FAIRNESS IN WATER QUALITY: A DESCRIPTIVE APPROACH

*Katrina Smith**

INTRODUCTION: FAIRNESS IN ENVIRONMENTAL PROBLEM SOLVING

Debates over environmental issues usually involve questions of distribution. Problems such as deciding where to site noxious facilities, how to share the costs of cleaning up pollution, and how to allocate natural resources equitably all raise concerns over who will bear the costs of using (or not using) natural resources. While science and economics can outline efficient and effective solutions to technical problems, the ultimate choice between possible solutions can only be made after considering qualitative issues such as power, politics, public opinion, tradition, and fairness.

Fairness is particularly important in fashioning agreements on environmental policy. Negotiators frequently appeal to fairness in advocating policies, and solutions seen as unfair are unlikely to be accepted or, if implemented, to survive for long. Numerous examples of the rejection of sound, but unfair, proposals exist.[1] Despite its importance, the study of fairness, particularly as a feature of environmental agreements, is relatively new.[2] Perhaps this is because the importance of fairness to a successful agreement seems intuitive. According to one commentator, fairness "encourage[s] the agreement or cooperation of those who pay the costs."[3] Others concur that fairness contributes both to the ability to come to an agreement and to the durability of such an agreement once made.[4] Recent examinations of fairness in

---

*I would like to thank the American Academy of Sciences for the opportunity to conduct research on this subject at the International Institute for Applied Systems Analysis.

1. *See, e.g.*, CHITRU S. FERNANDO ET AL., FINANCING GLOBAL ENVIRONMENTAL PROGRAMS: INSTITUTIONAL DESIGN WITH EQUITY AND EFFICIENCY (The Wharton School of the University of Pennsylvania 1993) (discussing effect of fairness on willingness-to-pay and successful agreement); Anna Vari, Public Perceptions about Equity and Fairness: Siting Low Level Radioactive Waste Disposal Facilities in the United States and Hungary 15 (June 20–22, 1993) (unpublished manuscript, on file with the author) (proposing consideration of six fairness criteria based on analysis of resistance to disposal site selection in New York and Hungary).

2. For two examples of recent studies of fairness in the environmental context, see Cecilia Albin, Negotiating the Acid Rain Problem in Europe: A Fairness Perspective (June 20–22, 1993) (unpublished manuscript, on file with the author); H. Peyton Young & Amanda Wolf, *Global Warming Negotiations: Does Fairness Matter?*, THE BROOKINGS REV., Spring 1992, at 46.

3. H. PEYTON YOUNG ET AL., COST ALLOCATION IN WATER RESOURCES DEVELOPMENT—A CASE STUDY OF SWEDEN 1, 7 (International Institute for Applied Systems Analysis [hereinafter IIASA] Working Paper No. 80–32, 1980).

4. CECILIA ALBIN, FAIRNESS ISSUES IN NEGOTIATION: STRUCTURE, PROCESS, PROCEDURE AND OUTCOME 3–5 (IIASA Working Paper No. 92–88, 1992).

environmental agreements have focused on hazardous waste facility siting,[5] sulfur dioxide reduction in Europe,[6] and global climate change.[7]

Despite the burgeoning research on fairness in environmental agreements,[8] no research to date has focused specifically on water quality agreements.[9] Water quality management invokes a set of concerns and problems unique to the discipline. Its goal is to control pollution to tolerable levels, a task made difficult by the potential number of pollutants involved and uncertainty as to the effects of multiple pollutants once they are discharged into the environment. Water quality problems are diverse: they may be local or international in scope, chronic or acute (as with spills), caused by point or nonpoint sources, and due to organic or inorganic pollutants. Water quality standards vary by use; those water quality levels considered acceptable for one use may be unacceptable for another. The situation is confounded by the differing priorities that individuals, regions, and nations attach to water uses, making comparisons between water quality agreements exceedingly complex. Strategies for addressing water quality issues have also been changing over time. An increasing emphasis on basin-wide management[10] and use of economic incentives adds additional variables to the fairness equation.

This Note examines fairness in the context of water quality agreements, particularly international transboundary river agreements. It surveys cases of environmental policy making, focusing on the criteria which actors in previous water quality agreements have used to define fairness. The method adopted follows a descriptive approach.[11] Part I briefly outlines recent philosophical, economic, and interdisciplinary approaches to analyzing the concept of fairness.

---

5. *See, e.g.*, Felix Oberholzer-Gee & Bruno S. Frey, Fairness in Siting Decisions—Theory and Empirical Results (June 20–22, 1993) (unpublished manuscript, on file with the author); Vari, *supra* note 1.

6. *See, e.g.*, ALBIN, *supra* note 4.

7. *See, e.g.*, FERNANDO ET AL., *supra* note 1; Young & Wolf, *supra* note 2.

8. *See* Alan McDonald, Fairness in River Basin Agreements (June 20–22, 1993) (unpublished manuscript, on file with the author) (presenting a database of water resource agreements).

9. The definition of "water quality agreement" used in this note is quite broad. "Water quality agreement" is used here to mean any decision related to water quality management in which fairness could be significant, including negotiations, court cases, and most administrative law. Although domestic administrative law may not explicitly invoke fairness concepts, regulators (at least in a democracy) must pay attention to what will be perceived as fair by the parties affected. At a minimum, they must avoid a solution which is so patently unfair that the affected parties refuse to accept or enforce it.

10. *See, e.g.*, Ludwik A. Teclaff & Eileen Teclaff, *Transboundary Toxic Pollution and the Drainage Basin Concept*, 25 NAT. RESOURCES J. 589, 591 (1985).

11. For examples of the descriptive approach, see generally Albin, *supra* note 2; Vari, *supra* note 1; Amanda Wolf, *Environmental Risks and Agreement Fairness: International Conventions on Whale Hunting and CFC Emissions* (June 20–22, 1993) (unpublished manuscript, on file with the author); *infra* Part III.

Part II sketches the ways in which fairness concerns manifest themselves by examining the legal and institutional settings of water quality management. Part III applies a fairness framework to existing and proposed international water quality agreements. Finally, Part IV concludes by suggesting directions for future work in fairness in water quality agreements.

I. APPROACHES TO ANALYZING FAIRNESS IN ENVIRONMENTAL PROBLEM SOLVING

A. Philosophical and Economic Approaches to Fairness

Fairness plays a key role in forming and enforcing environmental quality agreements by determining how the various costs and benefits associated with them will be distributed.[12] Parties involved will be unlikely to commit to proposed agreements that do not address their needs. Likewise, fairness promotes the durability of agreements by ensuring that the parties involved have incentives to enforce them.

Given that fairness is an essential component of environmental agreements, it would be extraordinarily valuable to develop a model that could predict what elements of an agreement would be considered fair by the parties involved. Unfortunately, a brief philosophical inquiry reveals that such a model is impossible to construct. Philosophers seek to explain or deduce ideas about fairness from fundamental values, principles, or conceptions of rights. But within any society, multiple beliefs and values exist. Young points out that Aristotle's classical normative theories of justice (allocation according to contribution), Bentham's classical utilitarianism (the greatest good for the greatest number), and Rawls' maximin principle (the least well-off party should be made as well-off as possible with respect to a given criterion) each fail to explain or predict what is perceived as fair in most practical situations.[13] To account for and encompass multiple theories of justice, several philosophers have begun to develop pluralistic approaches to fairness in environmental issues.[14] However, once fairness is construed as a pluralistic concept, fairness in a universal sense becomes nonsensical. Rather than being a predetermined goal, fairness is a function of the political process in developing specific agreements.

