized regime.⁵²

Within its historic and cultural context, India's embrace of the participatory approach is certainly logical, as it attempts to recapture the more provincial traditional methods of Indian water management. In the 18th and 19th centuries, for instance, local townships built canals themselves and relied on small-scale locally conceived and managed cooperative irrigation systems, such as commonly-held water harvesting tanks.⁵³ With the establishment of the British Raj in 1858, the federal government officially usurped the ownership and management of waters, but unofficially, the

⁴⁹ Low, et al., eds., *Consuming Cities*, 188.

⁵⁰ Republic of India Constitution. Twelfth Schedule. Article 243w, Paragraph 5.

⁵¹ Low, et al., eds, *Consuming Cities*, 189.

⁵² Sengupta and Sinha, eds., *Challenge of Sustainable Development*, 81.

⁵³ Mohile, "Integration in Bits and Part: A Case Study of India," 56.

components of an informal water economy still dominate India's resource management. Informal water economies are systems in which water users depend heavily on "self-provision, informal exchanges and local community institutions that are not under the direct influence of formal public institutions."⁵⁴ Such an informal water model still exists in modern India, as evidenced by a 2002 nationwide survey covering almost 80,000 households. This landmark survey found that less than 10% of Indian households used water from sources owned and managed by the government. In addition, less than 20% of rural households were connected with any public or community water supply system, and only one in every 12 villages had any public or community water supply or irrigation system even available.⁵⁵ This evidence is not uniform across India, as socio-economic levels play a large role in whether the state manages water within a particular locality. For example, in Bihar, one of India's poorest states, none of the 364 villages surveyed had a public/community water supply, but in the somewhat richer state of Haryana, over half the villages surveyed had a public water supply system, and in still richer Goa, every village surveyed had a public water supply system available for use, although one must note that not every household was hooked up to that system.⁵⁶

It is precisely the informal nature of this water economy that has prevented the Indian government from experiencing much success with its emphasis on the IWRM principle of valuing water as an economic good. It is not for lack of trying, however, and the National Water Policy of India, initially adopted in 1987 and updated in 2002, speaks to this desire, as it advocates pricing priorities for different water-using sectors, defines

⁵⁴ International Water Management Institute, *IWRM Challenges in Developing Countries: Lessons from India and Elsewhere*.

⁵⁵ *Ibid.*

⁵⁶ Mohile, "Integration in Bits and Part," 56.

water as an economic good, and “proposes the use of water pricing in a manner that would cover the costs of investment, operation and maintenance.”⁵⁷ Additionally, India publicly supports the South Asia Water Vision, created by the Global Water Partnership, an outreach group co-founded by several international organizations, including the United Nations Development Programme. The South Asia Water Vision calls for the privatization of water supply, and a pricing scheme for water that correlates “the levels of service to the prices charged; and to effective cost recovery.”⁵⁸ Despite India’s rhetoric and support of IWRM’s economic aims, in reality, India’s actions in this regard are superficial at best because most of the country’s population is not served by public water providers, or indeed, any sort of formalized water system; thus, pricing water to manage the demand of the resource holds little practicality or effect.⁵⁹

GANGA ACTION PLAN

Notwithstanding the implementation hindrances created by the nature of its informal water economy, India did succeed in altering its constitutional framework regarding environmental protection to be more reflective of IWRM’s drive for local stakeholder involvement in the water management process. In reality, though, the results of this effort suggest that the constitutional reforms made by the government of India are more cosmetic than substantive, as the central and state governments still retain most of the power for devising and implementing ecologically-related regulations. In effect, then, local governments continue to be excluded from efforts to mitigate the degradation of Ganges waters. One only needs to examine India’s execution of the Ganga Project

⁵⁷ Ahmad, “Forgetting Political Boundaries,” 187.

⁵⁸ Global Water Partnership/South Asia Technical Advisory Committee, *South Asia—Water for the 21st Century: Vision to Action*.

⁵⁹ Ahmad, “Forgetting Political Boundaries,” 187.

Directorate (GPD) and the Ganga Action Plan (GAP) to see the failure of its IWRM implementation.

The Indian government originally created the GPD and the GAP upon examining the results of a 1982 scientific study undertaken by the Central Pollution Control Board (CPCB), India's national pollution monitoring body. The CPCB's report detailed heavy land-use patterns, unacceptable loads of domestic and industrial pollution, and high levels of fertilizer and pesticide use in and around the Ganges River, and these unsettling results formed the basis of the Ganga Action Plan. Realizing the need for urgent intervention, the central government set up the GPD as a federal body responsible for both coordinating the different government ministries involved in the financial administration of the GAP and supervising all aspects of GAP compliance.

State governments, in contrast, were responsible for the actual execution of GAP directives, and the GAP's main objective has always been to intercept and divert urban waste away from the Ganges River through the establishment of sewage and industrial effluent treatment plants, public toilets, and electric crematoria.⁶⁰ Local governments, for their part, played very little role in the initial conception of either the GPD or the GAP, although as IWRM gained prominence in Indian legislative trends, certain localities attempted to exercise their newly granted constitutional rights regarding the pollution mitigation of their local Ganges waterways. Unfortunately, the exercise of 73rd and 74th Amendment municipality rights meant that an already largely ineffective plan, rendered so by clashes between federal and state bureaucracies, now had to contend with the wishes of local governments as well. The result was a three-tiered system of legislative chaos and disorder that stagnated efforts to mitigate the degradation of the Ganges.

⁶⁰ Helmer and Hespanhol, eds., *Water Pollution Control*, 307.

A STUDY IN CHAOS AND INEFFECTIVENESS

Upon examination of the GAP's timeline for implementation, the ineffectiveness of the plan becomes apparent. The first phase of the GAP began in 1985 and was initially scheduled to be completed by March 1990; however, due to inactivity, that deadline was continued until 2001, an eleven year extension. Phase I was still incomplete as of 2001, though, so India's central government further extended the GAP's deadline until December 2008. Moreover, GAP planners originally intended Phase II to begin in the late 1990s, and run concurrently with an extended Phase I, but as of March 2006, public interest litigation and judicial decisions had prevented the nationwide implementation of Phase II.

A series of reports by India's Comptroller and Auditor General (CAG) provides the most compelling evidence of the GAP's overall stagnation and ineffectiveness. By 2004, despite spending approximately 3.5 billion rupees, the GAP had met only 39% of its primary sewage treatment targets. In addition, government auditors observed that only 45% of the grossly polluting industrial units along the banks of the Ganges had installed effluent treatment plants, and 18% of those newly installed treatment plants did not function properly or failed to meet technical standards.⁶¹

The CAG Reports also highlight the complete disconnect between Indian federal, state, and local authorities, a divide that runs contrary to the cooperative multilateralism IWRM advocates. On the federal level, the Ganga Action Plan evaluation committee met only *twice* to monitor the GAP's progress, once in 1994 and once in 1997.⁶² Federal enforcement of the plan's directives, then, did not exist. In addition, the Indian central

⁶¹ Comptroller and Auditor General of India, *CAG Audit Reports 2004*.

⁶² *The Times of India*, "CAG Criticizes Ganga Action Plan Implementation," February 6, 2001.

government and GAP officials decided on dissolved oxygen content and biological oxygen demand as the two pertinent criteria for measuring the health of the Ganges River, but both of the numerical standards they chose for those criteria were below international World Health Organization standards, thus leaving the Indian population susceptible to a higher risk of waterborne disease.⁶³

As for the role of the states in the GAP's implementation, auditors found that while states complained that a lack of funds was the main reason for delay and failure to achieve their GAP targets, many of those same states failed to spend the money they were initially allocated. Other states, such as Bihar and West Bengal, drew on the GAP funds given to them, but they misappropriated those funds and used them for non-Ganges related expenditures.⁶⁴ Likewise, the GAP allowed states to determine which towns within their borders had the greatest need for sewage treatment plants, but by allowing for the decentralized determination of the requirements for those plants, the final list of approved towns and villages lacked a sense of uniformity and seemed to be based more on political cronyism and special interests than on actual need.⁶⁵

On the local level, the CAG observed that local communities, and Indian citizens in general, were either ignorant of or totally alienated from the objectives of the GAP, and, as a result, they did not feel a need to participate in the revitalization of the Ganges. Certain state governments were, in part, responsible for this lack of community involvement. The GAP originally called on states to establish citizens' monitoring committees by town, in order to increase the GAP's transparency so that the local populations might have some input into the pollution abatement process. The Haryana,

⁶³ *The Statesman*, "GAP between Words and Action," May 22, 2005.

⁶⁴ *The Hindu*, "Pace of Ganga Action Plan Slow," February 8, 2004.

⁶⁵ *The Times of India*, "All Plan No Action on Ganga Clean-Up," December 29, 2000.

Bihar, and Delhi governments, however, failed to create the citizens' monitoring committees in any of the towns included in the project. West Bengal, for its part, formed citizens' committees in only five out of 42 towns, and those five committees met very infrequently.⁶⁶

Overall, then, the Ganga Action Plan, India's nationalized version of IWRM implementation, has been abysmally unsuccessful, and India's own government auditors place the blame on inadequate administration at every level of the federal hierarchy. To date, approximately 12 billion rupees have gone towards cleaning up pollution in the Ganges, to little effect. The Indian government, however, is still proceeding to implement the GAP despite present failures. To that end, the government approved the creation of the National Ganga River Basin Authority (NGRBA) in February 2009 as Phase III of the GAP (even though Phase II has not been completed) in order to abate the exponentially increasing levels of pollution in the river.⁶⁷ Interestingly, the NGRBA parrots the rhetoric of IWRM's emphasis on the formation of River Basin Districts, and the Indian government claims that the NGRBA comprises a holistic approach to the Ganges by using "the river basin as the unit of planning."⁶⁸ Like all other Indian action on the Ganges issue, however, the NGRBA is a strictly unilateral Indian creation. The river's additional riparian stakeholders are not considered a part of the NGRBA, so Bangladesh continues to suffer the deleterious effects of India's unsuccessful localized IWRM implementation.

⁶⁶ Comptroller and Auditor General of India, *CAG Audit Reports 2000*.

⁶⁷ *The Times of India*, "Ganga Threatened by Increasing Pollution," July 31, 2009.

⁶⁸ Government of India – Press Information Bureau, "Ganga River Basin Authority to Ensure Effective Abatement of Pollution."

HEGEMONY AND UNILATERALISM

In the absence of a shared historical experience of transboundary cooperation, like the one that existed between the Rhine's stakeholders, a sense of *realpolitik* seems to reign in South Asian water management. Although the outcomes of both cases are divergent, the historical orientation of Ganges River management regimes plays a primary role in the success or failure of IWRM implementation, just as it did within the Rhine River Basin. Over the last sixty years, an approach that is bilateral in name, but unilateral in reality, has characterized India's Ganges water management strategy, and it is an approach that lies in stark contrast to the multilateral precepts of IWRM.

The theoretical literatures on collective action, common-pool resources, and privatization are particularly helpful in explaining India's unilateral water policy implementation. Since power factors can determine which states choose to comply with regime objectives and which states knowingly violate those objectives, regional hegemons, like India, choose when and if they will comply with the regime consensus.⁶⁹ Indeed, in the case of the Ganges, India is so dominant over all other riparian states in terms of its international presence, land area, population, and financial resources that it has the capability to dictate the terms of the regime to other actors.

This factor, perhaps more than any other, explains India's insistence on bilateralism/unilateralism in the Ganges' regimes of the last sixty years. Theory suggests that hegemonic preferences will prevail within a regime, and the Ganges case supports this concept, as India, the hegemonic regional power, successfully torpedoed the creation of effective multilateral regimes time and time again over the last several decades.⁷⁰ Just

⁶⁹ Mitchell, "Regime Design Matters," 428.

⁷⁰ Keohane, "The Demand for International Regimes," 326.

as with the creation of SAARC, India refuses to allow smaller, less powerful, actors to form a multilateral system capable of vetoing its decisions regarding the Ganges. Instead, India's unilateral version of the Ganges regime takes the form of imposition, a notion which also connects to India's hegemonic dominance in the region. India, as powerful actor, has established the 'rules of the game' and forced others, namely Bangladesh and Nepal, to conform to these arrangements through a combination of "coercion, cooptation, and the manipulation of incentives," particularly through its construction of the Farakka Barrage.⁷¹

With that weight of leverage over its rivals, there is nothing to prevent India from taking what it wants of the Ganges and denying its neighbors access to precious water resources. Amalgamating that type of regional hegemonic power with the added stress of severe water allocation issues attaches an additional layer of complexity to the conflict – a complication not seen in the Rhine River Basin, which never suffered from water allocation disputes between its stakeholders. If water is life, then without it, populations and their respective states can wither away. Consequently, it does not seem hyperbolic to claim that states may view the availability of water as a major security issue that fails to open itself to a cooperative resolution. It is this acute nature of the water scarcity problem in South Asia, combined with the asymmetric and aggressive orientation of the region's previous water management regimes that renders IWRM implementation unsuccessful in the case of the Ganges.

The CPR literature highlights further India's ability to force unilateral solutions to what is, at its core, a transboundary problem. In fact, an unusual characteristic of India's experience with the Ganges distinguishes it from Germany's experience with the Rhine

⁷¹ Young, *International Cooperation*, 88.

and enables India to forgo multilateral water management solutions. In theoretic terms, the Rhine River comprises a common-pool resource (CPR), or a resource that is rivalrous, but non-excludable in practice.⁷² Indeed, this definition holds true in the Rhine River Basin because all relevant stakeholders had never faced problems of appropriation, having always had access to the water they needed. India's construction of the Farakka Barrage, along with its geographic dominance of the river, transformed the Ganges from a CPR into a private good, and the construction of the barrage enabled India to effectively hoard Ganges water and exclude Bangladesh from using the resource. In doing so, the regime-related claims within the CPR literature, such as the effectiveness of spontaneous regimes at solving environmental policy quandaries or the ability of cooperation to solve dilemmas of common interest and/or aversion, fail to apply to the Ganges situation. In essence, the Farakka Barrage negated the non-excludability characteristic of the Ganges, thereby negating the need, in India's eyes at least, for any type of collaboration on water management.

Additionally, as the privatization literature suggests, India's effective redefinition of the Ganges as "private property" further speaks to the absence of transboundary IWRM policy in this region. The principles underlying IWRM are anathema to the idea of water as a private resource because "dominance of the private property concept will reduce, if not diminish, any interest in community projects and result in low participation in decision-making."⁷³ As the India/Bangladesh conflict suggests, India's claim of private property rights over the Ganges do not mesh well with the idea of a shared accountability and interest in safeguarding natural resources between all stakeholders.

⁷² Ostrom, et al., *Rules, Games, and Common-Pool Resources*, 6.

⁷³ Abu Shair, *Privatization and Development*, 123-124.

India's unilateral policy orientation extends even into its internal application of IWRM's principle of participatory management, to the detriment of the policy's implementation. The privatization literature, applied creatively, provides more insight into the failure of India's localized IWRM application than any other theoretical explanation. India took all the necessary steps, on paper in any case, to implement a more participatory management framework over the state's water resources. Indeed, this approach seems compatible with India's informal water economy, which already sees small communities managing their local water resources on a large-scale basis. India's implementation failure in this situation was in its follow-through. The Indian federal government required a massive change to existing water policy by supporting IWRM's implementation, but then failed to provide a "strong regulatory framework" to accompany the new policy focus.⁷⁴ Just as with the privatization process, the government cannot simply "wash its hands and walk away" after such a policy is implemented.⁷⁵ Instead, the Indian government needed to monitor IWRM's progress on a regular basis and establish strict control over the implementation process, which it failed to do.⁷⁶ The privatization literature also suggests that natural resource provision in states with fragmented governance structures may prove exceedingly difficult to regulate because there is no one agency or governance level designated as the overseer to a complex policy implementation process.⁷⁷ Instead of centralizing IWRM oversight, India's constitutional reforms decentralized the implementation process, rendering it wholly ineffective.

⁷⁴ Lovei and Gentry, *The Environmental Implications of Privatization*, 7.

⁷⁵ *Ibid.*, 45.

⁷⁶ Gleick, et al., *The World's Water, 2004-2005*, 60.

⁷⁷ Parker, "Privatization and Regulation of Public Utilities," 550.

The literatures on CPRs, collective action, and economic privatization serve as helpful aids in piecing together the intricate puzzle that is IWRM implementation in South Asia, as they help to explain several factors contributing to the sorry state of cooperative IWRM implementation in South Asia. India's regional hegemony, its geographic control over Ganges water, the aggressive nature of the river's previous water management regimes, and the lack of an effective regulatory environmental policy framework within India all combine to transform Ganges water management into a fragmented chaos of management. Amidst all the policy dissonance, the degradation of the Ganges remains consistent -- the water in the Ganges continues to disappear, and the little remaining water is so polluted that it is often poisonous to the human beings, animals, and agriculture it serves. In legend, King Bhagirathi asked that the sacred Ganges water descend from heaven and purify the ashes of his ancestors. It is doubtful that he could have imagined that, today, all relevant stakeholders seem either powerless or unwilling to purify and effectively protect the waters of holy 'Mother Ganga.'

CHAPTER VI
CANADA AND IWRM

When I was in space looking down on our magnificent blue and brown planet Earth, I realized how truly unique Canada is. This country with its fresh water, soil, atmosphere, and various types of climate, may well be the salvation of the whole planet.

-Roberta Bondar,
Canadian astronaut

A metaphor provided by one of Canada's own rivers symbolizes the unique complexity involved in the management of this vast nation's water resources. Members of Canada's First Nations communities consider sacred a river in Manitoba from which water flows both east into the adjoining Hayes River and west into the Nelson River. The Cree people call this unusual circumstance the *Echimamish*, or 'the-river-that-flows-both-ways.' In homage to the almost magical reversal of flow that allows for easy navigation between the Hayes and Nelson waterways, native people traditionally leave offerings each time they cross the *Echimamish* as a tribute to the river's dual nature.¹ This duality echoes the polarity confronted by water administrators across Canada's expansive territory – in that, Canada, as a relatively water wealthy nation, still suffers from episodic water scarcity.

Certainly Canada is an internationally-recognized leader in water management, and its water provision system ranked second out of 147 countries measured by the 2003 Water Poverty Index -- a metric using an amalgamation of a country's total amount of water resources, capacity for water provision, and ecological legislative protection of

¹ Newbury, "Return to the Rivers of Discovery in Western Canada," 237-248.

water as the barometer of its success.² IWRM principles play a significant role in Canada's water-related success and have for many years, as Canadian water policy adhered to IWRM ideals decades before the United Nations introduced the management framework to the international community at the 1992 Rio Conference on the Environment. Tacit references to IWRM principles appeared in Canadian national water policy as early as the 1960s and continued to affect legislation over the next two decades, finally finding official articulation in Canada's landmark 1987 Federal Water Policy.

Interestingly, the evolution of Canada's IWRM implementation within its own domestic context follows a very similar pattern to the transboundary execution of its Rhine counterpart, as the historical orientation of the region's previous water management regimes, along with an adherence to a sort of linear dialectic of regime sequencing have played a significant role in the Canadian experience. Canada's initial water management regimes were spontaneous in nature, arising out of a joint need for stakeholders to solve dilemmas of collaboration. Like the historical Rhine regimes, these early Canadian policy frameworks emphasized the IWRM components of environmental sustainability, interjurisdictional cooperation, and the democratization of water policy, although the actual implementation of these principles was hampered initially by a legislative push to lessen the government's role in water provision and service. A water-related tragedy, however, forced the Canadian government's return to a more formal implementation of the IWRM doctrines that had characterized the historical character of Canada's earlier water management regimes, and like a phoenix rising from the ashes of privatization, IWRM in Canada was born again.

² Lawrence, et al., "The Water Poverty Index: An International Comparison," 11.