The question of fairness can also be examined in economic terms. The pragmatic goal of economic analysis of environmental problems is to formulate efficient solutions that maximize society's net benefits.[15] Neoclassical

---

12. McDonald, *supra* note 8, at 1. *See also* Albin, *supra* note 2, at 2–6.

13. H. PEYTON YOUNG, EQUITY: IN THEORY AND PRACTICE 9–10 (1994).

14. *See, e.g.*, Douglas L. MacLean, Variations on Fairness (June 20–22, 1993) (unpublished manuscript, on file with the author).

15. *See generally* TOM TIETENBERG, ENVIRONMENTAL AND NATURAL RESOURCE ECONOMICS (3d ed. 1992).

economics defines efficient allocations of resources as those which are "Pareto optimal," meaning that there is no way to redistribute resources to make a party better off without making at least one other party worse off.[16] Applying Pareto optimality is problematic in that many real-world situations seem to contradict it.[17] For example, under a pure efficiency analysis, no allocation of cleanup costs in which upstream parties pay for benefits enjoyed entirely by downstream parties makes sense. Yet many such non-Pareto optimal agreements exist. To compensate for the inherent limits of Pareto optimality, economists generally advocate applying distributional equity criteria in addition to efficiency criteria to analyze public policy problems. Equity and efficiency are separate goals, and, as such, they may complement each other, diametrically oppose each other, or fall somewhere in between.[18]

Economists typically address the problem of equitable distribution in one of three ways. First, they may acknowledge the importance of equity but dismiss it as lacking a coherent framework for analyzing distributive issues.[19] Second, they may adopt a single principle of equity as reasonable and employ it as a basis for their analyses. For example, Romani proposes an "equitable" allocation of pollution reduction costs in which a "just" principle is defined as "that which the parties concerned would choose themselves if they had no vested interests."[20] Romani applies this notion of equity to argue that the "polluter pays principle" is a fair one, acknowledging that the principle may not be ethically satisfactory, but at least it is not unjust.[21] Third, economists may analyze several alternative principles and distributional rules by applying the consistency principle, in which goods are allocated "so that every two claimants divide the amount allotted to them as they would if they were the only two claimants."[22] An allocation that satisfies the consistency principle can always be achieved.[23] In each of these approaches, economists rest their treatment of equity upon ethical assumptions which may or may not hold for a given real case.

An alternative to purely economic analysis is the descriptive approach, which analyzes how past negotiators have sought to achieve efficiency in their agreements while simultaneously promoting equitable distribution. The descriptive approach combines aspects of both economics and philosophy. It

---

16. *Id.* at 28.

17. *See generally* Talbot Page, *Intergenerational Justice as Opportunity*, *in* ENERGY AND THE FUTURE 38 (Douglas MacLean & Peter Brown eds., 1983) (discussing discounting and intergenerational inequity).

18. ARTHUR M. OKUN, EQUALITY AND EFFICIENCY: THE BIG TRADE OFF 4 (The Brookings Institution ed., 1975).

19. *See* YOUNG, *supra* note 13, at 5–6.

20. FRANCO ROMANI, *Equity and Transfrontier Pollution*, *in* ECONOMICS OF TRANSFRONTIER POLLUTION 21 (Organization for Economic Co-operation and Development ed., 1976).

21. *Id.*

22. YOUNG, *supra* note 13, at 15 (emphasis omitted).

23. *Id.*

does not attempt to prescribe what is fair in a normative sense, but instead uncovers criteria that have contributed to the perception of fairness in past agreements. The descriptive approach complements economic research by casting light on the assumptions that have been made by past negotiators, providing a rich narrative of the range of distributions that have previously been considered fair.

B. A Descriptive Approach to Fairness

The descriptive approach to fairness analysis is both empirical and interdisciplinary. Assuming that existing agreements embody implied rules of fairness, the descriptive approach allows us to learn from experience. By categorizing and cataloguing rules applied in past agreements, we can develop a valuable "tool box" of fairness concepts that can be applied to future agreements. The tool box can serve as a source of precedent and a resource for negotiators in environmental debates who seek a variety of alternatives to problem solving. For example, countries that collaborate on transboundary hydroelectric projects traditionally divide the construction costs and the resulting electric power equally.[24] While such a division makes sense in some cases, it is not the only solution for how to share costs and benefits. Borrowing fairness concepts from other situations could expand the universe of considered solutions to include, for example, proportional distributions based on historical rights, needs, or Gross National Product (GNP).

Additionally, having a tool box of environmental fairness principles can improve communication within negotiations by allowing actors to better understand their opponents' arguments. Expressing values in a common language helps coordinate expectations about the goals of the proposed agreement. Once the parties understand each other, they are better equipped to communicate in a way that allows them to reach agreement.

C. Fairness Principles

Analysis of the fairness principles inherent in a water quality agreement requires scrutiny of the allocation rules contained therein. An allocation rule can be defined as "a method, process, or formula that allocates any given *supply* of goods [and costs] among any potential *group* of claimants according to the salient *characteristics* of those claimants."[25] In the case of international environmental water quality agreements, allocation rules are generally determined by a group of negotiators acting on behalf of the countries involved.

Scholars take a variety of approaches to defining these rules when describing problems with respect to fairness in environmental agreements.

---

24. McDonald, *supra* note 8, at 2–3.

25. YOUNG, *supra* note 13, at 8 (emphasis in original).

Some researchers focus more on the negotiation process; others focus on its outcome.[26] Different taxonomies are used, but all express recurrent principles of fairness that can be depicted as rules.[27] Many of these classifications of fairness principles use different words for the same concepts or provide groupings which overlap. Young has developed a particularly helpful lexicon in which he suggests that many agreements on fair allocations rest on the basic principles of equality, proportionality, and priority.[28]

"Equality" refers to situations in which costs or benefits are allocated equally among the parties involved.[29] The problem with the equality concept is that the parties are rarely, if ever, similarly situated.[30] While the allocation process itself may be equal, inequality among the parties often results in an unequal, and by implication, unfair end result. Depending both on the starting point and the type of good or burden being allocated, applying equality can result in widely disparate outcomes. For example, a policy requiring all industries to share the burden of pollution control equally by installing the same pollution control technology usually results in a much higher relative cost for small companies than for large companies. Similarly, a policy requiring all industries to achieve the same level of effluent control is often much more expensive for older, more heavily polluting facilities than for newer, state-of-the-art facilities.

The "proportionality principle" asserts that parties should be allocated the costs or benefits of a particular program in proportion to the parties' differences.[31] The way these differences are framed will have a critical impact on what is considered fair.[32] One frequently cited example of proportionality is the Thirty Percent Club, a group of European countries (plus Canada) that each agreed to reduce its 1980 sulfur dioxide emissions by at least thirty percent by 1993.[33] Another example is the Convention on the Protection of the Rhine Against Pollution by Chlorides, a group of countries that agreed to control and

---

26. In the descriptive study of fairness, a distinction is made between process and outcome fairness. Broadly construed, the 'process' is everything that occurs before the final agreement is reached. Although a fair process does not guarantee a fair outcome (nor vice versa), the two are no doubt related in people's minds. *See* Albin, *supra* note 4, at 11-26. The focus of this Note is on *outcomes* of water quality management decisions.

27. FERNANDO, *supra* note 1, at 39–42; YOUNG, *supra* note 13, at 68–85.

28. YOUNG, *supra* note 13. For a summary of how these principles interrelate, see *id.* at 79-80.

29. *Id.* at 75.

30. *Id.* at 79.

31. *Id.* at 68. Young attributes the prominence of the proportionality principle in Western society to Aristotle's writings on distributive justice. *Id.*

32. *See generally* FERNANDO ET AL., *supra* note 1, at 35.

33. McDonald, *supra* note 8, at 6; UNITED NATIONS, ECONOMIC AND SOCIAL COUNCIL, ECONOMIC COMMISSION FOR EUROPE, EXECUTIVE BODY FOR THE CONVENTION ON LONG-RANGE TRANSBOUNDARY AIR POLLUTION; ECONOMIC PRINCIPLES FOR ALLOCATING THE COSTS OF REDUCING SULFUR EMISSIONS IN EUROPE, U.N. Doc. EB.AIR/GE.2/R.26 (1989) [hereinafter United Nations Economic Principles].

reduce the amount of chloride ions being discharged into the Rhine River.[34]

The "priority principle" assigns one party or group of parties absolute precedence in the allocation of a good or burden. Adherence to the priority principle is helpful for deciding how to allocate an indivisible good.[35] The priority principle asserts, "He who has the greatest claim gets the good; the others do not."[36] Like proportionality, priority does not allocate the actual goods or burdens equally. Instead, it allocates to one party over another in order to maximize a given societal objective. It simply indicates an order of precedence.[37] The prior appropriation doctrine, in which water is allocated according to a "first in time, first in right" rule,[38] is one example of the priority principle applied to a water issue. Under prior appropriation, the first claimant's water need is treated as an indivisible good and the original claim is awarded priority.

D. Characteristics of the Parties

To apply the fairness principles to water quality agreements, three classes of party characteristics should be considered: contribution (such as the amount of pollution contributed by the party), need (how badly the party needs the status quo to be altered), and endowment (e.g., the ability of the party to pay for cleanup and residual injuries).[39] These characteristics are particularly important for applying the proportionality principle, for they define the differences that dictate what proportions will be used.

Consider the case in which a number of upstream parties pollute a river used by a number of downstream parties. One way to characterize the

---

34. McDonald, *supra* note 8, at 5; *see also* text accompanying notes 122 -135.

35. *Id.* at 40.

36. YOUNG, *supra* note 13, at 14. The priority concept is also reflected in the two very different theoretical frameworks of Bentham and Rawls. According to classical utilitarians like Bentham, the utility maximizing allocation should be chosen. Thus, the decision makers should allocate the good to the party whose marginal utility is highest. In a way, then, the criteria of economic efficiency may be considered to be a fair rule—if the parties have agreed to it. Each of these approaches prioritizes some member(s) of society with respect to a societal goal. *Id.* at 81–82.

37. *Id.* at 15. Young offers the example of a wait list to get one's child admitted to a day care center.

> [The] list expresses a concept of who is most deserving, who is next-most deserving, and so forth, given the claimants' circumstances and the good being distributed. Each captures a notion of equity, but it is not equity in the Aristotelian sense of proportionality. It is equity based on *priority*. Priority is an ordinal rather than a cardinal principle because it does not say how much more deserving one claimant is compared to another. It only says which among any pair of claimants is most deserving.

Id. (emphasis in original).

38. OTTO J. HELWEG, WATER RESOURCES PLANNING AND MANAGEMENT 140–41 (1985).

39. *See* FERNANDO, *supra* note 1, at 41–42; YOUNG, *supra* note 13, at 32–35.

differences between the parties is in terms of contribution. If the costs of cleanup are allocated proportionately to contribution, parties who contribute the most pollution to the river will pay the most in cleanup costs. This illustrates the "polluter pays" doctrine,[40] a proportionality-based concept. An alternative way to characterize the differences is by relative need for the desired use. In this same scenario, downstream parties suffering the most from pollution will gain the most from cleanup. Since downstream parties benefit the most, they should bear the largest costs of cleanup. This is an example of the need-based "victim pays" doctrine.[41] Third, differences can be characterized in terms of endowment. Using an endowment rationale, wealthier parties, who can more easily afford to pay for cleanup, should pay the greater share.

E. A Fairness Framework

The principles and characteristics outlined above are only meaningful when applied to specific issues of distribution. The unique characteristics and complexities inherent in water quality management should be considered when analyzing water quality agreements with respect to fairness. Water quality protection strategies, typical management institutions, and the level of certainty all affect the framework for fairness.

1. Characteristics of Water Quality Management

Rivers, lakes, and other surface waters provide wildlife habitat, drinking water, recreational uses, a means of waste disposal, a source of cooling water for industry, and hydroelectric power. These uses can be compatible. In many cases, however, the multiple uses and the many different users[42] may come into conflict. When the uses desired by different parties are not compatible or are predicted to conflict in the future, questions of fair allocation arise.

From an economic perspective, the goal of water quality management is to achieve an optimal level of water quality at the minimum cost feasible. Economists define the optimal effluent load as the level of pollution for which the sum of the cleanup costs and the damage from residual pollution are minimized.[43] The usual approach to achieving desired water quality is to focus on one of two standards:[44] *Ambient standards* for water quality limit the maximum allowable instream concentration for a given pollutant, such as

---

40. *See generally* United Nations Economic Principles, *supra* note 33 (analyzing the polluter pays and victim pays principles in the context of reducing sulfur emissions).

41. *Id.*

42. Potential users of a water body include not only riparian users at the shoreline, but users throughout the entire watershed. For definitions of riparian and watershed, see MICHAEL JEFFRIES & DEREK MILLS, FRESHWATER ECOLOGY 17–18 (1990) (providing an overview of watershed ecology).

43. *See generally* TIETENBERG, *supra* note 15, at 360–87 (providing an overview of the economics of pollution control).

44. *See also* text accompanying notes 74-77.

bacteria or heavy metals; *emission standards* limit the level of pollutants that a source is allowed to emit into a water body. A common approach to water quality management is to determine ambient standards, then set emission standards to achieve the ambient limit.[45] Traditionally, water quality management has focused on keeping the organic pollutant level below the assimilative capacity of the water body. This concept is problematic, especially for stock pollutants which are not absorbed but, rather, accumulate in the environment.[46]

Management of water quality in rivers is particularly difficult because riverine waters move in one direction, designating the parties involved as either upstream or downstream actors. Because rivers are uni-directional, the upstream actor has a natural advantage, which allows it to negotiate from a position of power. The upstream/downstream relationship may not be a critical factor in domestic situations where a central government has ultimate authority, but it is crucial in international negotiations.

Water quality management issues are also made complex by substantial scientific uncertainty regarding the effects of pollutants. This makes it challenging to determine what effluent standards should be allowed—even when the desired ambient quality standards have already been agreed upon. It may well be that fairness principles are sometimes invoked to define a solution when there is uncertainty about the technically optimal or economically efficient solution. This may explain the existence of the Thirty Percent Club for sulfur dioxide reduction in Europe.[47] An efficient allocation of reductions could not have been determined with existing information, even if efficiency were the primary goal of the parties. It may be interesting to trace how fairness principles and uncertainty interact in various cases. As scientific uncertainty decreases, the importance of fairness in the debate may also decrease—or vice versa.

2. *Describing Equality in Distributions*

Having established a lexicon for describing principles of fairness, it is also necessary to choose language that describes how equality is distributed. Again, Young's language is particularly useful. Young defines three terms for describing equality in distributions: (1) "the *objects* that are treated equally;" (2) "the *baseline* from which equality is measured;" and (3) "the *yardstick* of measurement."[48]

---

45. *See* A. Myrick Freeman III, *Water Pollution Policy*, *in* PUBLIC POLICIES FOR ENVIRONMENTAL PROTECTION 97, 106–08 (Paul R. Portney ed., 1990) (analyzing control policy for water pollution under the U.S. Clean Water Act).

46. TIETENBERG, *supra* note 15, at 361.

47. *See supra* text accompanying note 33.