In theoretical terms, the related literatures on common pool resources and collective action inform the following analysis illustrate how Canada is in the process of successfully implementing those IWRM policies that conform to the principles advocated by its historical management regimes. These pre-existing regimes, with their foci on environmental sustainability, collaborative enterprises, and public participation, marginalized water's economic valuation and completely disregarded the human right to water in a similar manner to the Rhine's management regimes. Additionally, the Canadian experience mimics that of the Rhine in terms of the efficacy of regime type and sequencing, as spontaneous, formalized, and imposed regime creations all play a fundamental role in the story of IWRM in Canada. The Canadian experience diverges with that of the Rhine on the implementation of water-related privatization, however; thus, the privatization literature plays a more significant role in Canada's case than in did in Western Europe, as it addresses Canada's disastrous efforts to privatize water provision and service.

THE TRUTH (AND FICTION) OF CANADIAN WATER

Modern-day Canadians share a deep-seated environmental ethic and commitment to ecological protection. According to a 2008 *EnviroNics International* public opinion poll, eight out of ten Canadians believe that environmental protection should be given priority over economic growth, and this is the highest proportion of support for the environment out of thirty countries surveyed.³ Another recent study found that care for the natural environment was one of only two common ideals espoused across all socio-

³ Boyd, *Unnatural Law*, 4.

economic segments of Canadian society (socialized medicine was the other).⁴ Even Canada's national iconography reflects its interest in the natural world, as the country's federal and provincial flags, coat of arms, and currency all exhibit images of landscape and wildlife.

Unfortunately, Canada's collective ecological commitment has not always translated into protection for the country's freshwater resources. Such neglect is due largely to the widely-held perception that Canada is a water wealthy country; and in the Canadian consciousness the idea that water is abundant has often appeared to negate the need for its legislative protection. Canada's proximity to large bodies of freshwater ostensibly validates this opinion, and the Canadian land mass lies adjacent to six of the largest freshwater lakes in the world (Ontario, Huron, Erie, Superior, Great Slave, and Great Bear). Moreover, several large rivers traverse this huge country, most notably the Fraser, Tatshenshini, Mackenzie, Saskatchewan, Red, Bow, Don, Ottawa, St. Lawrence, and Saguenay.

It is, perhaps, this perceived abundance that leads to the oft-cited claim that Canada holds 20% of the world's freshwater. In principle, this claim an honest one, but it is certainly misleading, as much of Canada's freshwater is either nonrenewable "fossil water" that has been trapped underground for millions of years in aquifers or is water that is solidly frozen in glaciers and inaccessible for human use. Considering these circumstances, Canada's actual share of the global supply of renewable freshwater is approximately 7%, placing it behind Brazil (with 12.4%) and Russia (with 10%) in terms of total available freshwater resources.⁵ Still, at approximately 33 million people,

⁴ Boyd, *Unnatural Law*, 4.

⁵ World Resources Institute, *Freshwater Resource 2005*.

Canada's population is relatively small in proportion to its landmass; thus, on a per capita basis the country has a tremendous amount of renewable freshwater available for its citizens.⁶ At 99,000 cubic meters per person/per year, Canada's accessible freshwater far surpasses the water available to people in the United States (9,277 cubic meters per person/per year) or France (3,408) and is staggeringly more than the amount of water to be had in more arid countries like Israel (389) or Kuwait (95).⁷

Although it may seem counterintuitive in the face of its relative water abundance, Canada does in fact suffer from instances of water scarcity. The uneven distribution of the country's water resources is the primary cause of this scarcity, as approximately 60% of Canada's fresh water drains to the north, even though 85% of its population lives within 300 kilometers of the country's southern border with the United States. Simply put, fresh water is largely unavailable for use in the southern part of the country, where the majority of Canadians live and work.⁸ Rainfall amounts play an additional role in Canada's water woes. Precipitation totals in the country vary from more than 5,000 millimeters per year along parts of the Pacific coast to less than 100 millimeters per year in parts of northern Canada and the prairies.⁹ Exacerbating these water shortages is the fact that Canadians are profligate water users, and they use the second largest amount of water per capita out of all the states in the Organization for Economic Cooperation and Development (OECD) -- the United States is first in this regard. This means that Canadians use water at a rate twice the European average and more than ten times the

⁶ De Loë and Kreutzwiser, "Challenging the Status Quo," 85.

⁷ Boyd, *Unnatural Law*, 14-15.

⁸ Sprague, "Great Wet North? Canada's Myth of Water Abundance," 25.

⁹ De Loë and Kreutzwiser, "Challenging the Status Quo," 85.

water use average in Africa and parts of Asia.¹⁰ These factors combine to produce dilemmas of common interest in Canada which, like the Ganges River Basin, has a constant need of an agency or institution with the power to coordinate or to allot individual use of its sometimes scarce water resources.¹¹

Allocative issues are not the only source of Canadian water scarcity. In many cases, physical water resources exist, but the quality of that water is extremely degraded due to pollution, thus rendering it almost unusable without expensive treatment. Byproducts from industry, farming, ranching, logging, mining, sewage disposal, and urban sprawl all combine to contaminate Canada's water resources.¹² Billions of liters of raw or minimally-treated sewage are dumped into Canadian waterways every year, and business and industry annually discharge more than 20 million kilograms of toxic chemicals into the country's rivers, lakes, and streams.¹³

Canada's cattle industry stands as the worst offender of all the country's myriad water polluters. In Canada, cattle ranching produces 132 billion kilograms of manure annually, and the run-off from cattle farms threatens local water supplies with coliform bacteria, nitrates, and pesticide residue.¹⁴ Fecal coliform infiltration is perhaps the most pressing consequence of ranching, as it is often responsible for outbreaks of waterborne disease in Canada – most commonly, *giardia* and *cryptosporidium*. Out of 423 treated water samples from across Canada, for example, 18.2% contained *giardia*, an organism which causes constant and debilitating diarrhea, and 3.6% contained *cryptosporidium*, a

¹⁰ Schindler, "The Cumulative Effects of Climate Warming and Other Human Stresses on Canadian Freshwaters in the New Millennium," 19.

¹¹ Ostrom, et al., *Rules, Games, and Common-Pool Resources*, 6.

¹² Boyd, *Unnatural Law*, 18.

¹³ *Ibid.*, 14-15.

¹⁴ *Ibid.*

pathogen which can cause serious disease or death in people with auto-immune disorders. Out of the provinces, British Columbia exhibits the highest levels of these waterborne diseases within the Canadian state, with 27 contamination outbreaks reported in the province during the last 18 years.¹⁵ These waterborne diseases are especially prevalent in the native Canadian, or 'First Nation,' communities, where more than 20% of the water systems contain excessive levels of sewage and toxic pathogens.¹⁶

WATER MANAGEMENT FRAGMENTATION

Due to well-publicized water contamination incidents in Walkerton, Ontario and, to a lesser extent, North Battleford, Saskatchewan, Canadians have begun to confront the country's 'myth of water abundance' with more honesty and concern in recent years. In particular, these incidents have encouraged Canadians to express a stronger commitment to water governance than in previous years, and a 2004 poll found that 97% of Canadians agreed their country should adopt a comprehensive national water policy that, among other things, addresses the country's uneven water distribution and pollution issues, while also recognizing clean drinking water as a basic human right.¹⁷

Although progress is certainly occurring, a comprehensive national water policy remains more of a dream than a reality due to structural cleavages within Canada's legislative water management framework. Much like the configuration of water governance in Germany and India, Canada's federal water policy hierarchy is a study in fragmented jurisdiction. Historically, this fragmentation has confused the actual implementation of water laws and legislation, while also leading to "regulatory gaps,

¹⁵ Boyd, *Unnatural Law*, 17.

¹⁶ Ibid.

¹⁷ Bakker, ed., *Eau Canada*, xi.

policy vacuums, and management by crisis.”¹⁸ In recent years, however, the Canadian federal government and provinces have begun to rectify their disjointed approach to water management in order to emphasize the principles of environmental sustainability, interjurisdictional cooperation, and policy democratization, all core IWRM components.

For one to understand the modern context of Canadian IWRM implementation, a discussion of the country’s legislative foundation for water governance is necessary. The Canadian Constitution Act of 1867 divides legislative power over water between the federal and provincial governments, with the provinces having the most direct responsibility for water management. Specifically, the Act holds that provinces and territories are accountable for protecting water quality, regulating drinking water systems, and making resource use and allocation decisions. This is not to say that each province governs its water resources in an identical manner; in reality, the opposite is true. Since the Second World War, each province has evolved its own legislative approach to water, and this has resulted in a large number of dissonant provincial water regimes in Canada.¹⁹

The federal government’s role in water management is more constitutionally imprecise than that of the provinces, as the Canadian Constitution allows the national government to take legislative initiative only over navigation, oceans, fisheries, federal waters (such as those in national parks and military bases), and certain water resources found on First Nations’ land. Not content with the constitutional vagaries of its water management role, Canada’s federal government sought to redefine and expand that role during the 20th century by utilizing the promotion of the “peace, order, and good government” constitutional clause as justification for assigning itself the responsibilities

¹⁸ Muldoon and McClenaghan, “A Tangled Web: Reworking Canada’s Water Laws,” 246.

¹⁹ Booth and Quinn, “Twenty-Five Years of the Canada Water Act,” 65.

of regulating toxic substances, promoting pollution prevention, and funding water-related scientific research.²⁰ The federal government also took upon itself to remedy the fragmentation of the country's many provincial water regimes by preserving a role for federal intervention in provincial water management, most specifically through the enactment of the Canada Water Act of 1970 and the Federal Water Policy of 1987.

THE CANADA WATER ACT OF 1970

With its implementation of the Canada Water Act (CWA), the federal government attempted to provide a structure for cooperative work between provinces on water-related issues, while also reserving a role for federal government mediation in the event that cooperation failed. Indeed, the rationale behind the introduction of the CWA may best be understood by a brief discussion of the legislation it replaced. The Canada Water Conservation Assistance Act of 1953 provided for federal financial assistance to provincial construction of dams and reservoirs, essentially serving as a monetary source for any project whose goal aimed to store water for later allocation. The 1953 Act was largely ineffectual, however, as only a few small flood control works qualified because cost-sharing disagreements between provincial stakeholders prevented the Act's application to major transboundary water construction projects like the proposed South Saskatchewan River Dam or the Winnipeg Floodway. Ultimately, both those projects were approved under special agreements that fell outside the purview of the 1953 legislation, rendering the Act almost completely ineffective in terms of interjurisdictional collaboration.²¹

²⁰ Hughes, Lucas, and Tilleman, *Environmental Law and Policy*, Chapter 2.

²¹ Booth and Quinn, "Twenty-Five Years of the Canada Water Act," 65.

The Canada Water Act, passed in June of 1970, was the eventual response to the collaborative shortcomings of the 1953 law. Rather than restricting federal participation, the CWA provided a structure which could be more comprehensive in its scope than separate federal and provincial approaches would allow. The Act consisted of four parts, each with its own goals and objectives. Part One allowed for joint federal and provincial collaboration regarding the management of water resources of “significant national interest.”²² Part Two called for unilateral federal intervention if two provinces failed to agree on the proper management of a transboundary water resource, and Part Three addressed pollution, by regulating the concentration of nutrients in cleaning agents and water conditioners (for instance, it limited phosphates in laundry and dishwashing detergents). Finally, Part Four allowed for the creation of public information programs and advisory bodies on water management, and this component of the Act actually served as an early evolution of what would become the primary IWRM principle of public participation in water governance.²³

For all of its ambitious goals, the Canada Water Act faced serious issues of implementation. The CWA, for example, permitted the federal government to formulate management plans with respect to waters of “significant national interest,” but it delegated no actual implementation authority for these tasks. Part Two of the Act is even more far-reaching in terms of federal action, as it permits Ottawa to intervene unilaterally in provincial water-related disputes; however, it is an act without teeth, as the government has failed to invoke this unilateral power even once over the past forty years. In reality, there is little prospect of such intervention happening in the future, given the

²² Booth and Quinn, “Twenty-Five Years of the Canada Water Act,” 66.

²³ Ibid.

reaction of provincial governments, which have utilized the federal court system to challenge the CWA over what they see as an affront to the precarious balance between federal and provincial responsibility over water management.²⁴ The Canadian courts, in response to these lawsuits, have sided largely with the provinces by narrowly defining the federal interest in water and restricting it to the particular constitutional power being invoked – for example requiring that “legislation passed pursuant to the fisheries power is indeed related to the management of fisheries rather than to wider goals of water management.”²⁵

THE 1987 FEDERAL WATER POLICY

Seemingly undeterred by the constitutional shortcomings of the Canada Water Act, legislators crafted a second bill that defined a more specific federal role in Canadian water management. The 1987 Federal Water Policy (FWP) was the result of this effort, and it was largely visionary in its construction, as it embodied the IWRM principles of stakeholder cooperation, environmental sustainability, public participation, and the notion of water as an economic good six years before those principles were ever institutionalized by the United Nations at the 1992 Rio Conference. The idea of Canada as an IWRM forerunner, then, arose out of an attempt to maintain a federal role among provincial legislative disorder.

The origins of the FWP lie in a 1985 federally-supported panel of inquiry, which was given a broad mandate to travel across Canada and “identify and substantiate the

²⁴ Saunders and Wenig, “Whose Water? Canadian Water Management and the Challenges of Jurisdictional Fragmentation,” 125.

²⁵ *Ibid.*, 122.

nature of emerging water issues, including the interjurisdictional dimensions thereof.”²⁶

The policy that emerged out of that panel’s findings had a stated overall objective compatible with the goals of sustainable development, as it encouraged “the use of freshwater in an efficient and equitable manner consistent with the social, economic and environmental needs of present and future generations.”²⁷ Most interestingly in terms of IWRM implementation, the FWP holds obvious parallels with the much later European Water Framework Directive (WFD) in terms of its stated methods and objectives. Although there is no direct evidence that elements of the WFD were modeled on the FWP, correspondence between the two pieces of legislation is striking.

The FWP’s division of water sources into ecological management units based on watersheds, for instance, serves as an early version of the river basin district (RBDs) concept that has proven a success in the administration of the Rhine. Such a designation rests upon a secondary recommendation of IWRM – that of using the river basin as the primary spatial unit of water management analysis. Canada was indeed ahead of its time in this regard, as the use of such geographic units of analysis was not unprecedented in Canadian water management at the creation of the FWP in 1987. In fact, the Canadian federal government had recommended comprehensive river basin planning in the late 1960s to its provinces, albeit with low levels of success. A later governmental assessment of that early Canadian experience with river basin planning revealed that the approach’s major drawback was that the recommendations applied to each river basin were usually not prioritized – a problem further exacerbated by the fact that once a plan was complete, the team which had prepared it dispersed, leaving few people who could

²⁶ Environment Canada, *Currents of Change: Final Report*, 189.

²⁷ *Ibid.*

provide insight about priorities. Within the tenets of its 1987 Federal Water Policy, then, the Canadian national government utilized the lessons of its 1960s experience to improve the river basin management planning process, and in doing so, provide a firmer, if implicit, foundation for future IWRM implementation in Canada.²⁸

The FWP called also for the establishment and application of strict evaluation criteria for all federally-sponsored water projects to ensure their compatibility with federal water management priorities, and again, the EU's WFD reproduced this trait within its tenets. Moreover, Canada's FWP supported opportunities for public consultation and participation in the water policy process, operating on the assumption that a well-informed public, along with clearly defined channels for public participation, would provide assurance that water management decisions account for the full spectrum of public values. To achieve effective implementation of the policy, the federal government designated the Interdepartmental Committee on Water (ICW) as the focal point for coordinating the policy among federal departments and agencies, much like the assignation of the ICPR in the Rhine region as the central coordinating agency responsible for the Rhine's management. As part of its responsibility, the ICW, like the International Commission for the Protection of the Rhine, was tasked with producing an annual report on the overall implementation of federal water policy, as well as assessing the strengths and weaknesses of that policy's execution.²⁹ Furthermore, the assignation of the ICPR as a static agency in charge of the planning process for the Rhine River Basin mitigated the concern with transitory planning regimes that had hampered early IWRM implementation in Canada.

²⁸ Mitchell, "IWRM in Practice: Lessons from Canadian Experiences," 51-52.

²⁹ Environment Canada. *Federal Water Policy*.

At the same time, the FWP called for improved federal-provincial coordinating mechanisms and bilateral arrangements in the water management field, including consultation and information exchange through interjurisdictional forums such as the Water Advisory Committee of the Ministers of the Environment (CCME) and intergovernmental agreements for cooperative programs with all provinces/territories.³⁰ The 1987 Policy, like the 1970 Canada Water Act, also created a mediation role for the federal government in the case of provincial disagreements over water management when the jurisdictions involved tried, but failed, to reach an agreement.³¹ Again, the much newer WFD echoed all of these legislative components, simply substituting the institution of the European Union in place of the Canadian federal government; thus, transforming a national policy into one applicable in an international context. Finally, Canada's FWP emphasized the strategic pricing of water through the establishment of a "fair value" for water, meaning a call for water prices to include the real value of the resource and its delivery systems, and the promotion of the "polluter pays" principle, both ideals espoused by the WFD twenty years later.³²

Canada's 1987 Federal Water Policy, then, served as a precursor to later IWRM-specific legislation, as it tacitly advocated three of the four IWRM principles – those of environmental sustainability, the democratization of water policy, and the economic management of water, all within the context of interjurisdictional cooperation. Moreover, in yet another remarkable similarity to the WFD, the FWP ignored the role of social equity in the water management equation, perhaps speaking to the fact that Canada's relatively privileged economic status allowed the vast majority of Canadian citizens to

³⁰ Environment Canada. *Federal Water Policy*.

³¹ *Ibid.*

³² *Ibid.*

benefit from the country's excellent water infrastructure, a condition that negated the need to institutionalize this principle in legislation. Unlike the European Union's Water Framework Directive, however, Canada's Federal Water Policy found no success in its first incarnation, as a wave of privatization swept the Canadian federal government during the next decade and mitigated the effectiveness of the 1987 policy. Until the Walkerton tragedy at the turn of the 21st century, the FWP remained little more than a statement of good intentions rather than a fully realized water management framework.

THE PARADOX OF PRIVATIZATION

During the 1990s, a newly-appointed federal administration led by Progressive Conservative Premier Mike Harris advocated the popular neoliberal economic agenda of the 'Washington Consensus' as a guiding principle of Canadian governance.³³ Premier Harris and his administration believed that by emphasizing deregulation, privatization, and fiscal austerity, the Canadian budgetary outlook, which was besieged by deficits during that decade, would improve. As a consequence, this new policy focus marginalized the FWP's emphasis on an increasing federal role in water policy; instead, the new government supported the privatization of certain aspects of water management and sold it to the Canadian public as a "toolbox" of techniques from which the government might draw those methods most appropriate to meet the task of efficiency.³⁴ In this model of distributive governance, the role of the Canadian state transformed as it shifted decision-making to the lowest, most local, level and increased the reliance on the private sector to provide effective water management and service.³⁵

³³ Stiglitz, *Globalization and Its Discontents*, 16.

³⁴ Feigenbaum and Henig, "The Political Underpinnings of Privatization," 185-186.

³⁵ Paquet, "Straws in the Wind," 76.

A legislative movement known as the 'Common Sense Revolution' (CSR) typifies the policy climate in Canada during that time. The CSR operationalized the policy components of the 'Washington Consensus,' and in essence, represented a push to provide Canadians with more service for less government. The subsequent creation of the Red Tape Commission, established in November 1995, became the policy vehicle of the CSR, as it identified areas of government "waste" and forced those particular departments to severely reduce their budgets. Environmental organizations and agencies became primary targets in this effort to reduce the size and role of government, and these organizations faced cuts of anywhere from 30% to 65% to their operating budgets.³⁶

THE RISE AND FALL OF THE P3

The specter of federal budget cuts meant that provinces received less money to help subsidize state-provided water treatment, leaving many municipalities struggling to fund their water treatment facilities in the midst of declining governmental revenues. To solve this dilemma, the mid-1990s saw several Canadian municipalities sign contracts with private companies for water supply and sewer management. These 'P3s' were public-private partnerships where the government retained ownership of supply networks, while contracting with private companies for a defined period of time to design, build, operate, or manage components of a public water supply system.³⁷ Theoretically, the P3s were to deliver infrastructure and services more efficiently and at a lower cost than government provision of the same service, and in Canada, the trend toward P3s on the municipal level was very much a reflection of the fiscal policies advocated by the Red

³⁶ O'Connor, *Report of the Walkerton Inquiry: Part 1*, 462-463.