48. YOUNG, *supra* note 13, at 75.

"Objects" refers to the units that are being treated fairly. In water quality issues, the objects might be nations, regions, industries, or individual users. When a fairness principle such as equality is applied to one set of objects, it may have very different effects on another set. For example, if two nations seek to divide the cost of a cleanup project, a fairness argument using the nation as object might be used to justify fifty-fifty cost-sharing. Consider, however, the effects of the agreement on other possible objects, such as taxpayers or individual industries. If the funds in the above example are to be raised by a general tax and one of the countries has twice the population of the other, the effect at the individual level will not be equal. The concept of equality applied to individuals would result in the more populous country bearing a greater total cost. At present, most international water quality agreements are based, like the first example in this paragraph, on the riparian state as the object. With the increasing recognition of the river basin as a unit for management,[49] industries and populations within the entire watershed may emerge as more appropriate objects. Such a shift in perspective might change—or be driven by—what is perceived as a fair pollution control agreement.

The "baseline" is the point from which the fairness of the distribution is measured. In most water quality management scenarios, two alternative baselines exist. One baseline would be the existing water quality, and the other would be the "pristine" state of the water (although this is usually difficult to quantitatively define and may be the source of substantial uncertainty). Depending on which baseline is used, parties will make different claims as to what they consider fair.[50] For example, under a "status quo" baseline parties will debate over whether or not it is fair to "grandfather" existing pollution practices. If a "pristine" baseline is used, however, the difficult issue of grandfathered claims would not be as likely to arise.

The "yardstick" is the measurement of what is being distributed. If the cost of cleanup is distributed, the yardstick would be monetary units. If the availability of clean water is distributed, the yardstick would be a measure of quantity. The yardstick measures both gains and losses. It can also be thought of as the good or burden being distributed among the objects. In deciding how best to clean up a polluted river, for example, negotiators might discuss distributing the predetermined allowable pollution load. In this case, the yardstick might be biological oxygen demand. The same problem can be looked at as a matter of distributing either the costs of attaining a given water

---

49. Teclaff & Teclaff, *supra* note 10, at 591–594.

50. This distinction has been one of the obstacles to an agreement on thermal pollution of the Rhine. A difficulty in these negotiations was "to what extent the convention should respect existing cooling practices or capacities instead of laying down maximum increases in temperature or maximum temperatures based on ecological requirements." J. G. Lammers, *The Rhine: Legal Aspects of the Management of a Transboundary River, in* NATURE MANAGEMENT AND SUSTAINABLE DEVELOPMENT 440, 447 (W.D. Verwey ed., 1989).

quality goal or the benefits from a pollution reduction plan. In the latter two examples, the yardstick would be monetary units.

Specifying the yardstick can be especially tricky if the priority principle is used. As opposed to siting decisions, in which the facility is indivisible, most water quality problems involve allocating a divisible good or burden: allowable pollution, water quality, or cost. Water quality problems may, however, also involve discrete goods and burdens. Such complexities make it very important to be clear about the nature of what is being distributed.

For a given environmental dispute, the pollutants of interest, level of certainty, institutions, and power balances are usually taken as given. However, the baseline, objects, and yardstick considered are questions of social construction and framing. This framing is likely to differ from case to case. Within a given case, reframing the issue may lead to a different perspective of what is fair. Therefore, it is important to be aware of how the problem is being framed by participants and of the alternative ways of framing that exist. Proposing alternate frameworks is part of the "tool box" of alternative fairness concepts that may enhance water quality negotiations.

II. FAIRNESS IN WATER QUALITY MANAGEMENT: LEGAL AND INSTITUTIONAL SETTINGS

This Note focuses on international water quality agreements, which are defined as agreements formed between two or more different countries. However, analysis of international water law and its inherent fairness issues is, for a few reasons, best begun by looking at various domestic water systems. First, domestic law informs international law. As there are few sanctioned international law-making bodies, most international law is an application and extension of the domestic law of the parties involved.[51] Second, domestic legal systems, including legislation, regulations, and judicial decisions, can be construed as a manifestation of what the legal elite of that country consider to be fair. The fairness principles that surface in domestic water quality law can thus be extended to apply to what a country might consider to be fair in international agreements as well. Third, regardless of their derivation, specific applications of international law, such as treaty provisions, must be implemented by the individual parties through their systems of domestic laws.[52]

A. Domestic Water Law

1. Diversity of Domestic Law Systems

Different parts of the world have developed unique systems of water law because "[t]he underlying philosophy of each particular system of water law has

---

51. DANTE A. CAPONERA, PRINCIPLES OF WATER LAW AND ADMINISTRATION: NATIONAL AND INTERNATIONAL 192–93 (1992).

52. *Id.*

a direct connection to the surrounding physical factors of its origin."[53] Caponera divides domestic water law systems into four regional/cultural groups: Islamic, Soviet, Hindu/Buddhist, and Roman (the precursor of both civil and common law systems).[54] A brief survey of these systems reveals that different fairness concepts are emphasized by different cultures.

Islamic water law constitutes a tangible body of law that reflects all three fairness principles of equality, priority, and proportionality. Equality is expressed in the right of all members of the Moslem community to have free access to water.[55] Priority is reflected, for example, in that the right to satisfy thirst (for humans before animals) is superior to the right of irrigation.[56] Similarly, in allocating irrigation water, priority is given either to those nearest the water, to those with the earliest rights, or to those occupying higher ground. Proportionality is used in allocating the cost of water systems over users according to the benefits each user receives from the system.

Under the former Soviet system, water was treated as a public resource closely tied to the land.[57] Because the primary purpose of this system was to promote rational use of water resources, efficiency was emphasized at the expense of fairness to individuals.[58] For example, the 1970 Fundamentals of Water Legislation of the USSR and the Union Republics did not permit using high quality water for purposes other than drinking water or domestic supplies.[59] In this sense, the Soviet system reflected priority according to need.

The Hindu water law system has been replaced in most countries where it was once used. Nonetheless, it provides some interesting insights into the role of fairness in an alternative system of water management. The Subak culture of Bali uses a decentralized system of village irrigation.[60] Its most distinctive feature is its flexibility of allocation, which considers environmental conditions and individual need in setting fair allocations. As with many other water law systems, domestic water use is given priority over other uses, although even domestic use can be outweighed by the public interest in an emergency (such as fire). Another interesting characteristic of the Subak system is its absolute

---

53. George Radosevich, *Global Water Systems and Water Control, in* WATER NEEDS FOR THE FUTURE: POLITICAL, ECONOMIC, LEGAL, AND TECHNICAL ISSUES IN A NATIONAL AND INTERNATIONAL FRAMEWORK 39, 39 (Ved P. Nanda ed., 1977).

54. CAPONERA, *supra* note 51, at 65–94. Caponera also includes "customary law" within his classification scheme. The term refers to any system of traditional water resource management. Because this is a form of law, rather than a single set of ideas, customary law cannot usefully be examined as incorporating specific fairness principles.

55. *Id.* at 68–70.

56. Radosevich, *supra* note 53, at 43.

57. CAPONERA, *supra* note 51, at 84–85.

58. *See id.* at 86. Note that "efficiency" in this situation is not the economic definition of efficiency as a Pareto optimal allocation. Rather, it allocates water according to some criteria of highest and best uses, for which the cost of alternative sources presumably would be the highest.

59. *Id.*

60. *Id.* at 89–91.

prohibition on using surface water for waste disposal. This is an example of "forced equality," in which everyone is prohibited from discharging, rather than allowing a few to pollute at the expense of the whole.[61]

The Roman law tradition gave rise both to the system of civil law (followed in much of continental Europe and its former colonies) and to the system of common law (followed in England and the areas it has influenced, including the United States). A distinguishing feature of civil water law is its division of waters into public (navigable waters) and private. While historically the government allocated and charged for use of public waters, owners of private waters retained an absolute right (priority) over their own waterways. In recent times, however, the granting of absolute water rights has been restricted.[62]

Common law water quality doctrines have developed in several ways. In England and the Eastern United States, the riparian doctrine has long governed water management, while in the Western United States, management was originally based on prior appropriation. Under the riparian doctrine, the riparian landowner has the right to make "reasonable use"[63] of the water flowing by. In terms of quality, the landowner has the right "to be free from unreasonable uses of others [of the water] that cause him harm."[64] Thus, all riparian owners are treated according to equality.[65] Taken literally, the riparian doctrine prohibits nearly all harmful discharges. This doctrine has been largely usurped by administrative law for water quality management.[66]

The prior appropriation doctrine is usually attributed to miners settling the western areas of North America, although many cultures have used the concept.[67] Its primary principle is "first in time, first in right;" an allocation rule in which the first claim has absolute priority over subsequent ones.[68] Additionally, each user is limited to the amount that can be beneficially used,[69] making prior appropriation a need-based doctrine of priority.[70] In most areas, the prior appropriation doctrine has been combined with other management systems in administrative law, particularly with regard to water quality.[71]

---

61. *See* YOUNG, *supra* note 13, at 20 (describing "forced equality").

62. *See, e.g.*, LUDWIK A. TECLAFF, WATER LAW IN HISTORICAL PERSPECTIVE 21 (1985).

63. CAPONERA, *supra* note 51, at 126. *See, e.g.*, Lux v. Hagin, 4 P. 919, 925 (Cal. 1884); Pennsylvania Ry. Co. v. Miller, 3 A. 780, 782 (Pa. 1886).

64. CAPONERA, *supra* note 52, at 126. *See, e.g.*, People ex. rel. Ricks Water Co. v. Elk River Mill & Lumber Co., 40 P. 486, 487 (Cal. 1895).

65. Alternately, one could focus on the non-riparian citizens, over whom riparian land owners had absolute priority.

66. TECLAFF, *supra* note 62, at 21–26.

67. Frank J. Trelease, *Alternatives to Appropriation Law*, *in* WATER NEEDS FOR THE FUTURE: POLITICAL, ECONOMIC, LEGAL, AND TECHNOLOGICAL ISSUES IN A NATIONAL AND INTERNATIONAL FRAMEWORK 59, 59 (Ved P. Nanda ed., 1977).

68. *See, e.g.*, Schilling v. Rominger, 4 Colo. 100, 103 (1878).

69. *See, e.g.*, Platte Water Co. v. Northern Colorado Irrigation Co., 12 Colo. 525, 531 (1889); Yunker v. Nichols, 1 Colo. 551, 551 (1872).

70. TECLAFF, *supra* note 62, at 22.

71. *See* Ann Macon McCrossen, Comment, *Is There a Future for Proposed Water Uses in*

The development of anti-pollution laws and the deterioration of the distinction between private and public waters have resulted in the common law and civil law systems treating water quality through similar systems of administrative law. According to Caponera, the permit system in civil law countries is "slowly rendering obsolete the former subdivision between public and private water ownership."[72]

These different sources of domestic law suggest that all three fairness concepts consistently arise in issues of water resources management. Although many of the traditional systems have been replaced by modern pollution laws, they provide a diverse conceptual basis for thinking about fairness in water quality management.

2. Administrative Law

Despite the varied origins of water law in different regions of the world, there is a nearly universal modern trend toward applying administrative law to the protection of water quality.[73] Since administrative law is widely used, it is useful to briefly examine the fairness concepts implied by the various strategies of water quality management under administrative law.

There are two methods of protecting water quality: (1) limiting the amount of waste delivered to the water body; and (2) increasing the assimilative capacity of the water body. The latter, which includes aeration and flow enhancement, is considered a temporary measure for coping with organic pollution.[74] Therefore, this Note only examines the various techniques employed to limit the amount of waste entering the water. Teclaff divides these into three classes: standards (both ambient and effluent limitations), effluent charges or fines, and financial inducement (government subsidies of pollution control).[75]

Ambient standards express the maximum allowable instream concentration for a given pollutant in the water. By standardizing ambient levels, the yardstick for fairness becomes water quality. Ambient water quality standards alone do not specify how these standards are to be achieved. To meet these standards, it is usually necessary to restrict emissions from various sources of pollution. Water quality models enable us to determine what level of emissions will produce a given instream pollution concentration, but not with absolute certainty. Even if the total acceptable emissions are determined, ambient water quality standards say nothing about how this allowable loading will be distributed among potential polluters.

Equitable Apportionment Suits?, 25 NAT. RESOURCES J. 791, 789–99 (1985).

72. CAPONERA, *supra* note 51, at 79.

73. TECLAFF, *supra* note 62, at 24–59.

74. *See* LOUIS KLEIN, ASPECTS OF RIVER POLLUTION 424–25 (1957) (analyzing the limitations of disposal by dilution).

75. TECLAFF, *supra* note 62, at 235–37.

One method of limiting pollution to achieve the desired ambient standards is to establish emissions stand rd . Emissions standards set the maximum allowable amount of a given po tant that each polluter may discharge. While these standards are usually justified on the basis of ambient water quality goals, they are often linked to technological levels (for example, the best available or practicable technology). Emissions standards are often used because they are relatively simple to implement and enforce. Different types of emissions standards have different fairness implications. For example, emissions standards may be set at a constant level, implying equality among pollution sources, although meeting these standards may have very different costs for different industries. Alternately, each source may be required to reduce emissions by a certain percentage of current emissions, implying a proportionality principle based on contribution. While ambient standards may be said to adopt a fairness concept relative to river users as objects, the objects of emissions standards are individual pollution sources.

Effluent charges reflect the "polluter pays principle."[76] The basic premise underlying effluent charges is that, faced with a per-unit fee, industries will reduce pollution until the marginal cost of further reduction equals the marginal cost of paying the effluent charge. When effluent charges are set at the correct level, industries limit their total emission levels to the point at which desired ambient water quality is achieved. In a sense, effluent charges encompass the equality principle since each polluter pays the same price for each unit of pollution. Viewed differently, the charge is proportional to the amount of pollution emitted. Since effluent charges require polluters to pay per unit of pollution discharged, the costs of pollution reduction are shared in proportion to contribution.

Transferable, or tradeable, emission permits are an alternative to effluent charges.[77] Instead of setting a price per pollution unit and letting the market determine the level of emissions, regulators issue a set number of tradable effluent permits. The number issued is limited so that total effluent levels do not exceed ambient water quality goals. The price of the permits is set through the market at an amount that will encourage an efficient overall level of pollution. Emissions permit systems reflect fairness principles most conspicuously in their initial distribution of permits.

Government subsidies are another means of inducing industries to control pollution. By underwriting conversions to cleaner technology, government subsidies conflict with the polluter pays principle because taxpayers end up paying for pollution control. Fairness principles are reflected both in the shift away from the polluter pays principle and in the tax structure used to collect the subsidy.

---

76. For discussion of the "polluter pays principle," *see infra* text accompanying notes 84-90.

77. *See* TIETENBERG, *supra* note 15, at 375–76.

B. International Water Quality Law

International water law has a long history, since the use of and rights related to surface waters have been a primary source of conflict between neighboring states and nations. Indeed, the word "rivals" is derived from *rivus*, the Latin word for rivers.[78] Although international agreements have only recently focused on water quality, the principles invoked derive from the extensive tradition of water use and other types of international water law.[79] Unlike systems of domestic water law, international water law has not been neatly codified. General principles arise from several sources, including international conventions, customary law, writings of international institutes, general principles of international law, and specific international decisions.