³⁷ Bakker, "Commons or Commodity? The Debate over Private Sector Involvement in Water Supply," 185.

Tape Commission. The most notable instance of a P3 emerging out of an increased desire for efficiency in water production was the contract that Hamilton, Ontario signed with Philip Utilities Management Corporation (PUMC) in December of 1994. This ten year agreement transferred responsibility for the operation, management, and maintenance of Hamilton's water and sewage system to PUMC, and at the time it was signed, the deal was the largest P3 agreement of its type in North America.³⁸

As a requirement of the contract, PUMC promised to safeguard Hamilton's water resources, while also providing new jobs in the water treatment industry for the city's citizens. Instead, PUMC slashed its workforce by 50% within eighteen months, spilled 180 million liters of raw sewage into the city's harbor, and flooded 200 homes and businesses by way of substandard water pipe maintenance.³⁹ Additionally, PUMC's inadequate management of Hamilton's wastewater treatment plant caused the city's sewage effluent to often exceed limits for phosphorus discharge, and these excessive phosphorus levels caused eutrophication and subsequent fish kills in local waterways. In response to PUMC's many ecological mishaps, environmental fines against the company mounted.⁴⁰

It did not help matters that, due to a series of corporate buyouts, the contract kept changing hands. During PUMC's tenure, the contract shifted five times, at one time landing with a subsidiary of Enron, and ending with German company RWE as the provider in charge at the time of the contract's renewal in 2004. During the renewal period, the Hamilton City Council chose initially to try the private option again and

³⁸ Bakker, "Commons or Commodity? The Debate over Private Sector Involvement in Water Supply," 185.

³⁹ Anderson, *Privatizing Water Treatment*, 4.

⁴⁰ *Ibid.*

instructed city managers to invite proposals from all bidders. These new bids were required to estimate costs for the city's newly proposed contract which addressed some of the problems of the previous agreement, including establishing liability in the case of another sewage spill, requiring liability insurance to be carried by the operator, and requiring the private operator to pay for routine system maintenance and upkeep. This new contract attracted American Water as its sole bidder, and the company presented a price that was three times the estimated cost of providing the service. At that point, the City of Hamilton opted to bring water management back into the public sector and run the water treatment and wastewater plants itself.⁴¹

The return to public operation of Hamilton's water and wastewater treatment saved the city at least \$1.2 million in its first contract year and also improved the quality of wastewater effluent in Hamilton, as levels of phosphorus in the sewage effluent were down 75% in 2005 from 2004 levels.⁴² In Hamilton's case, then, it rang true that state governments, rather than competitive market instruments, were more suited to providing services that a private company like PUMC did not have the incentive or means to efficiently supply and allocate.⁴³ Regardless, the negative privatization experience of the City of Hamilton seems to have soured the Canadian public on such ventures. Since Hamilton, there have been repeated protests, intense lobbying campaigns, and negative media attention against attempts to privatize water utilities in both Halifax and Vancouver, and today, most Canadian municipalities appear committed to the public provision of water and wastewater treatment over what are perceived to be more expensive and less effective private options.

⁴¹ Anderson, *Privatizing Water Treatment*, 4.

⁴² Ibid.

⁴³ Ibid.

Although the experiences of cities like Hamilton have led to a virtual abandonment of private water provision across much of Canada, another type of privatization had an even more lasting effect on Canadian IWRM implementation. At the behest of the Harris administration in the mid-1990s, the Red Tape Commission required all government agencies to identify the basic functions needed to continue “effectively” serving the Canadian citizenry. For its part, Environment Canada identified its three main functions as the provision of policy, science, and service, but in the face of fiscal austerity, it expressed the wish to maintain the capacity for policy and science and to reduce the provision of service. In terms of water management, this diminution of service meant significant reductions in water quality monitoring.⁴⁴ Before the budgetary cuts, the federal government provided each province in Canada with funds to operate several scientific laboratories tasked with monitoring water quality from Canadian cities and towns. After the ‘Common Sense Revolution,’ the government farmed out the job of water quality oversight to private laboratories which, the Red Tape Commission theorized, could provide the service more efficiently and at less cost to the Canadian taxpayer.⁴⁵ Unfortunately for some of Canada’s citizens, the privatization of water quality monitoring had deadly consequences, most specifically in the towns of Walkerton, Ontario and North Battleford, Saskatchewan. The cumulative effect of both tragedies prompted a reexamination and, ultimately, a discarding of the efficacy of privatization in Canadian water management and a reestablishment of a more prominent federal and provincial role in Canada’s water policy framework.

⁴⁴ Bruce and Mitchell, “Broadening Perspectives on Water Issues,” 4.

⁴⁵ Shrubsole and Draper, “On Guard for Thee? Water (Ab)uses and Management in Canada,” 47.

THE WALKERTON TRAGEDY

The Walkerton tragedy, more than any other water-related incident in modern Canadian history, served as the catalyst that sparked a return to the IWRM principles of environmental sustainability, public participation, and interjurisdictional cooperation in Canadian water management. For residents of Walkerton, Ontario, a small town of approximately 5,000 people, the Victoria Day weekend in May 2000 heralded the start of summer. This was not a Victoria Day like all others, however, and by the Monday morning following that year's holiday, Walkerton's first resident had died from drinking contaminated water -- that death only a precursor of the epidemic of waterborne illness that was to grip the small town.⁴⁶

At that time, like 80% of municipal water systems in Ontario, Walkerton's drinking water supply was managed by a publicly-run utility chartered and funded by both the town itself and the Province of Ontario. In Walkerton's case, a combination of elected representatives headed the town's Public Utilities Commission (PUC), while staff hired by those elected officials managed the utility's daily operations. Perhaps not unusual given Walkerton's small population size, two brothers, Stan and Frank Koebel, were primarily responsible for administering Walkerton's water utility, with Stan as the general manager of the Walkerton PUC and Frank as its foreman.

The week leading up to that year's Victoria Day had been filled with heavy rain. In Walkerton, a rural area where cattle farms surrounded many of the town's water sources, water quality tests provided an essential service in measuring the danger presented by the runoff from those farms. On Saturday, May 13, 2000, the first day of Victoria Day weekend, Frank Koebel was tasked with completing a daily measurement of

⁴⁶ Prudham, "Poisoning the Well," 343.

the chlorine residuals in Walkerton's well no. 5. At the time, well no. 5 served as the primary source of the town's water, and like all well water in Walkerton, well no. 5 was supposed to be disinfected every day by the use of sodium hypochlorite.⁴⁷ In standard operating procedure, a PUC employee would add sodium hypochlorite (a type of chlorine) to the well water, and he or she would then test the well's chlorine residuals to determine its viability as a healthy water source. While a measurement of high chlorine residuals suggests a low level of contamination, a measurement of low to no residuals indicates the presence of bacteria in the water, since chlorine dissipates as it eradicates contamination. Unfortunately for the people of Walkerton, Frank Koebel did not measure chlorine residuals that day nor in the days that followed, instead entering false information in log books kept by the utility. Two years later, the official inquiry into the Walkerton outbreak found that Walkerton PUC employees routinely entered a chlorine residual of 0.5 mg/L or 0.75 mg/L, even though they were actually setting the chlorine dosage much lower than that, and in some cases failing to add any chlorine at all, in response to complaints from the residents that there was "a chlorine taste in the water."⁴⁸ According to the court testimony of PUC manager Stan Koebel, this type of record falsification had occurred unabated for twenty years.⁴⁹

Frank Koebel's failure to perform the chlorine residuals test on May 13 meant that Walkerton's public utility was unaware contaminated water from cattle runoff was entering the town's water distribution system. Two days later, on May 15, PUC employees collected routine water samples from well no.5 and sent them to A&L Laboratories – the private lab contracted by the Walkerton PUC to conduct

⁴⁷ O'Connor, *Report of the Walkerton Inquiry: Part 1*, 57.

⁴⁸ *CBC News*, "Walkerton Inquiry: Sterling grilled about responsibility," June 28, 2001.

⁴⁹ O'Connor, *Report of the Walkerton Inquiry: Part 1*, 57.

microbiological analysis on the town's water. On May 17, A&L informed Stan Koebel that there were high levels of the deadly bacteria *Escherichia coli* O157:H7 (*E. coli*) in the water system, but Mr. Koebel chose to remain silent in the face of this report and failed to notify the town's managers or the provincial public health authorities about the contamination of Walkerton's water.⁵⁰

On May 20, in response to inquiries from the regional Ministry of Health Office, which by that time was inundated with reports of *E. coli*-related illness, Stan Koebel flooded the well-water system with chlorine until adequate residual levels were restored. Mr. Koebel did not, however, make a statement to the public regarding the health of Walkerton's water, nor did he acknowledge or report the documented presence of *E. coli* to Ontario's Ministry of the Environment (MOE). In fact, he failed to provide the results of the A&L Laboratory tests to the MOE until those results were directly demanded by Ministry staff on Monday, May 22.⁵¹ Moreover, when the MOE initiated an investigation of the Walkerton water system on May 22 and May 23, PUC employees, under the direction of Stan Koebel, altered the daily operating sheets to conceal the fact that many of the city's wells had operated without chlorination for the past several months.⁵²

By the time authorities were able to contain and eradicate the *E. coli* outbreak, seven Walkerton residents had lost their lives, and at least 2,300 had fallen seriously ill.⁵³ Stan Koebel later admitted that that "mistakes were made and things were done improperly" throughout his tenure as head of Walkerton's PUC, confirming that he falsified water safety test results, mislabeled water samples, submitted false annual

⁵⁰ O'Connor, *Report of the Walkerton Inquiry: Part 1*, 57.

⁵¹ Prudham, "Poisoning the Well," 350.

⁵² O'Connor, *Report of the Walkerton Inquiry: Part 1*, 57.

⁵³ *Ibid.*

reports to Ontario's MOE, and operated wells without any chlorination.⁵⁴ Koebel claimed that, in hindsight, he should not have been the top executive at the public utility because he lacked the education to run the town's water system.⁵⁵ In the end, investigators found that Mr. Koebel was not even aware of the existence of *E. coli* O157:H7, nor that this bacterium was potentially lethal, and his own behavior supports this finding of ignorance. In the days following the outbreak and *after* he had received the results of the A&L water quality test, Stan Koebel drank water from both a fire hydrant and a garden hose and filled his daughter's swimming pool with the contaminated water, all of which are unthinkable behaviors for someone aware of the potential consequences of *E. coli* infection.⁵⁶ Three years after the *E. coli* outbreak in Walkerton, the Canadian government charged Stan and Frank Koebel with several crimes relating to public endangerment and falsifying records. Both Koebel brothers were convicted, and Stan Koebel was sentenced to a year in prison, while Frank Koebel received six months of house arrest.

The 2002 federal inquiry into the Walkerton tragedy established the Koebel brothers' culpability and suggested that along with the brothers' negligence, the governmental move to privatization was responsible for the Walkerton tragedy. First, the provincial government reduced its environmental inspections of water systems during the 1990s due to staff cutbacks, leaving Walkerton's history of falsified water quality reports to go unnoticed. Of even greater consequence was the closure of 13 government-operated public health laboratories that provided routine microbiological testing of drinking water for Ontario's municipalities. In Walkerton's case, a provincial laboratory

⁵⁴ O'Connor, *Report of the Walkerton Inquiry: Part 1*, 183.

⁵⁵ *CBC News*, "Walkerton Water Tests Regularly Faked: Koebel," December 20, 2000.

⁵⁶ O'Connor, *Report of the Walkerton Inquiry: Part 1*, 183-184.

in Palmerston, Ontario tested water quality samples for the town before September 1996. As part of the aforementioned Red Tape Commission and its accompanying push for privatization, however, the province of Ontario felt the need to close these government-run water testing labs. This move left local water utilities, like the Walkerton PUC, scrambling to find private labs to provide the same service.

The federal inquiry into Walkerton concluded that during this privatization transition, the federal and provincial governments failed to enact a regulation obligating private labs to report contaminated water test results to governmental authorities due to the Red Tape Commission's general "distaste for regulation."⁵⁷ Due to these regulatory oversights, when A&L Laboratories found *E.coli* in Walkerton's water supply, it did not warn provincial officials because it was not required to do so. As a result of this inaction, health authorities required six extra days to figure out what was making so many people sick, and by that time several people had died from their exposure to the contamination.⁵⁸

A water contamination incident in North Battleford, Saskatchewan in 2001 further supported the conclusions of the Walkerton inquiry. In April of 2001, the city of North Battleford (population 15,000) faced an outbreak of the cryptosporidium parasite in its public water supply, and this contamination killed three people and sickened over 6,000. Authorities later determined that the release of untreated sewage from the town's "antiquated" wastewater treatment plant into the North Saskatchewan River near the city's drinking water intake facility caused the outbreak.⁵⁹

Much like the Walkerton tragedy, a federal inquiry into the North Battleford incident was launched and found that regulatory failures due to provincial budget cuts

⁵⁷ O'Connor, *Report of the Walkerton Inquiry: Part 1*, 368.

⁵⁸ *CBC News*, "Walkerton Inquiry: Sterling Grilled about Responsibility," June 28, 2001.

⁵⁹ Province of Saskatchewan, *The North Battleford Water Inquiry*, 12.

had contributed to the cryptosporidium contamination. Specifically, Saskatchewan, like Ontario, had discontinued routine government inspections of water and wastewater treatment plants in the mid-1990s in favor of a “risk-based” approach, where only the municipalities that requested inspections received them. This was a cost-cutting measure employed as a result of the Red Tape Commission. Due to its implementation, the North Battleford water treatment plant had not been inspected in ten years at the time of the outbreak, allowing its continued operation of outdated filtration technology. Additionally, the federal inquiry found that the expertise of the waterworks’ employees was inadequate, and because employees were not aware of the newest water treatment protocols, they did not follow proper procedure, a failure of operation that allowed the cryptosporidium outbreak to occur.⁶⁰ One witness even testified that expertise at the plant was so lacking that the plant was seemingly run “by the seat of the pants,” with no discernable order or hierarchy of decision-making.⁶¹

It is difficult to overstate the significance of the Walkerton, and to a lesser extent the North Battleford, contamination incidents, as both served as failures of “expert systems” in Canadian water governance and prompted a reexamination of the governmental role in water policy.⁶² Indeed, the federal inquiries in both cases laid the blame for the contamination squarely on the neoliberal agenda of the Progressive Conservative government of the 1990s, as they bemoaned the negative effect that privatization had on protecting both the environment and the public health.⁶³ In light of these two tragedies and after the loss of public confidence following them, the federal

⁶⁰ Laing, *Report of the North Battleford Inquiry*, 5.

⁶¹ *CBC News*, “North Battleford Water Inquiry Hears Final Testimony,” January 14, 2002.

⁶² Giddens, *The Consequences of Modernity*, 84.

⁶³ Neufeld and Mulamootil, “Groundwater Protection in Canada: A Preliminary Inquiry,” 15-22.

government pressured Canada's provinces to revisit their collective policies on subjects ranging from drinking water safety to water allocation to the environmental sustainability of watersheds, all directives that opened the door for a renewed policy emphasis on IWRM.

THE REBIRTH OF IWRM IN CANADA

In the wake of the Walkerton and North Battleford incidents, Canada's renewed IWRM implementation has focused on framework principles espoused by earlier Canadian legislation – those of environmental sustainability, public participation, and interjurisdictional collaboration. In terms of sustainability, the Canadian federal government has created a number of funding mechanisms that foster IWRM participation. Perhaps the most prominent of these is the Canada Strategic Infrastructure Fund (CSIF), an account of \$4.3 billion created in 2003, which serves as an implementation apparatus for IWRM's environmental sustainability principle. The Fund's objectives in terms of water management are providing for "safe, clean, and reliable drinking water," and the "environmentally responsible and sustainable treatment of wastewater," as well as "improv[ing] water and wastewater facilities to not only benefit the quality of life and the health of Canadians, but to also help protect aquatic habitat and promote economic growth."⁶⁴

The Canadian federal government, under the auspices of its 'Infrastructure Canada' department, uses the CSIF to propagate the application of mandatory IWRM criteria in all municipalities applying for water-related CSIF grants and loans. The Fund requires municipalities applying for CSIF funding to develop and submit an integrated

⁶⁴ Infrastructure Canada, "CSIF Program Details."

watershed management plan that demonstrates long-term sustainability objectives. Like the ICPR's Rhine River Basin Management Plans, the CSIF planning process calls for the establishment of clear goals and objectives regarding future water management, the design of implementation programs to meet those objectives, and the formulation of an empirical method for measuring implementation progress.⁶⁵

Additionally, since the Walkerton tragedy, the federal government has begun to operationalize the arbitration role it attempted to create for itself in the 1987 FWP by creating a number of interjurisdictional organizations that allow for stakeholder collaboration on specific water issues with transboundary provincial implications. These organizations conform to the "nested enterprise" concept found in the CPR literature, as they, like the ICPR in the Rhine region, function as places where "individuals are organized through smaller groups that are then organized into larger groupings."⁶⁶ Such nested enterprises are meant to redeploy the large number of Canada's collective water management actors into smaller, more targeted groups that will serve the personal needs of local stakeholders with more efficiency.

In Canada, many of these nested organizations and councils have existed for several decades, but languished until the catalytic effect of Walkerton. The Canadian Council of Ministers of the Environment (CCME) is perhaps the most well-known example of this type of organization, as it was initially created in 1987 as part of the FWP, but was essentially disbanded during the 1990s 'drive to privatize.' Experiencing resurgence after Walkerton, the CCME is not a governing body *per se*, but it is an important collaborative institution through which the provinces, territories, and federal

⁶⁵ Infrastructure Canada, *Integrated Water Resource Management: Research Note*, 1-2.

⁶⁶ Keohane and Ostrom, eds., *Local Commons and Global Interdependence*, 22.

government discuss and act on common approaches to many environmental priorities. In that vein, the CCME has become a cooperative vehicle for water-related research, the development of water quality guidelines, and better linking of networks that monitor water quality across Canada. Composed of the environment ministers from the federal, provincial and territorial governments, the CCME has 14 members who meet at least once a year to discuss national environmental priorities and determine work to be carried out under the purview of the organization. Since the organization lacks any element of enforcement power, however, its approach to water governance is generally consensus-based.⁶⁷

The Prairie Provinces Water Board (PPWB) serves as another notable cooperative organization that has been revamped since the Walkerton tragedy. Initially, the provinces of Alberta, Saskatchewan, and Manitoba, along with the federal government, recognized the need for cooperative management of shared waters in 1948, with the signing of the Prairie Provinces Water Board Agreement. From 1948 to 1969, the Board recommended the best allocation arrangements of interprovincial waters, although its recommendations were not binding and were seldom invoked in provincial water management. After Walkerton, however, the PPWB created a new mandate. As outlined in the organization's new charter (signed in February 2006), that mandate is to ensure that interprovincial waters are protected and equitably apportioned; protect the aquatic ecosystem and the sustainability of transboundary aquifers, provide a forum for information exchange in order to prevent or resolve conflicts; and promote cooperation in interprovincial water management.⁶⁸ Like the CCME, the PPWB works by consensus,

⁶⁷ Muldoon and McClenaghan, "A Tangled Web: Reworking Canada's Water Laws," 251.