1. International Conventions

International conventions include treaties and regional agreements between sovereign states. Most international conventions require the nations involved to enact appropriate domestic legislation to implement the terms of the agreement.[80] Although most international water conventions to date have addressed water quantity rather than water quality (so much so that one legal scholar commented that legal aspects of some international water quality issues are still largely "virgin territory"[81]), a number of international agreements focusing on water quality do exist. The existence of these agreements demonstrates that "numerous nation states [sic] have limited their freedom to pollute international streams and lakes and thereby have practiced the principle of limited sovereignty."[82]

The United Nations recently produced the Convention on the Protection and Use of Transboundary Watercourses and International Lakes.[83] This convention broadly defines transboundary water courses to include both surface water and groundwater and calls for the conservation of ecosystems and intergenerational equity. As a general convention, however, it does not contain specific rules for attaining these goals.

Another example of an international body agreeing to protect water quality is the Organization for Economic Cooperation and Development (OECD), which officially adopted the polluter pays principle.[84] One of the OECD's

---

78. WEBSTER'S THIRD NEW INTERNATIONAL DICTIONARY 1962 (1986).

79. *See generally* Albert E. Utton, *International Water Quality Law*, *in* INTERNATIONAL ENVIRONMENTAL LAW 154 (Ludwik A. Teclaff & Albert E. Utton eds., 1974).

80. CAPONERA, *supra* note 51, at 60.

81. Jan M. Van Dunne, *The Case of the River Rhine: The Rotterdam Contribution*, *in* WATER POLLUTION LAW AND LIABILITY 75, 77 (Patricia Thomas ed., 1993).

82. Utton, *supra* note 79, at 157; *see also infra* text accompanying notes 95-96.

83. Convention on the Protection and Use of Transboundary Watercourses and International Lakes, 31 I.L.M. 1312 (1992).

84. ORGANIZATION FOR ECONOMIC COOPERATION AND DEVELOPMENT [hereinafter OECD],

purposes in doing so was to eliminate the competitive advantage of firms located in countries that either subsidize or do not require pollution control.[85] While it is a good start, the principle has had only limited application.

Despite theoretical support for the polluter pays principle, it has not been extensively applied.[86] Political barriers and scientific uncertainty play a practical role in limiting its implementation.[87] Applying the polluter pays principle in the context of the fairness framework reveals immediate problems. Identifying the objects of fairness as the polluting industries is straightforward, but problems arise with the baseline and the yardstick. If the pristine state of the river is used as the baseline, for example, it becomes necessary to undertake the difficult scientific task of characterizing the unpolluted state of highly polluted waters. Quantification of environmental damages is another problem. Because of the difficulties associated with putting a price tag on environmental degradation, the OECD principle requires polluters to pay only for the costs of reducing their own pollution to the requisite level. Residual environmental damages are left unpaid.[88]

The polluter pays principle is not the only method of assigning costs. There are compelling alternatives to the polluter pays principle[89] that lead to different outcomes under the fairness framework. For example, if pollution reduction is viewed as an improvement over the status quo, the relevant objects can be typified as users of the resource who benefit from the improvement. In the case of rivers, downstream users are the primary beneficiaries of pollution reduction. From this perspective, allocating the costs of improvement in proportion to the benefits received might be perceived as fair—the victim pays principle. Neither principle is more or less inherently fair. Indeed, the balance of power between upstream and downstream parties reinforces the victim pays perspective. This might explain some of the difficulties, observed in practice, in implementing the polluter pays principle.[90]

2. Customary Law and Concepts

The "constant and uniform conduct by states" coupled with "their conviction as to the obligatory nature of such conduct as being in conformity

---

THE POLLUTER PAYS PRINCIPLE 6 (1975). The polluter pays principle exists in various pollution remedies. For example, imposing effluent charges or taxes on polluters internalizes pollution costs. *See generally* John Pezzey, *Market Mechanisms of Pollution Control: "Polluter Pays," Economic and Practical Aspects*, *in* SUSTAINABLE MANAGEMENT: PRINCIPLES AND PRACTICE 190 (R. Kerry Turner ed., 1988).

85. OECD, *supra* note 84, at 6–7.

86. Pezzey, *supra* note 84, at 191.

87. J. Rees, *Pollution Control Objectives and the Regulatory Framework*, *in* SUSTAINABLE ENVIRONMENTAL MANAGEMENT: PRINCIPLES AND PRACTICE 170, 170–72 (R. Kerry Turner ed., 1988).

88. Pezzey, *supra* note 84, at 191.

89. *See, e.g.*, United Nations Economic Principles, *supra* note 33, at 9.

90. *Id.*

with a judicial norm" creates international customary law.[91] Treaties arise as an expression of the rules of conduct developed in customary law.[92] From time to time, customary law is codified or restated by international organizations, scholars and private institutions.

Four theories underlie international water law: absolute territorial integrity, absolute territorial sovereignty, community theory, and limited territorial sovereignty.[93] The territorial integrity theory holds that lower riparian parties have rights to the natural flow of rivers. Strict interpretation of this theory essentially prohibits water quality deterioration by the upstream party. In contrast, absolute territorial sovereignty maintains that the upstream country is not responsible for the effects of its actions on its neighbors.[94] Absolute territorial sovereignty has limited appeal and has not been recently applied, perhaps because most countries are both upstream and downstream riparians. Community theory focuses on joint development and management by all states within the drainage basin. Although some cooperative institutions are progressing in this direction, including the International Commission for the Protection of the Rhine Against Pollution (ICPR), community theory cannot be claimed to be the basis of current international water quality law. Most modern expressions of international water quality law support limited territorial sovereignty.

Limited sovereignty appeals to the duty not to cause harm to other states and allows riparian states to use waters in ways that do not interfere with "reasonable use" by others.[95] Under the umbrella of limited territorial sovereignty, general rules concerning the use of international water resources are evolving to include a duty of co-riparians to cooperate, to refrain from practices likely to cause substantial injury to other states, to share information and consult one another before undertaking major projects, and to equitably utilize shared water resources.[96]

From a fairness perspective, the rule of equitable utilization is the most interesting. What is equitable explicitly depends on the particular circumstances. For example, the Helsinki Rules on the Uses of the Waters of International Rivers[97] state that "[e]ach basin State is entitled, within its territory, to a reasonable and equitable share in the beneficial uses of the waters of an

---

91. CAPONERA, *supra* note 52, at 189.

92. Utton, *supra* note 79, at 157.

93. *Id.* at 155.

94. This theory was reflected in the Harmon Doctrine, proposed by Judson Harmon, Attorney General of the United States, in 1895 in response to Mexico's protest against U.S. diversion of the Rio Grande. *Id.* at 155–56.

95. *Id.* at 155.

96. CAPONERA, *supra* note 52, at 190.

97. INTERNATIONAL L. ASS'N, REPORT OF THE FIFTY SECOND CONFERENCE HELD AT HELSINKI 447, 484 (1966) [hereinafter HELSINKI RULES]. The Helsinki Rules have provided the basis for many subsequent statements of international water law. *See generally* CAPONERA, *supra* note 51.

international drainage basin."[98] Reasonable and equitable shares are determined in light of all relevant factors in each particular case,[99] with the Helsinki Rules setting forth criteria to be taken into account when determining equitable utilization.[100] While these criteria are useful, they cannot predict what will be considered fair, as the Helsinki Rules grant substantial discretion in applying them.[101] The Helsinki Rules also contain equality concepts, e.g., "each basin State has rights equal in kind and correlative with those of each co-basin State."[102] Applying a fairness framework to the Helsinki Rules, the nations are the objects, the cost of preservation or cleanup is the yardstick, and the baseline is the status quo.

The International Law Commission recently produced a clarification of international water law in its Draft Articles on the Law of Non-Navigational Uses of International Watercourses.[103] The ILC Draft Articles provide for watercourse agreements between basin states and set forth four general principles: (1) equitable and reasonable utilization and participation;[104] (2)

---

98. HELSINKI RULES, *supra* note 96 art. IV, at 486.

99. *Id.* art. V, at 488.

100. *Id.*

> Relevant factors which are to be considered include, but are not limited to: a) the geography of the basin, including in particular the extent of the drainage area in the territory of each basin State; b) the hydrology of the basin, including in particular the contribution of water by each basin State; c) the climate affecting the basin; d) the past utilization of the waters of the basin, including in particular existing utilization; e) the economic and social needs of each basin State; f) the population dependent on the waters of the basin in each basin State; g) the comparative costs of alternative means of satisfying the social and economic needs of each basin State; h) the availability of other resources; i) the avoidance of unnecessary waste in the use of waters; j) the practicability of compensation as a means of adjusting conflicts among users; k) the degree to which the needs of a basin State may be satisfied, without causing substantial injury to a co-basin state.

Id.

101. "The weight to be given to each factor is to be determined by its importance in comparison with that of other relevant factors. In determining what is a reasonable and equitable share, all relevant factors are to be considered together and a conclusion reached on the basis of the whole." *Id.*

102. *Id.* art. IV, at 487.

103. *Draft Articles on the Non-Navigational Uses of International Watercourses: Draft Report of the International Law Commission*, U.N. GAOR, 43d Sess., U.N. Doc A/LN.4/L.463/Add.4 (1991) [hereinafter ILC Draft Articles], *reprinted in* 3 COLO. J. OF INT'L L. AND POL'Y 1 (1992). *See generally Doman Colloquium on the Law of International Watercourses*, 3 COLO. J. OF INT'L L. AND POL'Y 13 (1992).

104. ILC Draft Articles, *supra* note 102, art. V. Relevant factors are defined as

> (a) geographic, hydrographic, hydrological, climatic, ecological and other factors of a natural character; (b) the social and economic needs of the watercourse States concerned; (c) the effects of the use or uses of the watercourse in one watercourse State on other watercourse States; (d) existing and potential uses of the watercourse; (e) conservation, protection, development and economy of use of the water resources of the watercourse and the costs of measures taken to that effect; (f) the availability of alternatives, of corresponding value, to a particular planned or existing use.

general obligation to cooperate; (3) regular exchange of data and information; and (4) relationship between different kinds of uses.[105] Although the ILC Draft Articles set forth these guiding principles, they are not necessarily reflected in actual cases of water quality agreements.

3. Judicial Decisions

Prior judicial decisions—including rulings by international courts, arbitrals, and some national courts—may be taken into account in international water disputes. International decisions, however, bind only the parties involved and do not play as powerful a role as precedent as domestic decisions do.[106] Nonetheless, these decisions do reflect the development of international law. Cases most frequently cited as relevant to international water quality law include the *Trail Smelter* arbitration, the *Lake Lanoux* decision, the *Corfu Channel* case, and the *North Sea Continental Shelf Cases*.[107] Although not dealing with water quality directly, these cases are significant because they incorporate concepts important to international water quality issues.

The *Trail Smelter* case resulted from allegations by the United States that sulfur dioxide emissions from a smelter in British Columbia, Canada, caused property damage in Washington state.[108] Because there was no dispute over causation, Canada agreed to pay for previous damage, and both countries agreed to go before an arbitration tribunal on the issue of future indemnification payments and mitigation measures. In holding Canada liable for damage caused in the United States, the tribunal stated:

> [U]nder the principles of international law . . . no state has the right to use or permit the use of its territory in such a manner as to cause injury by fumes in or to the territory of another or their property or persons therein, when the case is of a serious consequence and the injury is established by clear and convincing evidence.[109]

Interestingly, although the case dealt with international air quality, the tribunal relied on U.S. Supreme Court water quality decisions for guidance.[110] The

---

Id. at art. VI.

105. *Id.* art. X. "[N]o use of an international watercourse enjoys inherent priority over other uses." *Id.*

106. CAPONERA, *supra* note 52, at 193.

107. For discussions of these cases, see Ludwik A. Teclaff, *The Impact of Environmental Concern on the Development of International Law*, *in* INTERNATIONAL ENVIRONMENTAL LAW 229 (Ludwik A. Teclaff & Albert E. Utton eds., 1974); Utton, *supra* note 79, at 154.

108. Trail Smelter Arbitral Decision (U.S. v. Can. 1941), *reprinted in* 35 AM. J. INT'L L. 684, 716 (1941).

109. *Id.*

110. *Id.* at 714–15 (citing Missouri v. Illinois, 200 U.S. 496 (1906) (involving interstate effects of sewage release in the Mississippi River); New York v. New Jersey, 256 U.S. 296 (1921) (involving interstate effects of upstream sewage release); New York v. New Jersey, 283 U.S. 336

decision has since been applied to water quality disputes.[111]

Similarly, in the *Lake Lanoux* arbitration between Spain and France, an international arbitration panel held that states cannot exercise their sovereign rights in a manner that ignores the rights of other states.[112] The case resulted from France's proposal to divert water from the Carol River, which flows from France into Spain, for hydroelectric projects. The Tribunal found that Spain's interests must be safeguarded and "that such interests include all those which might conceivably be affected [by France], whatever their nature and even though they do not correspond to a right."[113]

The *North Sea Continental Shelf Cases*[114] evoke the concept of proportionality in addressing boundary demarcation on the North Sea Continental Shelf. In its decision, the International Court of Justice held that "equity does not necessarily imply equality," but rather that the rights of each coastal nation are proportional to the length of its coastline.[115] It is interesting that the court focused on the length of the coastline, and not other factors, e.g., population density.[116]

Finally, the *Corfu Channel* case involved the duty of Albania to warn others of the dangers of explosive mines in its territorial waters.[117] Although the *Corfu Channel* case did not directly address water pollution problems, the International Court of Justice referred to "every State's obligation not to allow knowingly its territory to be used for acts contrary to the rights of other states."[118] This concept, if applied to water quality, could restrict an upstream country's right to pollute.

In summarizing the limited number of relevant cases decided in international courts, Utton writes: "[t]hough the volume of international judicial decisions is meager, they clearly adhere to the general principle of limited territorial sovereignty."[119]

4. General Principles of Law

In the absence of authoritative international conventions, customary rules, or judicial decisions, general common law principles may help resolve a specific

---

(1931) (involving diversion of river water affecting its quality)).

111. Utton, *supra* note 79, at 158.

112. Lake Lanoux Arbitration (Fr. v. Spain 1957), *reprinted in* 53 AM. J. INT'L L. 156, 170 (1959).

113. *Id.* at 169 (quoting 62 REVUE GENERALE DE DROIT INT'L PUBLIC 79 (1958)).

114. North Sea Continental Shelf (F.R.G. v. Den.), 1969 I.C.J. 3 (Feb. 20). *See also* L.F.E. Goldie, *The Protection of the Rhine against Pollution*, 25 NAT. RESOURCES J. 665 (1985) (providing summaries of these cases).

115. *North Sea Continental Shelf*, *supra* note 113, at 49.

116. *See id.* at 53–55. *Cf.* Goldie, *supra* note 114, at 682.