⁶⁸ Environment Canada, "Prairie Provinces Water Board."

and its board members are senior water administration officials in Alberta, Saskatchewan, Manitoba, and the federal Departments of Environment and Agriculture.⁶⁹

Similarly, the Mackenzie River Basin Board (MRBB) exists to aid in the implementation of the Transboundary Waters Master Agreement of the same name, an accord which forms the basis for cooperation in protecting and addressing the water quantity and quality of an aquatic ecosystem that covers one-fifth of Canada. Unlike the CCME and the PPWB, the MRBB is a relatively new creation emerging slightly before the Walkerton incident, and the parties to the MRBB have committed to five principles, all concomitant with the precepts of IWRM. These principles include maintaining the ecological integrity of the aquatic ecosystem; managing the use of the water resources in a sustainable manner; providing for early and effective consultation, notification and information on water-related issues; and resolving disputes on a cooperative basis.⁷⁰ Its members include representatives from the Canadian federal government, as well as the provinces of British Columbia, Alberta, Saskatchewan, the Northwest Territories, Yukon, and the First Nations community. The MRBB prides itself on the strength of its interjurisdictional partnerships, the participation of Aboriginal members (it is one of the only cooperative water organizations in Canada to allow First Nations membership), and its focus on maintaining the ecological integrity of the whole basin. Like other cooperative forums, the MMRB gained traction after the Walkerton incident, and one of its major achievements since the year 2000 is the drive to standardize water quality monitoring techniques in its member provinces.⁷¹

⁶⁹ Environment Canada, "Prairie Provinces Water Board."

⁷⁰ Environment Canada, "Mackenzie River Basin Board."

⁷¹ Ibid.

The Walkerton tragedy also served to reintroduce the idea of involving the Canadian public in water policy, allowing for the realization of yet another key IWRM principle. Since Walkerton, many federal, provincial, and territorial environmental statutes now enshrine public participation in water legislation. The Canadian Environmental Protection Act (CEPA), for instance, requires federal environmental officials to publish a list of newly proposed regulations in the *Canada Gazette*, the official newspaper of Canada's federal government. Within sixty days of publication of a regulation, any person may file a notice of objection requesting a review, and this is part of a "prior approval" approach. Recently, six of Canada's ten provinces have parroted the federal government on this issue and have adopted the prior approval approach to help enhance IWRM's effectiveness with respect to public involvement in environmental management.⁷²

Finally, the Canadian federal government employs technology to enhance public participation in the water management process. To this end, the federal government created *RésEau*, a website that provides Canadians easy access to a variety of freshwater-related information. The website's managing board spans several governmental departments, including Environment Canada as the lead, with Health Canada and Natural Resources Canada as secondary managers. The mandate of *RésEau* is to "support clean, safe, and secure water for all Canadians and ecosystems."⁷³ Specifically, the website provides access to both quantitative data and analytical texts collected from a variety of governmental and private water information sources and delivers them in a multifaceted

⁷² Shrubsole and Draper, "On Guard for Thee? Water (Ab)uses and Management in Canada," 46.

⁷³ Environment Canada, "RésEau: Building Canadian Water Connections."

platform to reach all Canadian citizens “from school children to professional water managers.”⁷⁴

CANADA AND WESTERN EUROPE PARALLELS

Canada as a nation and water as an element seem inextricably intertwined. The country’s large amount of freshwater, its early emphasis on IWRM policy principles, and its general respect for ecology and the natural world all suggest that Canada and IWRM are complementary entities. The international community even recognizes Canada’s recent progress and prominence on freshwater policy issues and awareness. In 2003, the United Nations (UN) ranked Canada’s water as one of the best managed water systems in the world. Five years later, the UN chose Canadian water policy expert Maude Barlow to serve as its “water czar,” a position created to advise the international community on global water policy issues. In this position, Ms. Barlow has repeatedly invoked aspects of Canada’s water policy as a model for the rest of the world.⁷⁵

When one discounts this type of anecdotal evidence, however, it is too early to conclude that Canada has in fact reached a high level of IWRM implementation success. All one can say for certain is that Canada’s IWRM implementation is strikingly analogous in many respects to IWRM implementation in Western Europe’s Rhine River Basin in terms of the fundamental roles played by historical regime orientation, the linear dialectic of regime sequencing, and the presence of a water-related tragedy as a catalyst for change. Certainly, the theoretical literatures on CPRs and regime creation are enlightening in this respect, as they help to illuminate some key factors underlying these accomplishments. First, the historical orientation of Canada’s water management

⁷⁴ Environment Canada, “Réseau: Building Canadian Water Connections.”

⁷⁵ *CBC News*, “Maude Barlow Named 1st UN Water Advisor,” October 21, 2008.

regimes, like those of the Rhine basin, has favored the IWRM principles of environmental sustainability, stakeholder collaboration, and public participation. Canada's federal water management framework even legitimized these particular IWRM components through numerous legislative efforts years before the United Nations advocated those principles in the context of global water policy. After Canada's failed privatization experiences and the Walkerton tragedy, the newly emergent regimes governing Canada's water resources emphasized those same IWRM components, as they were influenced by the historical model set by their antecedents.

Additionally, Canada's IWRM implementation, like that of the Rhine basin, disregards the principle of social equity in water management. The Canadian government's historical water-related regimes paid no attention to the human right to water, perhaps because the population it governed had long maintained widespread connectivity to water sources, rendering the social equity component seemingly unnecessary within the Canadian water policy framework. As such, the country's pre-existing water management regimes never addressed the connection between human rights and water access, and the historical discounting of this issue carries over into Canada's more recent IWRM implementation endeavors.

Likewise, both the Canadian and Rhine water management frameworks pay lip service to the importance of water pricing, but neither has made strides in executing any type of pricing reform. In Canada's case, the 1987 FWP called for the redefinition of water as an economic good, but in the ensuing years since the policy's creation, the federal and provincial governments have taken little action on this directive, even in the wake of Walkerton. Prices for water in Canada are set provincially or regionally for

industrial and agricultural users, and locally for municipal water users, just as they have been for the last several decades. Under this system, Canadians enjoy the cheapest water prices in the industrialized world, and the OECD has chastised Canada repeatedly for its profligate and heavily subsidized use of water and its refusal to charge prices that reflect, at a minimum, the costs of water supply infrastructure. Indeed, the OECD describes Canadian water unflatteringly, remarking that it is “cheaper than dirt.”⁷⁶

The method used for pricing water in Canada contributes to the country’s high levels of water use as well. Fifty-six percent of Canadian utilities charge a flat rate for water, meaning consumers pay the same amount regardless of how much they use. Another 13% of Canadian utilities charge a declining block rate, which means the *more* consumers use, the *lower* the price per unit becomes; in essence providing a bulk discount for water usage. The fact that only 57% of Canadian households have their water usage metered at all only serves to exacerbate the situation. In major cities like Vancouver and Montreal, that figure is less than 1%.⁷⁷

Since the introduction of the Federal Water Policy in 1987, and more significantly, since the Walkerton tragedy in 2000, no major initiatives involving pricing have arisen to reduce water consumption. Arguably, as in the case of the Rhine, the framing legacy of Canada’s water management regimes plays a central role in the marginalization of such a central IWRM component. As previously mentioned, Canada’s historical regimes framed their concerns within the lenses of environmental sustainability, interprovincial cooperation, and public participation, and paid little attention to operationalizing the economic valuation of water. Moreover, in the wake of

⁷⁶ Organization for Economic Cooperation and Development, “OECD Environmental Performance Reviews, Water: The Experience in OECD Countries.”

⁷⁷ Environment Canada, *A Federal Perspective on Water Quantity Issues: Draft Report*, 14.

Canada's negative experiences with the privatization of water service and provision, the country's water regimes seem even more reluctant to support the economic valuation of water, thus perpetuating the idea that historical issue framing continues to set Canada's modern water management agenda.

As for the future of Canadian IWRM implementation, the case of the Rhine may prove instructive, as it suggests that regime sequencing can play a significant role in the endeavor to achieve policy effectiveness. The regimes created to govern the Rhine arose spontaneously through the interests of all relevant stakeholders, and over time, evolved into a system governed by an explicit set of rules and, eventually, oversaw the institution of a governing body given the power to enforce penalties for non-compliant regime members.⁷⁸ Certainly, Canadian water governance has echoed the Rhine regime's evolutionary track to for the most part. Canada's initial water management regimes were spontaneous creations that emphasized the holistic management of water – ranging from an emphasis on using the river basin as a managerial unit of analysis in the 1960s to the creation of nested enterprises like the Prairies Provinces Water Board in 1948. Over time, the federal government attempted to formalize these regimes by enshrining their water-related goals in legislation -- specifically the 1970 Canada Water Act, and to an even greater extent, the 1987 Federal Water Policy. Unfortunately, the consequences of Canada's subsequent drive to privatize prevented these policies from taking hold. Just as the Sandoz tragedy on the Rhine River served as a catalyst to jumpstart IWRM implementation in Western Europe, the Walkerton water contamination incident spurred Canadians to reexamine their own water management hierarchy and reemphasize the roles of both IWRM and the federal and provincial governments.

⁷⁸ Young, *International Cooperation*, 84-85.

It is in this new, and more modern, implementation of IWRM that the experience of Canadian water management diverges from the linear model provided by the Rhine River Basin. After the Walkerton and North Battleford incidents, the Canadian federal government attempted to convert many of these previously spontaneous regimes to more formalized regimes with an official accounting of results and conscious agreement on the part of regime actors, but it has yet to achieve the level of imposition/enforcement provided by the European Union in the Rhine regime.⁷⁹ Canada, in fact, may never reach that particular iteration of regime evolution because its federal constitution limits the national government's water management responsibility, restricting it to the legal role of bystander, rather than enforcer.⁸⁰ Unless Canada amends its constitution as Germany did to give the federal government more of an official regulatory role over water management, it may never achieve the type of imposed regime that successful IWRM implementation requires. At the very least, quantitative benchmarks have yet to be set in Canadian water policy, as there is no coercive governing power to enforce such benchmarks. Without this type of quantifiable measurement to help indicate success or failure, the final verdict on Canadian IWRM implementation remains hopeful, but is ultimately unknown.

⁷⁹ Young, *International Cooperation*, 87.

⁸⁰ *Ibid.*, 88.

CHAPTER VII
SOUTH AFRICA AND IWRM

We want the water of this country to flow out into a network – reaching every individual – saying: here is this water, for you. Take it; cherish it as affirming your human dignity; nourish your humanity. With water we will wash away the past.

-Antjie Krog,
South African poet

The public perception of South Africa's environmental policy has entirely transformed over the last fifteen years. Prior to 1994, South Africa's apartheid government forcibly removed thousands of black South Africans from their ancestral lands and segregated them in impoverished 'township' and 'homeland' areas, denying them basic citizenship rights. Such institutionalized discrimination carried an unintended consequence, in that it encouraged many in the country's black population to resent the idea of state-driven ecological protection. This resentment was certainly understandable given the circumstances; as black South Africans saw their government allocate millions of dollars to protect the flora and fauna on white-owned farms and game parks, while condemning the majority of the population to a life without vital infrastructure, including electricity, sewage disposal, and/or drinking water treatment. During the apartheid era, then, many black South Africans perceived environmental protection to be at best a concern of the white race that was of "little relevance to the anti-apartheid struggle," and at worst, an "explicit tool of racially based oppression."¹

¹ McDonald, ed., *Environmental Justice in South Africa*, 1.

With apartheid's end in the early 1990s and the subsequent return of multiracial democracy in South Africa, the country's new leaders began to present environmental policy to the South African public in a new light, reimagining it as an instrument of recovery and healing, rather than one of subjugation. The new government went so far as to feature environmental priorities within the state's 1996 constitution, a document which granted eco-protection a place of legislative prominence by guaranteeing every South African the right to a healthy and sustainable environment. That constitution affirms that South Africa's government can achieve its eco-goals by enacting regulations that prevent pollution and support conservation, while also promoting justifiable economic and social development.² Notably, this constitution is one of the first in the world to institutionalize environmental protection in such an explicit and detailed manner, although the operationalization of its commitment to these principles has oft proven difficult given the immense social obstacles left by apartheid's legacy of poverty and discrimination.

Nowhere is this difficulty more apparent than in the governmental management of South Africa's water resources. In the wake of apartheid-era policies operating amid a fragmented chaos of governance between the federal, provincial, municipal, village, and tribal levels,² South Africa has attempted to implement Integrated Water Resources Management (IWRM), a water policy framework that has been embedded formally as a legal instrument within state legislation since 1998. Unfortunately, South Africa has struggled mightily with its implementation of the framework's principles over the last decade due to the state's past discriminatory policies – a historical condition that has engendered within South Africa a primary need to redress the inequities of apartheid rule. Simply put, this means that the South African government has prioritized the social

² Republic of South Africa Constitution. Act 108, Section 24.

equity component of IWRM above all else, positioning social equity as the lens through which it interprets all other IWRM principles. This homogeneity of perspective, however, has sabotaged South Africa's effective realization of IWRM's other components. Indeed, although South African legislation recognizes the importance of decentralization, environmental sustainability, and privatization in water management, the execution of these principles has been overwhelmed -- and at times contradicted -- by the state's need to provide for social justice in water provision.

This singular focus has led to a continuing failure of IWRM implementation, as evidenced by the millions of South Africans who still lack access to water and sewage infrastructure, the unclear mandates and lack of training that exist among the various levels of governmental water managers, and rivers that remain overrun with fecal pollution. In theory, IWRM was a policy framework with the potential to correct all of these problems, but the homogeneity of objectives in South African water management has hindered the country's execution of IWRM principles. Certainly, this seems an interesting finding when much of the theoretical literature suggests that South Africa took many of the necessary steps for successful water policy management, and its efforts to redefine water as a common-pool resource, privatize the provision of water cost recovery, along with its acceptance of the constitutive norm of the human right to water should have led to the IWRM framework's success within the South African context. In the end, though, just as apartheid policies marginalized the water needs of black South Africans, the post-apartheid government's attempts to rectify those same injustices have marginalized the heterogeneity of IWRM's various non-equity related policy

components -- in essence denying the framework's potential to realize a holistic and integrated approach to water management.

A CHALLENGING RESOURCE

There is no question that South Africa suffers from severe water scarcity. Its mean annual rainfall of 475 millimeters is roughly half of the world average, and as in India's Ganges River basin, South Africa's precipitation amounts are subject to monsoon variability, as very little rain falls for eight out of twelve months of the year.³ Indeed, South Africa's per capita water availability of 1,100 m³ ranks 120 out of 149 countries around the world for which data are available.⁴ Making matters worse is the fact that South Africa has no truly large or navigable rivers, and the combined flow of all the rivers in the country amounts to less than half that of the Zambezi River, a water source that traverses South Africa's neighboring states.⁵

Moreover, the availability of South Africa's groundwater is little better than its surface water. The predominantly hard rock nature of the country's geology prevents the accession of most groundwater resources, and only 20% of the country's groundwater is readily available through large-scale aquifer withdrawals.⁶ Historical circumstances further aggravate these scarce water conditions, as the location of natural resource mines and/or the former segregation of black South Africans in homelands established most urban and industrial development in locations remote from large water sources.⁷ As a result, South Africa suffers not only from water scarcity, but also from an uneven

³ Conca, *Governing Water*, 315.

⁴ *Ibid.*, 311.

⁵ Republic of South Africa – Department of Water and Forestry, *National Water Resource Strategy*, 15.

⁶ *Ibid.*

⁷ *Ibid.*

distribution of water in both space and time, and a poor fit exists between the location of the country's water and the needs of its water users.

In terms of allocation, irrigation comprises the majority of South Africa's water use, accounting for approximately 62% of the country's water requirements. Urban and industrial water uses occupy 23% of total water use, while rural water use and mining constitute the remaining allocation of water within the South African state.⁸ Intense conditions of water scarcity and the irregular distribution of the country's water resources have prevented, however, many of these sectors from getting the water they require. Thus, in recent decades, the South African government has tried to ameliorate scarcity by dramatically reengineering the country's river systems, primarily by building dams. Both the apartheid and post-apartheid governments engaged in approximately 520 dam-building projects on South Africa's rivers, including a dozen smaller rivers that drain the coastal regions to the sea; the Orange and the Vaal, which cross through the center of the country; and several border region rivers, including the Crocodile, Olifants, Limpopo, Molopo, Incomati, and Maputo. As a result of the government's reengineering efforts, there are no substantial rivers within South Africa whose flows remain untouched by anthropogenic change. Thousands of smaller reservoirs or "farm dams" also exist in the country, and most of these are not registered with the South African government, making it almost impossible to estimate their effects on water allocation and river diversion except to say that they exacerbate an already dire situation.⁹

⁸ Republic of South Africa – Department of Water and Forestry, *National Water Resource Strategy*, 29.

⁹ Conca, *Governing Water*, 311-315.

THE WATER POLICY OF APARTHEID

South African water provision not only suffers from a lack of rainfall and an uneven distribution of the country's water resources, but also from the historical inheritance of apartheid, which presents perhaps the biggest obstacle in terms of South Africa's allocation of water to the people that need it the most. Since apartheid rule created or exacerbated many of the water challenges faced by contemporary South Africans, a brief history of the relationship between race, water scarcity, and apartheid ideology is in order. Historically, the pastoralist *Khoisan* people and the *San* hunter-gatherers lived within the borders of what is now modern-day South Africa. Due to the region's low level of rainfall, both of these communities gradually adopted a nomadic way of life, roaming the countryside to find subsistence by following the local rainfall patterns. In their interactions with each other, the *Khoisan* and the *San* did not consider land and natural resources, including water, to be private property. Instead natural resources were the commonly held property of all, and every individual was free to use those resources as he/she required.¹⁰ Under these conditions, water was treated as a true public good, or a resource that was both non-rivalrous (since population densities were so low at the time) and non-excludable.¹¹

Change was on the horizon, however, as the arrival of the Dutch East India Company in 1652, along with the subsequent introduction of the more formal European system of private land ownership, altered the *Khosian* and *San* nomadic ways of life and reframed water as an element of private property. Upon their arrival, the Dutch occupied the Cape of Good Hope and claimed ownership of all local land and adjacent water

¹⁰ Funke, et al., "Redressing Inequality: South Africa's New Water Policy,"¹².

¹¹ Samuelson, "The Pure Theory of Public Expenditure," 387.

resources. In time, the idea of controlling any permanent water supply that flowed across a piece of owned land became known as the “riparian principle,” and its implementation altered the way of life for Southern Africa’s native peoples. Eventually, the restrictions inherent in the riparian principle forced many of the *Khosian* and *San* to work on Dutch East India Company farms because, in the case of the *Khosian*, they were denied access to the land or water resources needed to sustain their cattle, and in the case of the *San*, they were not able to hunt animals on Dutch-owned land.¹²

Dutch rule ended in 1805, but the idea of water as private property remained, as the British government took over the Cape Colony. The British even formalized the riparian principle by creating policies that advanced and institutionalized it. The Irrigation and Conservation of Waters Act of 1912, for instance, promoted irrigation by enhancing the customary riparian allocation. The Act freed water for irrigators’ demands by distinguishing between ‘normal flow’ (the minimum reliable flow) and ‘surplus water.’ Although normal flow remained subject to the traditional riparian allocation, every riparian owner was now entitled to use as much surplus water as he/she wished. This allowed white-owned farms to expand their irrigation operations because landowners could lay claim to surplus waters well beyond the provisions of their riparian allocation. In turn, the excess use of water for irrigation further limited the amount of water flowing downstream and into some of the newly created “reserves” for black South Africans (land that would later be expanded into the ‘homeland’ territories), creating even greater conditions of water scarcity there.¹³

¹² Funke, et al., “Redressing Inequality: South Africa’s New Water Policy,” 12.

¹³ Conca, *Governing Water*, 320.

The 1940s, and in particular the aftermath of World War II, saw South Africa undergo rapid industrialization. As evidence of its growth, manufacturing increased from 4% of South Africa's GDP at the end of the Great Depression to almost 20% by the early 1950s.¹⁴ This newly created industrial sector required enormous amounts of water, and with the competition for water rights between it and the agricultural sector, both businesses and farms scrambled to acquire land in order to gain water rights.

At the same time, the political rise of the National Party (NP) in the late 1940s introduced apartheid as the government's official ideology, a move that further worsened water access for black South Africans. Under apartheid, South Africans of color were denied citizenship and had very few basic rights, and the government institutionalized its new ideology through a myriad of discriminatory policies, perhaps most infamously with its forced resettlement of millions of black Africans into segregated homelands. In terms of water policy, the 1956 Water Act entrenched discrimination into South Africa's water management framework and helped to cement the NP's control over water resources. The creation of the Department of Water Affairs (DWA), a government agency mandated with providing and allocating water for all types of development, only served to worsen the black population's water access. Under the 1956 law, the DWA decided who could and could not access water by implementing a permit system for industrial, agricultural, and urban water users.¹⁵

There were two methods through which an individual or company could gain access to water under the new permit scheme. First, that individual could own the land through which the water flowed, thus employing the riparian principle of land ownership.

¹⁴ Conca, *Governing Water*, 321.

¹⁵ *Ibid.*, 324.

Second, the state could intervene and reallocate water to an individual or business if it felt that reallocation was in the public interest. Ultimately, then, access to water “derived from racially discriminatory land laws and/or the intervention of the racially discriminatory state.”¹⁶ Not surprisingly, South Africa’s white population benefitted enormously from the 1956 Act, as the DWA considered the water needs of black South Africans to be its lowest priority, continuing to allocate the majority of South Africa’s scarce water to white-owned farms and businesses.¹⁷

The marginalization of black South Africans’ water needs grew with the entrenchment of apartheid over the next several decades. In 1961, the Republic of South Africa declared independence from Britain, while also continuing its commitment to apartheid rule. Over time, the sustained race-based policies of the government had a major effect on the black community’s access to potable drinking water and wastewater sanitation, as the DWA restricted funding for the infrastructural development of the black homelands; therefore using water as “a very effective weapon in the apartheid government’s arsenal of oppression and control.”¹⁸ Moreover, with no political clout, black South Africans had no say in the demarcation of the homeland boundaries. Thus, white farms, the most fertile land, and the riches of potential mining areas remained in white-owned hands. In terms of water, this meant that black South Africans were forced to live on land with little to no water resource access.¹⁹

¹⁶ Conca, *Governing Water*, 324.

¹⁷ Ibid.

¹⁸ Funke, et al., “Redressing Inequality: South Africa’s New Water Policy,” 13.

¹⁹ Kalipeni and Mijere, “Population and Environment: The Political Economy of Resource Distribution in Transkei, South Africa,” 271.

MOVEMENT TOWARD A NEW WATER PARADIGM

By the late 1980s, facing both international pressure and domestic upheaval, South African President F.W. de Klerk helped to engineer the state's transition from apartheid rule to a more equal democracy, and the country held its first multiracial democratic election in 1994.²⁰ The African National Congress (ANC) won control of the government in that election, and when it took the helm of state later that year, it faced a catastrophe of water provision, as approximately 14 million South Africans lacked access to piped water within 200 meters of their home, and 21 million people had no access to wastewater or sewage treatment. An additional four million people did not have access to a toilet of any kind, and roughly six million individuals had no form of trash removal. Given the history of apartheid rule, it is unsurprising that the impact of this infrastructural deprivation fell disproportionately on black South Africans. Moreover, the environmental implications of these infrastructure deficits were quite grave.²¹ Generally speaking, the lack of toilets and garbage collection meant that large numbers of people were defecating as well as dumping their refuse in rivers, streams, and open spaces. In turn, these behaviors caused extensive public health dilemmas by creating disease channels for malaria, cholera, and tuberculosis, as well as contributing to ground and surface water contamination.²²

Faced with such acute health crises, the new South African government embarked on a quest to change the country's philosophy of, prioritization, and approach to water resource management. The provision of basic water supply and sanitation to the majority of South Africa's people, as well as the need for equity in the allocation of

²⁰ Conca, *Governing Water*, 332.

²¹ Hemson, "Easing the Burden on Women? Water, Cholera, and Poverty in South Africa," 152.

²² McDonald, ed., *Environmental Justice in South Africa*, 292-293.

water, was suddenly given high priority on the political agenda. Indeed, several new water laws over the next few years reflected the government's new priorities. Perhaps the most prominent of these was the new Republic of South Africa Constitution (Act 108 of 1996), which established a human rights dimension for access to adequate and sustainable water supply and services. The wording of this new constitution contained an overt attempt by the government to redress the wrongs of the apartheid era and in the government's own words, "end discrimination with regard to access to water on the basis of race, class or gender."²³

The 1996 constitution speaks to water issues on several levels. First, it contains ambitious language on individual rights, social justice, and the need for national healing and reconstruction in light of apartheid's inequities. In this vein, several of its provisions indirectly address human water needs, including the constitutionally created rights to equality (Section 8), life (Section 9), human dignity (Section 10) and health (Sections 24 and 27). Second, the constitution contains provisions on environmental protection and land use that affect water policy and practice. For instance, it guarantees all South Africans a constitutional right to an environment that protects human health and well-being.²⁴ Third, the constitution speaks directly to the water question, stating that all South Africans shall be guaranteed access to "sufficient food and water" (Section 27).²⁵ This new constitution helped to set the stage for the prioritization of IWRM's social equity component, as the landmark document itself unequivocally recognizes that the country's history of oppression, race-based inequality, and widespread poverty created a

²³ Republic of South Africa Constitution. Act 108, Section 2.1.4.

²⁴ Conca, *Governing Water*, 333.

²⁵ Republic of South Africa Constitution. Act 108, Section 27.

particular context for the current transition toward realization of these rights.²⁶ In other words, the historical orientation of South Africa's previous water regimes directly impacted the state's modern water policy, a fact supported by a closer look at the specifics of South Africa's IWRM implementation over the next several years.

THE PRIMACY OF SOCIAL EQUITY

With such an emphasis on redressing the wrongs of apartheid, the implementation of IWRM, and in particular its social equity component, seemed a natural fit for the South African state. Interestingly, IWRM was not a new idea within South African water policy circles, as an episode of severe water scarcity precipitated South Africa's first implicit foray into IWRM policy consideration in the late 1980s. From 1978 through the early part of the next decade, South Africa experienced another in a long line of brutal droughts, and the accumulation of years of drought conditions triggered massive restrictions on water use, more aggressive demand-side management efforts, and extensive public criticism of the DWA, the government's water policy arm.²⁷

As a result of that drought, the DWA produced a 1986 policy brief titled *Management of the Water Resources of the Republic of South Africa*.²⁸ This document, known as "the red book" among the country's water policy managers, holds the first implicit references to IWRM within the South African context, although little thought was given to the operationalization of such a framework during the apartheid era.²⁹ For its part, the red book called for a "holistic water management strategy" through the

²⁶ Liebenberg and Pillay, eds., *Socio-Economic Rights in South Africa*, 31-32.

²⁷ Conca, *Governing Water*, 328.

²⁸ Department of Water Affairs (South Africa), *Management of the Water Resources of the Republic of South Africa*.

²⁹ Conca, *Governing Water*, 328.

realization of policies emphasizing environmental sustainability, and it specifically mentioned the mitigation of water quality problems like salinization, eutrophication, and pollution.³⁰ The red book also highlighted the need for full-cost water pricing, but stopped short of embracing market-based allocation mechanisms, unlike later incarnations of IWRM.³¹

The publication of the red book was the first tentative step in South Africa's IWRM implementation, but it was several years before more substantive commitment to IWRM principles occurred. The delay was due to the political upheaval and regime change that characterized the decade following the red book's release. As a result, South Africa's water policy remained fairly stagnant until March 1995, when the Department of Water and Forestry or DWAF (the new government's name for the DWA) issued a thirty-page report titled *You and Your Water Rights*, which it billed as a call for public response.³² The report contained a detailed review of existing water law and set out the rationale for legal reform of old water policy. In *You and Your Water Rights*, the Department of Water and Forestry called for changes in the old policy due to its inadequate protection of rural peoples and the environment; the "antique systems" of water allocation currently in use; the lack of a well-structured water pricing system reflecting the actual value of water; the need to pay greater attention to the water customs of rural communities; the failure of existing law to reflect the integrated character of water resources; and the derivation of existing principles of water law from European

³⁰ Conca, *Governing Water*, 330-331.

³¹ Republic of South Africa – Department of Water Affairs, *Management of the Water Resources of the Republic of South Africa*, xx.

³² Republic of South Africa – Department of Water and Forestry, *You and Your Water Rights*. 4.

colonizers, who were from places “where the climate, culture and hydrology are very different to South Africa.”³³

The DWAF’s 1995 report was more of a public recognition of the need to reform water policy than it was a legally binding legislative document, but its implicit commitment to IWRM ideals lingered within the consciousness of the South African government and appeared again, in more concrete form, two years later with the issuance of the *White Paper on the National Water Policy of South Africa*.³⁴ The *White Paper* served as a policy statement in which the government began to view all other IWRM principles through the lens of water’s social equity, by classifying itself as a guardian of the nation’s water resources charged with allocating water in a way that is “uniquely South African and is designed to fit South Africa’s specific circumstances.”³⁵ In the *White Paper*, the DWAF even developed a new slogan to reflect its reordered priorities of water management. That slogan was and still remains today “Some, For All, Forever,” which refers to “access to a limited resource (some) on an equitable basis (for all), in a sustainable manner now and in the future (for ever).”³⁶

THE WATER SERVICES ACT

The *White Paper* espoused IWRM-related principles which were subsequently operationalized by the 1997 Water Services Act (WSA) and the 1998 National Water Act (NWA). The WSA and the NWA were meant to be the twin pillars of a new and more equitable water policy for the South African state. For its part, the WSA focused on

³³ Republic of South Africa – Department of Water and Forestry, *You and Your Water Rights*, 4.

³⁴ Republic of South Africa – Department of Water and Forestry, *White Paper on a National Water Policy for South Africa*.

³⁵ *Ibid.*, 24.

³⁶ *Ibid.*, 7.

water supply for drinking and sanitation needs, while the NWA addressed the legal requirements of the new policy framework for managing water resources. A combination of constitutional and practical considerations determined the split in legislative focus between the two documents. Put simply, legislators felt that it was more important to deal first with the lack of water resources for black South Africans (a historically marginalized group), while a political and legal policy framework for water management could occur at a slightly later date without serious repercussions.³⁷ Thus, while the NWA addressed the constitutional directive that the national government remain in a standard-setting role within water management, South Africa enacted the WSA first, as it addressed the more practical daily considerations of local water provision.

The first of the two legislative pillars, the Water Services Act, reiterates the constitutional right to an adequate water supply and prioritizes the provision of basic water supply and sanitation to all South Africans above every other concern.³⁸ The Act gives the DWAF the power to set standards and timetables for local water service delivery and water quality, as well as determine any relevant taxes and tariffs. The WSA also tasks regional water service authorities with appointing specific water providers in their local areas and formulating detailed plans for the delivery and development of water provision. As a safeguard, the Act gives the federal government monitoring responsibility and intervention power when local water authorities fail to provide adequate service, although the legislation fails to detail the terms and conditions of that intervention.³⁹

³⁷ Hemson, "Easing the Burden on Women? Water, Cholera, and Poverty in South Africa," 145.

³⁸ Republic of South Africa. *Water Services Act [No. 108 1997]*.

³⁹ Conca, *Governing Water*, 341.

THE NATIONAL WATER ACT

The National Water Act of 1998 (NWA), as a comprehensive policy framework, is more significant in terms of IWRM implementation than is the WSA.⁴⁰ With its enactment, the NWA repealed more than 100 prior water laws dating back to 1914, including the discriminatory Water Act of 1956. Moreover, the NWA created the legal foundation for several new instruments of water management and policy, in essence institutionalizing the four key IWRM components – social equity, decentralization, economic efficiency, and environmental sustainability. The legislation gives each of these principles careful thought, and a brief discussion of the NWA’s approach to each is included below.

SOCIAL EQUITY

Not surprisingly, given South Africa’s historical context of apartheid, IWRM’s social equity component serves as the lens through which the NWA interprets all other IWRM principles. Indeed, the National Water Act adheres to the policy recommendations of the 1997 *White Paper* by advocating a return to a water commons, suggesting that the country’s water belongs to its entire people and cannot be privately owned; thus, officially abandoning the riparian principle.⁴¹ The NWA further supports this notion of water as a common resource through the creation of an administrative licensing system. With this system, the state, and more specifically the DWAF, regulates the withdrawal of water for large-scale uses such as industry and irrigation, while it exempts the domestic uses of water from permit requirements, including small-scale irrigation and the watering of animals for non-commercial purposes. Under the NWA,

⁴⁰ Republic of South Africa, *National Water Act [No. 36 1998]*.

⁴¹ *Ibid.*, 1.3.

South Africa's government assumes the role of trustee over the state's water, serving to reallocate it in a way that allows previously marginalized people access to the resource, while also encouraging the conservation of water by those more privileged South Africans who have historically maintained ready access to the resource.⁴² Taken together, the South African government intends these actions to ensure that it can avoid a "tragedy" of its water commons, while redressing the social wrongs advanced by the country's discriminatory apartheid-era water policies.⁴³

DECENTRALIZATION

The NWA also encourages the social equity of water through water policy's decentralization. This policy path was taken in response to the governmental inadequacies of the past, as even the DWAF itself characterized its own history as that of "an inaccessible centralized bureaucracy in which the needs of the people on the ground, particularly the black majority, were not taken into account."⁴⁴ Accordingly, the NWA emphasizes the subsidiarity principle, which stipulates that those water management functions that can be more efficiently and effectively carried out by lower levels of government should be delegated to the lowest appropriate level, leaving the federal government as a manager and overseer of policy, but not its main implementation arm.

To achieve this diffusion of IWRM execution, the National Water Act divides South Africa into 19 water management areas (WMAs) which match the boundaries of major watersheds, a similar type of classification to the river basin areas that exist in the Rhine region and in Canada. To facilitate the implementation of IWRM within the

⁴² Funke, et al., "Redressing Inequality: South Africa's New Water Policy," 15.

⁴³ Hardin, "The Tragedy of the Commons," 1244.

⁴⁴ Republic of South Africa – Department of Water Affairs and Forestry, *You and Your Water Rights*, 30.

WMAs, the Act provides for two types of institutions charged with water policy oversight -- catchment management agencies (CMAs) and water user associations (WUAs). A CMA is responsible for the water management of its entire WMA, while a WUA's area of jurisdiction remains localized. Additionally, the NWA mandates that CMAs develop 'strategy plans,' similar in nature to the Rhine's river basin management plans, and those plans should detail the protection, use, development, conservation, management, and control of water resources in the respective WMA in which they operate.⁴⁵ At this point in time, however, CMAs remain more of a theoretical ideal than a reality, as South Africa has yet to formalize and create a single CMA. Until such time as CMAs can be established officially, the regional offices of the DWAF will continue to manage the water resources within the 19 water management areas of the South African state.⁴⁶

In contrast to CMAs, the National Water Act envisions water user associations (WUAs) as institutions comprised of stakeholders who wish to undertake mutually beneficial steps to manage a local water source. Essentially, these WUAs are to serve as organizations that help avert dilemmas of common interest, or the avoidance of reaching a suboptimal solution among users in a given water management issue, while ensuring a particular and preferred outcome.⁴⁷ WUAs are accountable for implementing federal water policies on a local level, and their responsibilities include ensuring local water services and delivery, constructing or maintaining the waterworks necessary for drainage and irrigation, and regulating the distribution of water resources according to the relevant federal laws. Despite the decentralized nature of WUAs, the federal government maintains a strong influence over their actions. WUAs, for instance, may assess water

⁴⁵ Republic of South Africa, *National Water Act [No. 36 1998]*, 2.1-2.7.

⁴⁶ Goldin, "It Takes Two to Tango: Steps Towards Change in the Water Sector," 49.

⁴⁷ Stein, "Coordination and Collaboration," 309.

use charges on members, but they have no authority to decide on the applicable pricing strategy; instead, the federal government retains that decision-making ability.⁴⁸

ECONOMIC MANAGEMENT

The NWA also stresses social equity through another IWRM principle -- that of demand-related water pricing. Essentially, the legislation assumes that the assurance of economic efficiency in the face of social justice requires South Africa's government to evaluate the social, economic, and environmental costs and benefits of competing water uses. To achieve this goal, the NWA allows for a system of water-use charges to finance the costs of water management and infrastructure, as well as to achieve "an equitable and efficient allocation of water."⁴⁹ Ultimately, the Act gives the DWAF broad powers to set fees and to differentiate them across geographic areas, categories of users, or even individual users, all for the purpose of promoting the social equity of water provision within a framework of economic management.⁵⁰

ENVIRONMENTAL SUSTAINABILITY

Moreover, with its creation of the "Reserve," the NWA acknowledges the importance of IWRM's environmental sustainability component, while still stressing the primacy of social equity. Both ecological and human elements constitute the Reserve. For its part, the Reserve's ecological arm refers to the quantity and quality of water required to remain within water sources in order to ensure the healthy functioning of surrounding aquatic ecosystems. In contrast, the NWA defines the Reserve's human component as the minimum quantity and quality of water required to meet human needs

⁴⁸ Goldin, "It Takes Two to Tango," 49.

⁴⁹ Republic of South Africa, *National Water Act [No. 36 1998]*, 5.56.

⁵⁰ *Ibid.*

for drinking water, food preparation, and hygiene.⁵¹ According to the Act, local water managers must set aside an adequate amount of water to meet both ecological and human requirements before allocating water to other types of users, such as those in the industrial and agricultural sectors. Essentially, then, the Reserve is a quantity of water that cannot be allocated to high volume water users. Its purpose is to ensure the constitutional right of South Africans to access enough water for their basic needs, along with the maintenance of an environment healthy enough to secure socioeconomic development that is ecologically sustainable.⁵² Finally, the Act vests the DWAF with authority to determine the level of the Reserve for a given water resource, although the legislation fails to specify a mechanism for its calculation.⁵³

CANADA REDUX: WATER PRIVATIZATION

The South African government enacted the National Water Act at the same time it pursued the privatization of water provision. Indeed, the NWA and privatization worked in tandem for a time, as the government's emphasis on recovering the costs of water provision operationalized many of the NWA's suggestions regarding water's economic management. Eventually, however, in an eerie parallel to the Canadian experience, South Africa's water privatization efforts were directly responsible for a public health tragedy. In turn, that tragedy served as a catalyst for an even deeper legislative emphasis on the social equity of water provision and a concurrent minimization, although not an abandonment, of water's cost recovery within South Africa.

⁵¹ Republic of South Africa, *National Water Act [No. 36 1998]*, 3.16.

⁵² Funke, et al., "Redressing Inequality: South Africa's New Water Policy," 16.

⁵³ Republic of South Africa, *National Water Act [No. 36 1998]*, 3.16.

Like many developing states, South Africa was not immune to the winds of economic globalization during the 1990s. Under the guise of macroeconomic growth, the country's newly seated government moved to privatize many of South Africa's public services during the latter half of that decade. More formally, the government released its future fiscal strategy titled "Growth, Employment and Redistribution" (GEAR) in June of 1996, which included a broad-based privatization component as part of a larger economic initiative emphasizing deficit reduction, fiscal discipline, currency deregulation, and international investment stimulus. More specifically, in terms of this analysis, GEAR targeted water and sanitation services as one of the sectors ripest for privatization in South Africa.⁵⁴

GEAR's approach to the commoditization of water underscored the restructuring of state oversight rather than the full privatization of government-run industries. Essentially, GEAR advocated partial privatization – a process by which the government would sell equity in public services to various private entities, while remaining a majority stakeholder. In other words, the South African government wanted to exist more as an overseer of private provision because, in keeping with its promotion of social equity, it believed the "social goods" aspect of natural resource provision could not be protected if ownership of those resources was entirely private.⁵⁵ Accordingly, then, the main objectives of the government's privatization initiatives were social in nature -- specifically, to facilitate economic growth, promote the development of historically disadvantaged communities and black economic empowerment, extend private ownership

⁵⁴ Jerome, "Privatization and Regulation in South Africa: An Evaluation," 186.

⁵⁵ Gleick, et al., *The World's Water, 2004-2005*, 60.

of government-controlled assets to previously disadvantaged persons, and promote skills transfer and fair competition.⁵⁶

From its inception, however, South Africa's privatization program suffered from a lack of policy credibility within the business and labor communities, albeit for differing reasons. Criticism from the South African business community centered on the perceived inertia of the government in implementing GEAR, arguing that the government was sending the wrong signals to the financial community by delaying much-needed investment. Labor's criticism, on the other hand, was based on the supposition that GEAR's implementation endangered the delivery of basic social needs, an analysis that seemed rather prescient given the waterborne disease outbreak that occurred at the turn of the century.⁵⁷

During the last several months of the year 2000, South Africa experienced a cholera epidemic which sickened 120,000 people and caused 265 deaths. Cholera is a highly communicable disease characterized by abdominal cramps, severe diarrhea, exhaustion, and without treatment, eventually death, but it is also a disease that is easily eradicated by a combination of effective sanitation infrastructure and clean drinking water. In this particular case, KwaZulu-Natal, one of South Africa's more economically-disadvantaged provinces, served as the center of the outbreak. The government later concluded that the cholera epidemic in this area was a direct result of policies intended to recover the cost of water provision from the country's poorest residents.

⁵⁶ Jerome, "Privatization and Regulation in South Africa: An Evaluation," 189.

⁵⁷ *Ibid.*, 187.

The most populous of South Africa's nine provinces with about nine million people, KwaZulu/Natal is also one of its least developed.⁵⁸ During the apartheid era, water was free in KwaZulu because most people were not connected to a formal water system, and instead relied on local streams, rivers, and springs to obtain the water they needed. After the ANC government came to power in 1994, its efforts to connect people to more formal water sources resulted in the installation of communal taps throughout the province. Between 1997 and 2000, however, as part of GEAR, the government allowed private companies to install prepaid water meters on those communal taps in order to charge people for their water use. As cost recovery was one of GEAR's primary objectives, this seemed a rational step from an administrative and financial point of view: prepaid meters cost companies less money to monitor because there are no meter readings, no billing statements, and no need to employ bill collectors.⁵⁹ Instead, the meters required the use of "water cards," which consumers could purchase at set locations around the province. Once one purchased a water card, he/she only needed to swipe it at a keypad on the communal tap, which would then provide water to that individual until the card's funds were exhausted, at which point the tap would terminate water provision.⁶⁰

A connection fee of 50 Rand (at that time, approximately \$8.00 U.S.) allowed people initial access to the prepaid meters; but in an area where the average monthly income was approximately 500 Rand, the connection fee was beyond reach for a large number of consumers. Over time, as these individuals became unable to pay for their

⁵⁸ Cauvin, "South Africa Asks for Help in Cholera Outbreak: Thousands are Ill and 59 are Dead," January 7, 2001.

⁵⁹ Harvey, "Managing the Poor by Remote Control: Johannesburg's Experiments with Prepaid Water Meters," 121.

⁶⁰ Ibid.

water cards, many of them reverted back to using local streams and rivers for their water provision. That decision proved to be deadly, however, as most local water sources were infected with the cholera bacteria. In turn, the infected water users spread cholera to other areas of South Africa, and the resultant epidemic lasted months. The outbreak engendered unexpected consequences as well, such as the riots in Alexandra, a Johannesburg township, where hundreds of squatters fought with police who came to evict them out of their homes because the nearby river was infected with cholera.⁶¹ Several months later, after the epidemic receded, the DWAF identified the application of cost recovery methods through the prepaid meters as the accelerator of the cholera outbreak, if not the “direct trigger.”⁶²

SOCIAL EQUITY THROUGH FREE BASIC WATER

The cholera epidemic served as a catalyst that would change the face of South Africa’s water policy and management as it ushered in an even deeper commitment to the social equity of water provision. In September 2000, as a direct result of the recent cholera outbreak, the DWAF adopted the ‘Free Basic Water’ (FBW) policy, which allowed 6,000 liters per month of free water for all South African households (the equivalent of 25 liters per person per day). With FBW, the government hoped that the poorest South Africans would always have access to clean water, thus negating the need for them to resort to bacteria-infested rivers and streams for water provision.

The move to FBW left the South African government facing a bit of a conundrum, however. The philosophy underlying the FBW concept was to provide a set amount of water to every South African citizen in order to avoid a repeat of the cholera

⁶¹ *CBS News*, “Cholera Crisis in South Africa,” February 18, 2001..

⁶² Hemson,, “Easing the Burden on Women? Water, Cholera, and Poverty in South Africa,” 153.

epidemic. Conversely, the government still recognized that the country's available water resources were insufficient to meet projected current and future demands, and in that respect, water conservation policies, including water price increases, were necessary. It was in the attempted reconciliation of these two contradictory goals that South Africa decided to integrate the FBW supply of 25 liters per person per day with an increasing block tariff water pricing structure for any provision levels beyond that prescribed daily amount.⁶³

The government's approach in this case was not without precedent, as a similar water provision strategy had succeeded in Durban, South Africa, the second largest city in the country, for many years. Durban's unique water provision strategy evolved organically from an initial attempt to regulate the overconsumption of water from communal standpipes around the city. Upon the original installation of free communal taps in Durban (which occurred in the early 1990s), the city's water managers found that the taps were often left running night and day, even when no one was using them. Such practices, of course, led to water waste, a situation that Durban could ill afford given the scarce nature of its regional water sources. To combat this problem, Durban Water decided to offer consumers an alternative that would allow them more convenient water access than a communal standpipe at a lesser price than having water piped directly into their homes. Ultimately, Durban Water intended the result of this initiative to be a higher level of water conservation among the majority of its consumers.

To achieve this goal, Durban Water advocated the construction of a ground-based water tank for each home as a communal tap alternative. Under this system, the household paid an initial fee for the tank and its connection to the water main, plus a

⁶³ Schulz, "Water Pricing, Inequality, and Economic Welfare," 171.

monthly fee that included Durban Water filling the 200 liter tank with treated water each day. If consumers requested it, Durban could fill the tank more than once a day, but customers would pay a premium price for each extra tank refill. Water provided under the ground tank system was not piped directly into a consumer's home; instead, Durban Water installed a standpipe in the yard, and the tap was for the exclusive use of that particular household. Ultimately, the ground tank proved an extraordinarily popular water provision model, as the company found that almost all of its household consumers preferred the ground tank option to the communal tap system since it ensured a supply of water to an individual house on a regular basis.⁶⁴

Over time, though, Durban Water found that the costs of administering the billing of the ground tank system was actually higher than the cost of the initial 200 liters of water piped into the tank each day; thus, from 1998 on, all ground tank consumers enjoyed their daily 200 liters for free. After the obligatory provision of 200 liters, however, the price for additional water use increased exponentially to encourage water conservation, but only consumers using more than 200 liters per day were charged at all, and only those users could be disconnected for non-payment.⁶⁵

At first glance, Durban's organically conceived system seemed an efficient and effective method for the South African government to apply writ large in order to successfully address both IWRM's demand management and social equity components. Unfortunately, what was relatively easy to implement on Durban's smaller scale has not proven as workable in a larger application. Certainly, a decade after the commencement of FBW, many South African citizens still do not have access to daily Free Basic Water.

⁶⁴ Schulz, "Water Pricing, Inequality, and Economic Welfare," 171-173.

⁶⁵ Ibid.

While it is encouraging that the country's most urban provinces, including the Western Cape, Gauteng, and the Free State, report that between 86 to 92 percent of their populations now receive their free water allocation on a regular basis, more rural and impoverished provinces show the lowest levels of FBW implementation in South Africa, including Limpopo, Mpumalanga, North West, Eastern Cape, and KwaZulu-Natal. Thus, the economically disadvantaged people whom the policy targets have been the last to receive it, and today about seven million of South Africa's poorest individuals still do not have access to Free Basic Water.⁶⁶

Even in areas in which the government has successfully implemented FBW, along with its sister block tariff pricing component, such implementation can have unexpected and negative consequences for the country's poorest individuals. According to the Durban model, the logic behind the pairing of FBW with block pricing is that consumers that exceed their FBW allocation will actively conserve water once they face a dramatic increase in water prices. A recent study looking at this very issue suggests, however, that the water demands of rich households in South Africa are much more responsive to price changes than those of poor households because wealthier individuals are able to restrict external water uses like watering lawns, washing cars, gardening, etc.; thus, this segment of the population can easily cut its consumption of water if it feels the price beyond the FBW is too high. Low income water uses, however, are more inelastic; consequently, extreme price increases for water supply beyond FBW function more like a tax for the poor. A 10% price increase, for instance, cuts the water consumption of South Africa's poorest by 3.2%, while their bills increase by 6.5%.⁶⁷ Hence, price increases may not be

⁶⁶ Hemson,, "Easing the Burden on Women? Water, Cholera, and Poverty in South Africa," 162.

⁶⁷ Jansen and Schulz, "Water Demand and the Urban Poor," 606.

the most effective method for restricting the water consumption of South Africa's economically disadvantaged households. Ultimately, South Africa's ambiguous success with its FBW/block pricing implementation suggests that reconciling the mutual exclusivity of IWRM's privatization and social equity arms will prove an exceedingly complicated, if not impossible, task.

THE FAILURE OF DECENTRALIZATION

South Africa's passionate commitment to social equity has also hampered its government's implementation of policies intended to support IWRM's decentralization and environmental sustainability components. The decentralization of South Africa's water policy oversight, for example, has failed in large part because of the crippling lack of water management expertise in the state – a situation created by apartheid and, perhaps counter-intuitively, worsened by the new government's commitment to reversing apartheid's social inequity of employment. Both the National Water Act and Water Services Act tasks South Africa's federal government (specifically the DWAF) with creating IWRM-related policies, but rely on the country's municipalities, towns, and villages to execute those policies. Unfortunately, most of these localities lack staff adequately trained as water managers, a factor which impedes significantly the implementation of IWRM legislation.

South Africa's federal government declared at the end of the apartheid-era that it would transform its administration from predominantly white to predominantly black in a period of just ten years, a move intended to reflect the demographics of the country's population. At the same time, most local and municipal governments committed to transforming their employee demographics in a period of only four years from

apartheid's end. At a glance, these transitional efforts were largely successful. Through democratic elections, affirmative action policies for members of the black population, and redundancy programs for whites, local governments in both the former white areas and the former homelands, are now predominantly black. Through no fault of their own, however, many of these newly appointed government employees are not adequately trained for their jobs due to apartheid labor policies which offered them little opportunity for education, instead relegating them to unskilled work and leaving them with modest training to meet the technical requirements of their new occupations.⁶⁸

In terms of water management, the resultant lack of scientific expertise within local governments hinders the implementation of IWRM-related legislation. For example, the South African federal government estimates that it will take up to 20 years to establish the CMAs called for in the National Water Act. Much of the delay is due to the fact that each CMA will require a staff of engineers, among other highly trained experts, to help monitor and account for the health and functionality of the regional water area. Currently, however, South Africa is experiencing a shortage of black civil engineers, or indeed, civil engineers of any race. As of 2004, there were only 15,000 civil engineers in all of South Africa, with the bulk of those in the private sector, meaning that exceedingly few engineers are available to serve as the workforce of a prospective CMA.⁶⁹

Indeed, this shortage of qualified water managers is one of the primary reasons that the South African government has yet to establish even one CMA within the

⁶⁸ Funke, et al., "Redressing Inequality: South Africa's New Water Policy," 16.

⁶⁹ Ibid., 18.

country.⁷⁰ Without the technical information that a CMA would provide regarding the quantity and quality of the catchment's water resources, South Africa's localities are operating within an informational vacuum in terms of apportioning water allocations for their areas. Unfortunately, then, this lack of expertise has resulted in a situation where more water is allocated than is feasible from the standpoint of ecological sustainability. As a result, local governments have over-allocated the water supply of at least 15 of the 19 water management areas in South Africa.⁷¹

A lack of water management expertise further hampers the National Water Act's call for the inclusion of traditional village authorities in the decentralization of water management. Under the mandate of the NWA, village leaders participate in water user associations (WUAs), and these WUAs have the responsibility of managing several aspects of a locality's water provision, including infrastructure maintenance, pricing enforcement, and water allocation amounts. The members of these WUAs often have even less technical training than water managers in the municipal governments, yet they retain considerable decision-making power over the distribution and use of communal land and other community natural resources; thus, local and district municipalities are forced to work with them to ensure policy implementation.⁷²

The experience of Ga-Mashishi is illustrative of South Africa's larger struggle with the decentralization of water policy. Ga-Mashishi is a relatively small village located in the Sekhukhune District of the Limpopo Province. The village has around 1,000 households, each with an average of 6.5 residents, and the area is economically

⁷⁰ Funke, et al., "Redressing Inequality: South Africa's New Water Policy," 18.

⁷¹ Goldin, "It Takes Two to Tango," 52.

⁷² Uiterweer, et al., "Redressing Inequities through Domestic Water Supply," 61.

depressed. Unemployment rates are high in Ga-Mashishi, and almost 40% of its residents depend entirely on government pensions or welfare for their survival.⁷³

Ga-Mashishi's water use is governed by a WUA known as the Ga-Mashishi Water Committee (GWC), a group comprised of local leaders. The Committee's members are elected during a mass meeting held every year in the village, and the GWC is responsible for many aspects of the area's water provision, including advancing communication between the village and municipal water operators; noticing and repairing breakdowns in the system; and collecting water fees from consumers.⁷⁴ At present, Ga-Mashishi's water supply consists of 43 communal and 45 approved household standpipes. In addition, there are a plethora of illegal water connections to private yards all over the village, and although these connections are forbidden officially by both the DWAF and municipal water operators, the GWC tolerates and even encourages the illegal connections for those who have the money to pay for them.⁷⁵

Although the need for water conservation in the area is of the utmost importance (it, like much of South Africa, operates off a very limited local water supply), the GWC only turns down requests for an illegal water connection if that connection will disturb one of the many graves scattered across the village. Certainly, the GWC's members, although well-versed in tribal and traditional issues like grave placement, are not very familiar with the conservation-related consequences of these illegal connections, in part because the NWA legislation does not require WUA members to undergo any technical training in water management. Even if the NWA stipulated such training, it is not clear that the relevant municipal authorities would be able to provide such education to the

⁷³ Uiterweer, et al., "Redressing Inequities through Domestic Water Supply," 62.

⁷⁴ Ibid.

⁷⁵ Ibid.

GWC, as they themselves are suffering from a lack of technical expertise within their ranks.⁷⁶ As a result of the village's overextended water resources, the taps of local water users often run dry, forcing those individuals to resort to nearby stream and rivers for their water and increasing the potential for waterborne disease outbreaks. The case of Ga-Mashishi, then, suggests that water user associations, having been vested with so much legal authority for daily water provision, must have the proper training regarding the importance of water conservation and effective resource provision, or they will fail to equitably and sustainably allocate and maintain local water resources.⁷⁷

THE SOCIAL EQUITY OF SUSTAINABILITY

IWRM's environmental sustainability principle has also suffered under South Africa's singular emphasis on redressing the wrongs of apartheid in water management. In order to provide impoverished black South Africans with the sewage and water treatment the previous government never afforded them, the country's post-apartheid authorities have consistently devoted the bulk of the DWAF budget to developing new water and wastewater infrastructure in South Africa. In doing so, however, the DWAF has provided little to no funding for the maintenance of existing treatment plants, a practice that has contributed to what the DWAF admits are unacceptably high levels of fecal pollution in many of South Africa's waterways.⁷⁸ In 2008, for instance, sections of the Vaal River, which serves as Johannesburg's main drinking water source, registered excessively high levels of fecal coliform bacteria, forcing the area's water managers to warn Johannesburg residents to refrain from contact with the river. In the Vaal's case,

⁷⁶ Uiterweer, et al., "Redressing Inequities through Domestic Water Supply," 63.

⁷⁷ Ibid.

⁷⁸ Republic of South Africa – Department of Water and Forestry, *Press Release: South Africa's Looming Water Crisis and the DA's Plan to Address It*.

the contamination is largely the result of ill maintained and outdated wastewater treatment facilities that have allowed the release of improperly treated sewage effluent back into the river. This problem is not unique to the Johannesburg area, as most municipal sewage systems in South Africa are between 30 to 50 years old and in need of serious repair or replacement.⁷⁹

The Umsunduzi River provides yet another example of a water source suffering from excessive fecal contamination due to improper wastewater treatment. In the days after a well-known river race on the Umsunduzi in 2009, over 40% of participants reported contracting chronic diarrhea. Subsequent tests showed that the levels of human fecal matter in the river were 115,000 parts per 100ml, when international standards dictate that an acceptable level of coliform bacteria (in terms of drinkable water) should never exceed 150 parts per 100ml of water. Indeed, the region traversed by the Umsunduzi River has the highest diarrhea infection rate in all of South Africa.⁸⁰ Ultimately, the inattention paid to the maintenance and repair of older sewage treatment plants when contrasted with the DWAF's prioritization of sewage treatment provision to areas lacking such a service suggests that the healthy water required by the National Water Act's ecological and human 'Reserve' is of secondary importance to the social equity of water infrastructure development within the South African context.

THE PATH DEPENDENCE OF APARTHEID

South Africa's water law was borne out of its history of conquest and expansion, as colonial lawmakers implemented the riparian principle so popular in Europe and

⁷⁹ IRIN/United Nations Office for the Coordination of Humanitarian Affairs, "South Africa: The Quiet Water Crisis."

⁸⁰ Ibid.

applied it within the unsuitable framework of Southern Africa's arid climate. Over time, lawmakers used that principle to advance the interests of a dominant population which had privileged access to land, economic power, and ultimately, water. Upon the fall of this discriminatory governing system, the new democratic government faced the unenviable task of righting past social inequities and providing basic water infrastructure services to millions of South Africans who had gone without for decades. The newly-elected ANC government made it clear from the start that it would address apartheid's environmental injustices as an integral part of its reconstruction and development mandate, and it chose Integrated Water Resources Management as the prevailing water policy framework for addressing the country's unique political legacy and circumstances of scarcity.

In theory, South Africa pursued a righteous course in terms of IWRM policy implementation, a fact which makes its failure to achieve its IWRM objectives all the more surprising. The theoretical literatures on common-pool resources, privatization, and human rights all speak to South Africa's actions in this respect. CPR scholarship, for instance, supports South Africa's reclassification of water from an element of private property under the riparian principle to a common-pool resource safeguarded by government intervention. Upon its election, the ANC government took on the mantle of making decisions about water allocation for the purposes of social equity instead of leaving those decisions to individual land owners. With this move, the government wished to guarantee the non-excludability component of CPR resources, by ensuring that all segments of the South African population gained access to this very necessary

resource.⁸¹ Moreover, the literature suggests that the mitigation of CPR dilemmas of appropriation and provision, both of which South Africans face, may call for an institution with the power to coordinate or allot the individual use of the resource; thus engendering favorable governing conditions for top-down IWRM mandates. In redefining South Africa's water as a CPR, then, the government allowed itself the latitude to mitigate the free-rider issue, believing that "social arrangements that produce responsibility are arrangements that create coercion of some sort."⁸²

The privatization literature further defends South Africa's operationalization of IWRM economic principles. South Africa, as a developing nation facing a very unique historical legacy, applied privatization "by the theoretic book," so to speak, given its need to both redress the social wrongs of the past and encourage the conservation of the country's scarce water resources. Instead of fully privatizing all government industries, South Africa's leaders explored the use of partial privatization as an individual strategy to help achieve some sort of social objective for the purpose of realigning "institutions and decision-making processes so as to privilege the goals of some groups over the competing aspirations of other groups."⁸³ As attested to by the literature, "neither public nor private sector managers always work to the best interest of the consumer," and South Africa followed this mandate, acting as if both groups needed incentives or regulations to achieve efficiency (in terms of conservation), while also providing for individual social welfare.⁸⁴

⁸¹ Ostrom, et al., *Rules, Games, and Common-Pool Resources*, 6.

⁸² Hardin, "The Tragedy of the Commons," 1247.

⁸³ Feigenbaum and Henig, "The Political Underpinnings of Privatization," 191.

⁸⁴ Bennett, *The Politics of Water*, 181.

Moreover, the literature on norm creation is also relevant to the South African IWRM experience. As one of the first states in the world to codify the human right to water within its constitution, along with its commitment to providing a prescribed level of water at no cost to every citizen, South African certainly internalized the norms inherent in IWRM, in essence reaching the stage where such norms are “no longer a matter of broad public debate.”⁸⁵ Due to the exclusionary nature of South Africa’s apartheid regime, the normative drive to provide water to all South Africans has become constitutive norm in modern South Africa, or a normative ideal that “create[s] new actors, interests, or categories of actions” by establishing an institutional regime that is organized around the previously unrecognized combination of IWRM principles.⁸⁶ Moreover, legislation, such as the National Water Act, serves to operationalize and institutionalize IWRM as a newly-constitutive norm.

Despite theoretical support of its water policy initiatives, South Africa post-apartheid government has stumbled in its realization of IWRM’s holistic approach to water management. Although the situation has certainly improved since 1994 (with nine million additional people gaining access to clean water since apartheid’s end), millions of South Africans still lack access to water and sewage infrastructure, the overlapping mandates and lack of expertise among governmental water managers have yet to improve, and the country’s rivers face increasing levels of pollution.⁸⁷ Why, then, has South Africa not experienced more success with its IWRM implementation? Certainly, the related literatures on regimes/collective action and common pool resources help to

⁸⁵ Finnemore and Sikkink, “International Norm Dynamics and Political Change,” 895.

⁸⁶ *Ibid.*, 891-892.

⁸⁷ IRIN/United Nations Office for the Coordination of Humanitarian Affairs, “South Africa: The Quiet Water Crisis.”

answer this question, as both regime sequencing and the necessity of heterogeneity in water policy application prove important.

For its part, regime sequencing matters in South African water management, just as it did in Germany and Canada, as institutions and laws conceived to operationalize IWRM within the South African context were not allowed the spontaneous stage of regime creation. Indeed, the literature indicates that environmental management frameworks that arise spontaneously, or through a process in which actors do not set out to explicitly create a regime but fashion one naturally through a tacit learning process, are the most successful.⁸⁸ The story of Durban Water's successful integration of IWRM's privatization and social equity components supports this contention. Durban's success was the direct result of a completely spontaneous and organic process that evolved over time, ultimately becoming formalized into an early version of the Free Basic Water concept.

Unlike Durban Water, South Africa's post-apartheid federal government did not enjoy the luxury of time in its regime creation, as it was faced with a large-scale catastrophe of water provision at the outset of its term. To mitigate the critical provision issues it faced, the ANC government fashioned a series of immediate and more formalized water management regulations in order to restore the country's social equity of water provision, further codifying its intentions in IWRM-related legislation like the 1998 National Water Act. This newly-created legislation, did not provide, however, any element of enforcement imposition, instead leaving the new policies to be operationalized by the country's extremely fragmented and ill-trained water governing network. Due to

⁸⁸ IRIN/United Nations Office for the Coordination of Humanitarian Affairs, "South Africa: The Quiet Water Crisis."

the immediacy of the water problems faced by the post-apartheid government, South Africa was never granted the opportunity to allow for spontaneous regime evolution, but foregoing this step on the dialectic of regime creation has proven a detriment to its effective IWRM implementation.

Ultimately, however, the ANC government's singular focus on social equity provided the definitive hindrance to the implementation of IWRM's decentralization, privatization, and environmental sustainability policy components. In the end, the legacy of apartheid magnified the importance of IWRM's social equity arm to the point that it eclipsed the holistic application of IWRM's other policy emphases. This essentially rendered IWRM impotent to a certain extent because a heterogeneity of issues, and the ensuing symbiosis between those issues, lies at the heart of the policy framework's ideology. The CPR literature provides a parallel to this notion, suggesting that a heterogeneity of issues in CPR management is significant because without it relevant stakeholders do not have the opportunity to create "the potential for mutually advantageous issue linkage, thus increasing the probability of successful cooperation."⁸⁹ Simply put, stakeholders will hold differing priorities regarding water management; eventually amalgamating these interests to forge a policy compromise for the good of the CPR.

That amalgamation of IWRM's priorities is precisely what is needed in the South African case, as the strategic framework calls for a holistic water policy application that mirrors the integrative nature of the natural environment it governs. Unfortunately, South Africa's legacy of apartheid prevented the country's water managers from seeking such a heterogeneous approach. Its government instead employed a more homogenous ideal and

⁸⁹ Martin, "Heterogeneity, Linkage, and Commons Problems," 88.

prioritized IWRM's social equity component over all others, a move which hijacked its attempts to implement the totality of the framework's components.

Interestingly, South Africa unwittingly foreshadowed its struggles with IWRM in its 1996 constitution which, while stressing the importance of redressing the wrongs of apartheid, also stipulates that the rights it promises its citizens must be realized 'progressively,' meaning that the realization of those rights cannot be immediate but must occur over time and under conducive conditions. Perhaps a similar commitment to the progressive realization of IWRM's policy components would prove more successful in South Africa's case, allowing the state to lay the knowledge, development, and governing infrastructures required for a sound, successful, and holistic IWRM implementation. Until that day, though, full IWRM realization within South Africa remains an unfulfilled objective, leaving the government hoping that water will "one day, unheralded, modestly, easily, [and] simply flow out to every South African who turns a tap."⁹⁰

⁹⁰ Republic of South Africa – Department of Water and Forestry. *White Paper on a National Water Policy for South Africa*, 1.

CHAPTER VIII

CONCLUDING THOUGHTS AND THEORETICAL IMPLICATIONS

We never know the worth of water till the well is dry.
-Thomas Fuller,
Gnomologia, 1732

The seemingly simple chemical process of water creation belies the difficulties many states around the world have in safeguarding and nurturing this fundamental resource so essential to human life. The international community, under the auspices of the United Nations, has embraced Integrated Water Resources Management (IWRM) as an overarching policy framework providing a potential solution to the world's encroaching water woes. Its holistic approach to water management espouses four policy components that attempt collectively to decentralize water governance, value water as an economic good, promote the environmental sustainability of water resources, and ensure equitable water provision to individuals at all socio-economic levels. Simultaneously, IWRM attempts to encourage effective interjurisdictional collaboration over shared water resources in both an intra- and interstate context. The United Nations heralds the flexibility of the IWRM methodology as a system in which diverse types of states can pick and choose the solutions that best mitigate their assorted water problems.

The intensity of the UN's IWRM advocacy over the last two decades has helped the framework's four-pronged approach to water management find widespread adoption among states across the globe. Unfortunately, not all of these states have realized the same level of achievement in executing IWRM's core principles. States within the

developing world have often struggled to implement IWRM's components while their more developed counterparts have seen higher levels of implementation success. Certainly, these differences in realization call into question the efficacy of the IWRM policy framework as a one-size-fits-all solution to water management.

This study explored the disconnect between the UN's IWRM rhetoric and the reality of the framework's implementation through a theoretical comparison of the IWRM experiences of four states. Two of these states, Germany and India, served as examples of an IWRM implementation success and failure at the interstate level of water governance, while the cases of Canada and South Africa stood as examples of IWRM success and failure at the state level. This methodology allowed for an examination of at least one success and one failure of IWRM policy at both the national and international governance levels, and all four cases emphasized the implementation of IWRM as a hypothesized cause of the resulting state water policy, while controlling for macro hydrological characteristics, geographic diversity, governance capabilities, and the existence of federal and democratic systems of governance. The illustration below provides a graphic regarding the orientation of each of the study's four cases.

	Success	Failure
Interstate	Germany	India
Intrastate	Canada	South Africa

Fig. 1. Case study matrix

At its outset, this analysis expected that various theories of international relations could help to explain the IWRM implementation gap between Germany, India, Canada, and South Africa. These theories include the literatures on regime creation and collective

action, common-pool resources, economic privatization, and the construction and diffusion of normative ideas regarding water rights across societies. Ultimately, although all of these theoretical perspectives illuminated various aspects of a state's success or failure with IWRM, it was the scholarship on regimes and collective action that best explained variations in IWRM implementation. The regime literature highlighted the importance of an historical sequencing of environmental regime creation and the integration of both decentralized and centralized water governance mechanisms as key explanations of disparate IWRM implementation success. Moreover, the extant character of a region's previous water management regimes plays an important normative role in reconciling the IWRM framework's internal inconsistencies, while also providing the structural policy foundation on which to base the execution of IWRM's core principles.

COMPARATIVE CASE SUMMARIES

Indeed, a linear sequencing of regime creation proved important to the success of IWRM implementation in both the German and the Canadian experiences. In the German/Rhine region, the ICPR, arose in the 1950s as a spontaneous regime tasked with mitigating the pollution in the Rhine. Over time and spurred by the public pressure of the Sandoz chemical spill, the ICPR transformed into a formalized regime characterized by the detailed goals and objectives elucidated in the 1987 Rhine Action Plan. In turn, both the ICPR and its Rhine Action Plan were eventually subsumed under the umbrella of enforcement provided by the European Union's Water Framework Directive, a move which forced the ICPR to become explicitly negotiated with a "formal accounting of results."¹ Moreover, upon the creation of the WFD, the ICPR functioned as a 'nested

¹ Young, *International Cooperation*, 84-88.

enterprise' to help compensate for the difficulties in cooperation presented by the larger number of participants within the EU as a whole.²

Correspondingly, Canadian IWRM implementation followed a structurally similar path to that of IWRM in the Rhine region. Canada's initial water management regimes were spontaneous in nature, arising out of a joint need for stakeholders to solve dilemmas of collaboration over shared provincial water resources. Such regimes, however, were ad hoc in nature and failed to explicate clearly stated goals and objectives in Canadian water management. In time, Canada's 1987 Federal Water Policy institutionalized IWRM principles into legislation, but the subsequent drive to privatize Canadian water management during the following decade prevented the Federal Water Policy from reaching full realization.

Eventually, these privatization attempts led to the Walkerton *E. coli* outbreak, and as in the Rhine region, this water-related tragedy forced the Canadian government's return to a more formal implementation of the IWRM doctrine that had characterized the historical character of its earlier water management regimes. During the last ten years, then, the Canadian national government has been able to enforce the Federal Water Policy by requiring Canada's municipalities to adhere to IWRM principles as a requirement of federal infrastructure funding. Additionally, Canada's modern water management, like that of the Rhine, includes a focus on nested enterprises with the creation of small water management governing groups like the Prairie Provinces Water Board and the Mackenzie River Basin Board. These groups allow localities a say in their neighborhood water policies, while still adhering to a larger policy framework emphasizing the federal government's commitment to IWRM.

² Keohane and Ostrom, eds., *Local Commons and Global Interdependence*, 22.

In contrast, the interstate management of India's Ganges River, along with the management of South Africa's national water resources, represent failures of IWRM implementation. In the Indian case, both geography and power factors played a role in the failure of IWRM as a transboundary policy regime. India, as the regional hegemon and the geographic holder of the majority of Ganges' water, was able to hinder IWRM implementation in the region. India's powerful position relative to Bangladesh and Nepal, the other riparian actors, allowed the Indian state to establish the unilateral 'rules of the game' and forced all actors to conform to these arrangements through a combination of "coercion, cooptation, and the manipulation of incentives."³ Additionally, India's construction of the Farakka Barrage, which transformed the Ganges from a common-pool resource to a private river under India's sole control, enhanced India's unilateral control over the river and rendered the multilateral and collaborative objectives of IWRM meaningless within the Ganges context. India's unilateral control over the Ganges stands in stark contrast to the stakeholder collaboration of the Rhine region. Certainly, none of the Rhine's stakeholders enjoy the same level of regional power and geographic control over the Rhine as India does over the water of the Ganges.

Like India, South Africa has struggled mightily with its IWRM implementation and is the only state out of the four cases studied here that attempted to operationalize all four IWRM policy components within its water management objectives. Indeed, the IWRM principle of social equity played a larger role in the South African context than in any other state within this research project. As a developing nation facing a very unique historical legacy, the South African government codified the human right to water in its

³ Young, *International Cooperation*, 88.

constitution, and in doing so, transformed the IWRM principle of social equity into a constitutive norm.⁴

Moreover, as in the Canadian case, South Africa's water privatization experience led to a water-related tragedy and affected the state's current IWRM implementation. The government's practice of allowing private companies to charge for water access resulted in a major cholera outbreak, the deadly consequences of which led South Africa to deemphasize privatization and further highlight the social equity of water provision. Also, as in the Rhine region and in Canada, South African water management institutionalizes the notion of nested enterprises within its IWRM legislation which calls for the creation of smaller scale catchment management agencies and water user associations to help implement broad IWRM principles on a local basis. Despite these efforts, however, IWRM has failed in South Africa because its water regime creation lacks the sequential nature of regime creation in the more successful German and Canadian cases, a finding that will be further explored below.

THE IMPORTANCE OF REGIME SEQUENCING

Oran Young's conception of environmental regimes as "social institutions" (a set of rules and conventions that lend an element of orderliness over the activities they govern) forms the foundation of much of this analysis.⁵ Young suggests that a spontaneous regime may prove the most effective at solving water-related problems, as long as that regime includes regionalization to help mitigate the effect of a large number of actors. In contrast, formalized/negotiated and imposed regimes are less helpful when dealing with environmental issues because they can include high transaction costs and

⁴ Finnemore and Sikkink, "International Norm Dynamics and Political Change," 891-892.

⁵ Young, *International Cooperation*, 14.

encroaching restrictions on the individual liberty of stakeholders. Moreover, these more formal regimes often incorporate a focus on compliance, which prevents stakeholders from building trust before holding each other accountable for breaches of agreement.⁶

The application of Young's regime typology to the four case studies within this analysis suggest that spontaneity alone in environmental regimes does not necessarily constitute the most effective IWRM framework. Although spontaneity and nested enterprises certainly prove important in the larger context of water management, a linear integration of spontaneous, negotiated, and imposed regime types must occur to create the governing framework necessary for successful IWRM implementation. The overwhelming success of the Rhine's IWRM regime serves as the most telling example of the efficacy of this sequencing in water management. The creation of the International Commission for the Protection of the Rhine (ICPR) in 1950 was a spontaneous event, involving no element of coercion. The initial ICPR alliance was simply a group of stakeholders organizing themselves into a collaborative entity tasked with reducing the continued pollution of their primary water resource. Unfortunately, for the next several decades, the ICPR effected little substantive change, and although it advocated various ideas for the river's pollution mitigation, the operationalization of these ideas remained elusive. After the Sandoz tragedy, however, the ICPR faced public pressure to do more. As a result, it created the Rhine Action Plan (RAP), a more formalized set of goals and quantitative objectives for the river's water management, but the RAP contained no instrument for enforcing the various objectives it set. Several years later, the European Union's Water Framework Directive and its concomitant water policy enforcement mechanisms provided that missing element of imposition to Rhine water management.

⁶ Young, *International Cooperation*, 92-93.

With that final element of coercion in place, the Rhine's IWRM regime has been able to meet and surpass its water management goals over the last decade. As a spontaneous regime, then, the ICPR eventually transformed into a more formalized regime, and then evolved into an imposed regime with the European Union's intervention. Indeed, it is this last iteration of Rhine water management under the EU that has proven the most successful in terms of IWRM implementation, but it could not have reached that level of success without the evolutionary history preceding it.

Canada's fairly successful IWRM experience, although occurring within a domestic rather than international context, mirrors that of the Rhine's regime sequencing. Certainly, an element of spontaneity characterized Canada's earliest collaborative water arrangements between its provincial and national water managers. As early as the 1960s, Canada's national government, alongside several of its provinces, implemented facets of IWRM in the country's water management policy, including enhanced interjurisdictional collaboration, the utilization of the river basin as the spatial unit of analysis, and the notion of a holistic approach to water management. For several decades, these ideals were implemented on an ad hoc basis but were not institutionalized within the country's legislation. In time, though, the Canada Water Act and the Federal Water Policy formalized IWRM principles by including a clear accounting of water management goals and objectives in their precepts. These legislative acts, however, did not include an avenue for federal imposition or coercion; thus, they served more as formalized guideposts for provincial water management.

This status quo in water management prevailed until the year 2000, when Canada, like the Rhine, faced a water tragedy that spurred it to reinforce its commitment to the

environmental sustainability component of IWRM. Since that time, the federal government has found creative means of enlarging its role in IWRM enforcement, although the country's constitution still restricts the national government from legally imposing IWRM-related sanctions upon its municipalities and provinces. For instance, the Canadian federal government now requires provinces to meet specific IWRM objectives before they can qualify for financial assistance for water-related infrastructure. Thus Canada, like the Rhine region, has undergone a linear sequencing of water management regimes. This sequence began with localized spontaneous attempts to manage provincial waters and transformed over time into more formal legislative agendas with the Canada Water Act and the National Water Policy. Currently, the Canadian federal government is attempting to add that final element of imposition over its provincial and local water managers through the manipulation of IWRM-related financial incentives.

The integration of all three regime types was paramount to IWRM's success in the Rhine and Canadian experiences, but it was a lengthy period of spontaneous regime creation that allowed stakeholders the time to resolve any of IWRM's inherent contradictions before those contradictions manifested in their respective national and international water policies. Both Rhine and Canadian water managers were able to choose, over time, those IWRM principles that best suited each country's individual water needs, while deemphasizing those of the framework's principles that might prove contradictory to their chosen water management objective. South Africa, in contrast, has failed to fully realize its IWRM-related goals, and it is telling that the process of linear regime sequencing that has found success in both the Rhine and Canadian regions never

occurred within the South African context. South African water management certainly confronts unique challenges not faced by its developed counterparts, as its governmental mandate to redress the social injustices of apartheid has created a crisis of provision where solutions are needed immediately, rather than allowing the luxury of time for water policy to arise spontaneously among stakeholders. In this crisis mode, the South African government has skipped the process of spontaneous regime creation altogether and has instead advanced to formalizing IWRM principles in its National Water Act (NWA). Unfortunately, the forced abandonment of spontaneous regime creation has prevented South Africa from enjoying the time needed to reconcile IWRM's internal contradiction regarding the concurrent implementation of water's social equity with the conservation-oriented economic valuation of water. Moreover, the institutionalized NWA regime lacks any enforcement mechanism, and the result has been the uneven and unsuccessful implementation of IWRM directives throughout South Africa's towns, villages, and provinces. At this point in time, then, South African IWRM implementation has failed largely because it has only incorporated the negotiated nature of a water regime without the benefit of a more spontaneous evolutionary period or the necessary element of legislative coercion.

India suffers from similar sequencing problems to South Africa, albeit for differing reasons. On an interstate basis, India's attitude of *realpolitik* and its unilateral management of Ganges water disallowed any transboundary IWRM regime creation between interstate Ganges stakeholders. Certainly the geography of the Ganges allowed Indian political dominance over the river, as India's soil houses over 90% of Ganges water. This situation stands in stark contrast to that of the Rhine, a river in which the

majority stakeholder, Germany, holds only 60% of the river. Geography, then, has allowed India to control any collaborative agenda between itself and neighboring Bangladesh regarding Ganges management. In turn, India's agenda has been an agenda of self-interest, disavowing the collaborative aspects of IWRM implementation at any point over the last sixty years.

Conversely, India's national water management has embraced IWRM principles regarding the Ganges through the creation of the Ganga Action Plan, a blueprint that included formalized quantitative goals regarding pollution control and infrastructure creation on the river. Due to the limits imposed by its constitutional mandate for decentralized environmental policy, however, India's federal government proved unable to provide any sort of centralized enforcement to ensure that the GAP's objectives were met. Moreover, even if the central government had been able to hold villages and municipalities accountable for IWRM adherence, the informal nature of India's water economy may have rendered GAP realization impossible. In an environment in which less than 10% of Indian households use water from sources owned and managed by the government and only one in every 12 villages has any public or community water supply or irrigation system available, the GAP assumed a higher level of infrastructure connection than actually existed instead of adapting to the spontaneous nature of India's extant local water management regimes.⁷ Like South Africa, then, India tried to implement a negotiated water regime to replace perhaps tens of thousands of localized spontaneous systems without imposing a centralized implementation authority. In the

⁷ International Water Management Institute, *IWRM Challenges in Developing Countries: Lessons from India and Elsewhere*.

end, India's attempts at IWRM regime creation only succeeded in creating a complete chaos and dissonance in water governance.

CENTRALIZATION AND DECENTRALIZATION

The importance of imposition in environmental regime creation deserves an extended discussion here, as it highlights one of the major inconsistencies of the IWRM framework. As previously mentioned, the existence of a centralized enforcement authority with the power to coerce a regime's stakeholders into complying with IWRM directives is a vital component of any effective IWRM implementation. This finding, however, stands in direct contrast to one of IWRM's core principles -- that of the decentralization of water policy formation, an idea whose theoretical underpinnings center on the notion that stakeholders will be more likely to comply with water policies in whose creation they have been directly involved. In effect, IWRM conflates two distinct stages in the policy process—formulation first, and then enforcement—and suggests that decentralization works best for both stages. In fact, the study suggests that while decentralized formulation is necessary for stakeholder participation, centralized enforcement is essential to implement IWRM principles. While it certainly seems logical that water management flourishes when individual stakeholders can devise their own situation-specific water policies, that emphasis on decentralization, as articulated within the framework's principles, is not sufficient for successful IWRM implementation. In fact, this emphasis on decentralization constitutes one of the framework's internal fallacies in that IWRM assumes policy decentralization to be the only viable method for achieving increased stakeholder participation when there are numerous other avenues for stakeholder input within the framework of a centralized policy process. Certainly, the

nested enterprises concept that proved so successful in the Rhine case contradicts this assumption, as it speaks to the validity of localized participation within the context of a larger implementation authority. Ultimately, the experiences of the four states in this analysis suggest that the IWRM framework requires a careful balance between decentralized policy formulation and imposed enforcement in order to achieve a high level of implementation success.

Indeed, both India and South Africa lack official enforcement instruments for their IWRM-related legislation. The absence of coercion has hindered IWRM's success at mitigating water problems in these regions. India's federal government, for example, followed IWRM's lead and amended its constitution to decentralize its domestic water management, but in the process left no authority for enforcing or coordinating any ensuing water policy. The result is a three-tiered system of legislative chaos and disorder that has stagnated efforts to mitigate the degradation of the Ganges. Additionally, in terms of the Ganges' transboundary water management, India's lack of a centralized coordination and enforcement mechanism, coupled with its decentralized national water management, could easily allow Indian towns, villages, and municipalities to circumvent any water management agreement between India and Bangladesh if the two were ever able to come to a mutually acceptable accord over the water allocation of the river.

The South African case shares some similarities with India in this regard, although there are significant differences as well. Unlike India, South Africa's federal government retains the power to issue non-binding water policy guidelines to local governments, but in a similar fashion to India, South Africa's constitution gives the country's provincial and municipal governments control over the final acceptance and

implementation of that water policy. Thus, the South African federal government has little to no power to enforce the IWRM principles it has institutionalized within its National Water Act. This absence of imposition has instead resulted in a system that lacks consistency and suffers from similar organizational confusion to that of the Ganges region, with localities, tribal areas, towns, provinces, and the federal government all assuming overlapping roles and mandates for the state's water policy. This situation ultimately renders the entire enterprise ineffective.

The Canadian case offers a counterpoint to the South African and Indian IWRM experiences, as Canada's federal government has started to utilize creative methods of overcoming its constitutional prohibition against centralized IWRM enforcement. To this end, Canada's national government is enforcing IWRM policies through various strategies, including limiting federal funding to municipalities that do not comply with IWRM mandates; legislating a larger arbitration role for itself in the event that provinces cannot come to an agreement regarding water allocation; and perhaps most importantly, creating smaller organizational groupings, or nested enterprises, such as the Prairie Provinces Board or the Canadian Council of Environmental Ministers, in which the federal government plays a role in advising provinces regarding appropriate IWRM policies. Through the utilization of these inventive strategies, Canada's national government has begun to find a way to centralize IWRM enforcement in practice, while still allowing its provinces the ability to localize their water policy creation.

The Rhine region is again the best example of the seamless integration of environmental policy decentralization and centralization, further demonstrating that nested enterprises can help to successfully amalgamate decentralized policy formulation

with a centralized enforcement component. The ICPR, as a nested enterprise within the larger European Union's Water Framework Directive, compensates for the difficulty imposed by the large number of EU stakeholders because it organizes those stakeholders into smaller localized groupings. This stratified organizational structure allows large group cooperation throughout Western Europe to be built upon the foundation of successful small group collaboration, so that the number of regime members becomes secondary to other considerations within the water policy regime.⁸ The ICPR, then, is allowed to create policy specific to the regional and local needs of Rhine river stakeholders, but as a nested enterprise, is still subject to the element of policy coercion provided by the EU at large.

PRE-EXISTING WATER REGIMES

The success of a state's IWRM endeavors not only rests upon the sequencing of its water management regimes and the successful integration of its policy decentralization with centralized enforcement, but also on the instrumental value of a region's pre-existing regimes. These play an important normative role in reconciling IWRM's internal inconsistencies, including the previously discussed tension between the decentralization of policy and the centralization of enforcement and, as evidenced by the South African case, the incongruity between concurrently providing for the social equity of water and manipulating its price to stem demand. Although IWRM is theoretically a holistic approach to water management, in practice, its most successful implementation occurs when states concentrate on the execution of only one or two of its components.

⁸ Keohane and Ostrom, eds., *Local Commons and Global Interdependence*, 22.

Accidents of history help to determine which emphases prevail within each state, as past attempts to manage water shape the form and function of modern IWRM implementation. Certainly, water crises have played a pivotal role in this sort of path dependence of IWRM-related policy. The Rhine region, Canada, and South Africa all faced water tragedies of some sort (a chemical spill, *E. coli* epidemic, and cholera outbreak, respectively) that spurred each state to emphasize certain IWRM principles over others and set the stage for any future iterations of the framework's application. Prior to its adoption of IWRM, for instance, the Rhine region had a long history of a commercially-oriented water management regime whose actions and decrees eventually created an untenable amount of pollution in the Rhine River. These policies led ultimately to the Sandoz chemical tragedy on the Rhine, and as a direct reaction to that pollution incident, the IWRM principle of environmental sustainability emerged as a way to correct the wrongs of the previous regime. As such, ecological integrity, rather than human rights or economic demand management, has comprised the primary focus of the Rhine's successful water management for the last two decades.

As in the Rhine region, decades of policies oriented around the environmental sustainability of water resources characterize Canada's national water management agenda. A brief policy detour into privatization prompted the water-related tragedies of Walkerton and North Battleford. Since that time, Canada has implemented IWRM's environmental sustainability component as a reinforcement mechanism embodying its previous emphasis on pollution mitigation. Thus, in both the Rhine and Canadian cases, IWRM implementation acts as a sort of intervening variable that helps to organize and magnify the success of extant sustainability-oriented policies. Such a finding implies that

while IWRM can certainly enhance the effectiveness of existing water management policies, without the support of an existing policy framework, the implementation of IWRM principles may not be sufficient for the mitigation of water pollution and scarcity.

In further support of this point, consider the relationship between IWRM principles and the absence of pre-existing water management regimes in both South Africa and India. At the time of their respective IWRM implementations, water distribution in both states revolved around informal water economies rather than formalized, government-controlled water management regimes and infrastructure. In South Africa, apartheid policies that assumed water access to be a tool of dominance and exclusion comprised the country's only form of pre-existing water management regime. These policies created the prevalence of an informal water economy in much of South Africa. Apartheid's artificially created homelands and territories deprived black South Africans of formal water provision and forced them to operate under conditions characterized by "self-provision, informal exchanges and local community institutions that [were] not under the direct influence of formal public institutions."⁹ This informal water economy became the inheritance of the post-apartheid regime and since the new constitution came into force in 1994, governments have attempted unsuccessfully to force the extant informal water economy to conform to a more formalized IWRM framework.

This pervasiveness of an informal water economy characterizes India's historical, and in many ways, its modern water management, as only 10% of Indian households are currently hooked up to the infrastructure of formal water provision.¹⁰ Given these conditions, India faced the policy dilemma of making a square peg fit in a round hole. It

⁹ International Water Management Institute, *IWRM Challenges in Developing Countries: Lessons from India and Elsewhere*.

¹⁰ Ibid.

is unsurprising, then, that a country with virtually no history of centralized water management regimes failed to implement successfully a formal IWRM regime during the 1990s. Certainly, in both India and South Africa, the lack of pre-existing water management regimes, or indeed the most basic pre-existing water management infrastructure, has hindered the execution of IWRM principles.

ACCOUNTING FOR RIVAL EXPLANATIONS

In assessing any potential shortcomings of this study's findings, one must acknowledge and address rival explanations of IWRM success or failure. In particular, the importance of good governance stands as a possible alternate rationalization of variations in IWRM implementation success. Although it may seem logical to assume that governance provides an easy and convincing explanation as to why IWRM more often succeeds in developed rather than developing states, sophisticated governance mechanisms and/or high levels of development are not persuasive rival explanations for IWRM success or failure. Indeed, the two IWRM "failures" in this study, India and South Africa, served as crucial cases because they are two of the best governed and most developed states in the Global South. At the outset, then, one expected IWRM implementation to succeed in both cases, and since it did not, these cases prove important analytically and help to support the findings of this study.

As further evidence of this point, one should consider that IWRM implementation has failed even in states that have both transparent and consensus-oriented governance and high levels of development. The United States, for instance, as one of the best governed and most developed states in the world, has tried but failed to implement IWRM policies in its Colorado River region. Over the last fifteen years, the Colorado

River's relevant stakeholders, including federal, state, municipal, and international governments, have employed IWRM as a basis for collaborative management to mitigate the region's water scarcity and pollution. The results have been lackluster at best, and despite the policy framework's implementation in this region, water scarcity in the Colorado has worsened over the last ten years. Current projections indicate that by 2025 the river's water will be wholly "insufficient to meet certain consumptive water resource demands."¹¹ The river's pollution levels have also worsened in recent years, and the water's increasing salinity poses an increasingly vexing issue for Mexico. Indeed, the overconsumption of the Colorado's water on the U.S. side of the border has substantially increased salt levels in Mexico's allocation of the river's water, which in turn, has negatively affected Mexican irrigation and agriculture.¹² All of these problems continue to worsen despite the application of IWRM principles in this very highly developed and well-governed region of the world, and this particular IWRM failure suggests the spurious nature of using either governance or development as rival explanations for variations in IWRM implementation success.

Moreover, these four case studies suggest a finding that may make IWRM advocates very unhappy: IWRM is a more successful policy framework for mitigating pollution rather than water scarcity. This seems a logical conclusion on the face of the matter, as governments can significantly affect water pollution by regulating industrial and agricultural output or by constructing water or wastewater treatment plants, but they do not have the power of Mother Nature to produce rain on a whim. Indeed, perhaps one of the reasons IWRM has found such success in both the Rhine region and Canada is

¹¹ Bates, et al., eds., *Climate Change and Water: Technical Paper*, 105.

¹² Ibid.

because both areas suffer from excessive water pollution rather than severe water shortage; thus IWRM implementation has allowed stakeholders in those regions to realize sizable gains in pollution alleviation without having to worry about the thorny allocative issues involved in water scarcity amelioration.

One must consider the possibility, however, that IWRM implementation success in the Rhine and Canadian cases is overdetermined, and instead, two equally plausible explanations exist to explain IWRM's efficacy in the developed world. Certainly, the first reasonable explanation is that of the importance of spontaneous regime creation in allowing Canadian and Rhine stakeholders the time to resolve any of IWRM's inherent contradictions before those contradictions manifested in their respective national and international water policies. As this analysis suggests, it is for this reason that IWRM has more effectively promoted sustainability than it has scarcity mitigation.

It is also possible, however, that scarcity mitigation is more difficult to achieve than ecological sustainability because scarcity is a dilemma of common interests rather than a dilemma of common aversion.¹³ Conditions of water scarcity constitute a dilemma of common interests because when faced with decreasing water resources, all actors wish to be the sole user of the resource, and careful collaboration between stakeholders is required to resolve such a dilemma. Achieving sustainability, on the other hand, amounts to a dilemma of common aversion because all actors wish to avoid one outcome – in this case, the continued pollution of the resource. Sustainability, then, requires coordination to achieve, which relevant theory indicates is a much easier undertaking than the creation of a collaborative regime.¹⁴

¹³ Stein, "Coordination and Collaboration," 312.

¹⁴ *Ibid.*

If overdetermination is indeed present in both the Rhine and Canadian success stories however, than IWRM is an even weaker regime than this analysis suggests because IWRM acts as a spurious, rather than intervening, variable. Moreover, and just as importantly, the difference between scarcity mitigation and sustainability, while analytically useful, is blurred in an ecological sense. Unsustainable practices clearly create conditions of scarcity, and scarcity can exacerbate efforts to mitigate pollution, thus linking the two factors inextricably. For this reason, one cannot view Germany and Canada's implementation success through the singular lens of coordination resolution. Instead, that success constitutes a complex integration of solutions that help to mitigate both dilemmas of common interest and aversion.

POSSIBILITIES FOR FUTURE RESEARCH

Of course, this study represents only a first step in what could, in time, become an extensive project. With the encouragement of the United Nations, states around the globe are operationalizing IWRM components within their transboundary or internal water policies in larger numbers each year, thus providing an almost endless amount of subject matter for additional qualitative and/or quantitative study regarding the framework's implementation. In the future, for example, one could attempt to quantify the independent variables within the study to derive a more precise numerical measurement representing IWRM's implementation successes or failures. Another of the many possibilities for future research might include an expansion of the qualitative component of this analysis to study IWRM implementation in additional geographic regions of the world and/or by various forms of political systems beyond federalism. China's increasing focus on IWRM implementation, for example, would prove an excellent test

case for the application of the findings of this study, particularly in terms of assessing the necessity of the intricate balance between policy democratization and the enforcement potential provided by a strong central government. A case of successful IWRM adaptation in China, with its highly centralized policy structure, may provide additional means of redefining the importance of IWRM's policy decentralization component.

Turkey's IWRM application in the Tigris-Euphrates river basin may prove to be another instructive case in terms of the theoretical implications of this study. Turkey, like India, enjoys geographic domination over the upstream development of the Tigris and Euphrates in a region rife with water scarcity and pollution. Also, as in the Indian case, recent water policy squabbles between riparian actors Turkey, Iraq, and Syria suggest that Turkey feels confident exerting its unilateral control over the Tigris-Euphrates river basin. As a state that is in line for accession to the European Union, however, Turkey is also required to comply with the mandates of the EU's Water Framework Directive and its IWRM-compatible policies. Thus, the tension between Turkey's interest in safeguarding its scarce water resources at the same time it is required to collaborate with its riparian neighbors might prove enlightening in terms of IWRM efficacy and the strength of the IWRM regime.

Finally, any future scholarship on this topic should include a comprehensive assessment of the initial process of IWRM regime establishment in the late 1980s and early 1990s. Such an assessment would seek to answer the question of how the IWRM regime became rife with internal contradictions from its inception. Certainly, the answer to this question has important theoretical implications regarding the idea that the functional logic of institutionalism does not always prevail. The findings of such an

assessment may substantiate the sociologically-based theoretic view that regimes are highly idealized and internally inconsistent creations, rather than fully pragmatic ones.¹⁵ Ultimately, the subject of IWRM implementation contains a myriad of future research possibilities, and any of these potential approaches will allow both researchers and water managers further insight into whether IWRM principles and suggested practices will work to alleviate pollution or scarcity within the context of a country's own unique water economy.

THE INADEQUACIES OF THE IWRM FRAMEWORK

In the end, the results of this analysis suggest that the theoretical literatures on regimes and collective action best explain the IWRM implementation gap across the developed and developing worlds by highlighting the importance of environmental regime sequencing, the integration of both decentralized and centralized water governance mechanisms; and the extant character of a region's previous water management regimes as the primary predictors of IWRM success or failure. Moreover, the nature of a region's principal water problem matters, as IWRM has proven a more effective framework for countering sustainability issues than for mitigating water scarcity. These results present an obvious question – can the IWRM policy framework help to solve water-related problems in the scarcity-plagued and informal water economies of the developing world?

The answer is a resounding no. Since IWRM proves a more helpful model for solving issues of ecological sustainability rather than scarcity, the framework is an untenable policy model for developing states, many of which frequently confront

¹⁵ Meyer, et al., "World Society and the Nation-State," 144-181.

conditions of both water pollution and extreme water scarcity at the same time and without the luxury of time to reconcile the internal inconsistencies of IWRM's principles. Certainly, the two developing states in this analysis, South Africa and India, suffer from severe water scarcity, and they are not unique in this respect as conditions of water scarcity are becoming ubiquitous across much of the developing world. Today, most regions of Africa, Central, South, and Southeast Asia all face conditions of severe physical water scarcity that experts project will only worsen over time.¹⁶ As these states struggle to correct their impeding water woes, this analysis suggests that IWRM as a model for alleviating conditions of water scarcity is not compatible with their pre-existing informal water economies.

In point of fact, IWRM's primary weapon in the fight against water scarcity is its economic management component, which encourages pricing water to control demand as a means of conserving a precious and finite resource. How, though, can IWRM's emphasis on economic management ever become an effective tool of conservation when employed within an informal water economy? How can a public provider of water in a state like India expect to encourage widespread conservation by charging higher prices for the resource when less than 10% of the country's households obtain their water through public provision? India certainly recognized the futility of this effort in its domestic IWRM implementation and completely ignored IWRM's economic management component, instead concentrating on the framework's pollution mitigation potential.

South Africa's informal water economy has also proven an inhospitable framework for IWRM's emphasis on demand management, as the country's government

¹⁶ International Water Management Institute, *Getting the Message Out*, 1.

feels it must provide for the social equity of water while at the same time encouraging the conservation of its scarce water resources. Not surprisingly given the complexity of its situation, South Africa's attempts to reconcile the dichotomy of its water objectives have proven unsuccessful thus far. For instance, when South Africa attempted to recover the cost of water provision from its poorest members by allowing a private supplier to utilize pre-paid meters, a deadly cholera epidemic resulted. In response to the epidemic, the South African state advanced the idea of Free Basic Water to be deployed simultaneously with a conservation-oriented block pricing framework, but again, the implementation of Free Basic Water has struggled to take hold in the country's poorest areas. Moreover, the conservation pricing scheme has not accounted for the inelasticity of demand for water from the poor, ending up as a form of a tax on the people who can least afford it.

Under these types of conditions, IWRM is ineffective at mitigating water scarcity and pollution because its design components are not intended nor equipped for dealing with the unique and multifaceted water problems that accompany the informal water economies in many parts of the developing world. The major policy implication at the heart of this study, then, is that the IWRM framework cannot be *fixed* to better address the needs of developing states and states characterized by informal water economies; instead it must be abandoned, and the international community should begin deliberating anew more efficacious solutions. Certainly, if IWRM can only succeed under certain extant conditions, such as in states with a history of spontaneous water policy regime creation, effective sustainability-oriented policies, extensive public water provision, and centralized policy enforcement, then IWRM proves an inadequate policy model for states without such pre-existing conditions.

As it stands now, and despite the claims of the United Nations, IWRM is an inflexible management system whose adoption inhibits the efficacy of its suggested policy prescriptions; thus it is not nearly as flexible a policy framework as its advocates portray. At the end of the day, the gap between UN discourse and the reality of IWRM policy implementation implies that an exact replication of successful policy models from developed and formal economies is incompatible with the more informal water economies of the developing world, many of which may be structurally resistant to certain IWRM mandates. In a way, then, the IWRM framework represents a further extension of the policy hegemony of the developed world; its successful implementation requires a certain level of extant organized governance and public water provision, but its principles fail to provide a roadmap for establishing those conditions in states without them.

The informal water economies of the world that suffer from the twin degradations of water pollution and scarcity deserve a more effective solution for providing their populations with a clean and sufficient amount of water to sustain their lives. This is certainly an important task in a future characterized by population growth, rising urbanization levels, the spread of water-reliant industries, and the deleterious effects of climate change, all of which combine to portend an era of increasing water scarcity. Given these conditions, one truth is certain -- the international policy community should welcome, and indeed, encourage, a dialogue on the value of IWRM as a policy framework, as both the gravity of the globe's impending freshwater issues and the form and function of the solution to those issues cannot be overstated.

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