117. Corfu Channel (U.K. v. Alb.), 1949 I.C.J. 4 (Apr. 9).

118. *Id.*

119. Utton, *supra* note 79, at 160.

water quality case. Caponera lists the fundamental principles for international water law as: (1) that there be no abuse of rights (*sic utere tuo ut alienum non laedas*); (2) that states should act in accordance with good neighborly relations (*bon voisinage*); and (3) that national water laws of the individual countries involved should be applied 'harmoniously' in international disputes.[120] Again, these principles are too general to define operational rules of fairness. Nonetheless, they provide a guide for determining what is generally considered fair in international water quality disputes.

III. CASES IN WATER QUALITY AGREEMENTS

Given the generality of existing international water quality law, it is necessary to analyze specific agreements to learn how fairness principles are actually applied to achieve an equitable apportionment. While many examples of international water resource management agreements exist, most relate to navigation or funding of hydroelectric projects.[121] The relatively few that do address water quality exist predominantly in Europe and North America. Of chief importance are the Rhine Chlorides Convention, the European Community pollution control legislation, the Rhine Action Plan, and the U.S.-Canada Great Lakes water quality agreements.

A. The Rhine Chlorides Convention

In 1950, a number of European countries established the International Commission for the Protection of the Rhine (ICPR) to address pollution of the Rhine.[122] The ICPR became an intergovernmental organization in 1963 and currently involves Switzerland, France, Germany, the Netherlands, Luxembourg (because of fishing interests), and the European Community. One of the first issues addressed by the ICPR was salination caused by chloride pollution. A significant part of the Rhine's salination is caused by potassium mining in Alsace, France,[123] with the negative effects felt primarily by agriculture in the Netherlands.[124]

In 1976, the Convention on the Protection of the Rhine Against Pollution by Chlorides (RCC) was signed.[125] This agreement has two parts. First, each participating nation is required to prevent any increase in the amount of

120. CAPONERA, *supra* note 52, at 191–92.

121. *See, e.g.*, McDonald, *supra* note 8, at 2–3.

122. Christophe DuPont, *Switzerland, France, Germany, The Netherlands: The Rhine*, *in* CULTURE AND NEGOTIATION: THE RESOLUTION OF WATER DISPUTES 97, 98–100 (Guy O. Faure & Jeffrey Z. Rubin eds., 1993).

123. *Id.* at 101.

124. *Id.*

125. Alexandre Kiss, *The Protection of the Rhine Against Pollution*, 25 NAT. RESOURCES J. 613, 623–24 (1985).

chloride ions discharged into the Rhine basin within its territory. Second, the agreement sets forth a plan to reduce pollution from the mines in Alsace through inground injection. The costs of this injection system were to be divided among the riparian nations with the Netherlands paying thirty-four percent; Germany, thirty percent; France, thirty percent; and Switzerland, six percent.[126]

France did not agree to this solution until 1983.[127] The treaty was finally implemented when an additional protocol was signed in 1991.[128] Although in the interim many of the chloride pollution issues were addressed through private law, the fairness concepts implicit in the original convention make an interesting study. The solution and distribution of costs in the RCC is so unusual that it has been extensively cited and analyzed.[129]

The ICPR is strongly motivated by the principle that pollution of the Rhine is the responsibility of all riparian countries.[130] The close political and economic ties between European nations alter the typical balance of power between upstream and downstream parties. These ties create important linkages that motivate cooperation on the part of upstream countries. This "solidarity principle" means that parties accept cost sharing for investments in cleanup, such as the injection well project in France.[131]

In the fairness framework, individual countries in the RCC are treated as the objects of fairness, although consideration is given to groups within each country. For example, the negotiations considered the effects on potassium mining companies in France as well as on farmers in the Netherlands.[132] The fairness yardstick used by the RCC can be expressed in one of two ways. First, the yardstick can be seen as the cost of reducing chloride pollution (the perspective that applies to the potassium mines in Alsace). Alternately, the

---

126. *Id.* at 632.

127. *Id.* at 632–33.

128. *Protocol to Curb Saline Discharges into Rhine Approved by Five Nations*, 14 INT'L ENV'T REP. (BNA) No. 20, at 544–45 (Oct. 9, 1991).

129. *See, e.g.*, Van Dunne, *supra* note 81, at 76–77; Richard B. Stewart, *Environmental Regulation and International Competitiveness*, 102 YALE L.J. 2039, 2090–91 (1993).

130. Christophe DuPont, *The Rhine: A Study of Inland Water Negotiations*, *in* INTERNATIONAL ENVIRONMENTAL NEGOTIATION 135 (Gunner Sjöestedt ed., 1993).

131. *Id.* at 143.

> Another factor that can be identified as having had an impact on the negotiations is the distribution pattern of causes (contributions to) and consequences of damages. Gradually, the negotiators took the view that the responsibility was global, as all countries shared in one way or another (though obviously not to the same extent) in the pollution (e.g., not only chlorides but also toxic substances, not only mines but also municipal waste, not only recurrent but also exceptional, accidental discharges) and the benefits of any plan or action would be not only for the downstream actors but also for all actors along the river. Compared to specific self-defense interests, this view introduced into the negotiations a value-creation component.

DuPont, *supra* note 130, at 110.

132. *See* DuPont, *supra* note 129, at 101–02.

yardstick can be construed as the total allowable chloride emissions.

The first part of the agreement requires all countries to keep chloride pollution at or below current levels. This reflects the principle of prior appropriation, or grandfathering, giving priority to existing uses. In another sense, the status quo clause of the RCC distributes the total chloride load according to current contribution and treats countries equally by allowing no increases in emissions. Thus, the priority given to existing uses for chloride disposal is balanced against the needs of agricultural users in the Netherlands. The provisions to reduce chloride pollution from the mines in Alsace reflect this balance. From this perspective, the funding formula is interesting. It combines two different notions of proportionality: need, or benefit, and contribution. France and Germany produce the majority of the chloride pollution. Thus, their thirty-percent contributions reflect their degree of responsibility.[133] Switzerland contributes very little chloride, hence its low financial responsibility (six percent).[134]

Switzerland, France, and Germany receive relatively few direct benefits from the project. On the other hand, the Netherlands contributes little to the chloride problem, but the reduction provides it substantial benefits. In other words, it has the greatest need. Exactly how these percentage contributions were derived from balancing these principles cannot be understood without scrutinizing the negotiations. As Kiss notes: "It is an ironic observation that, although an up-river state agreed to contribute to the cost of the operation, it is the victim state that pays the largest contribution."[135] Thus, this solution reflects proportional contributions according to both need and contribution, a significant deviation from the strict polluter pays principle.

B. European Community Pollution Control Legislation

A common debate in water quality management is whether to use ambient standards or emission standards for all water bodies.[136] Opinions differ in the European Community on this matter, with Britain favoring ambient water quality standards and the remaining countries favoring limit values, which are constant emissions standards. This debate can be analyzed in terms of the fairness framework.

The limit value approach "assumes that regulation should be as stringent as technology permits."[137] This approach is often considered fair, since each source is equally allowed emissions, although the actual cost borne by each

---

133. Lammers, *supra* note 50, at 444.

134. Kiss, *supra* note 125, at 632.

135. *Id.*

136. Glen McLeod, *Approaches to Setting of Priorities and Policies Amongst Water Quality Protection and Enhancement Alternatives: The European Community*, *in* WATER POLLUTION LAW AND LIABILITY 3, 10 (Patricia Thomas ed., 1993).

137. *Id.* at 5.

industry may differ greatly. The equality principle is applied in the distribution of allowable pollution discharges among individual sources. However, when seen from another perspective, this result does not seem so fair. Limit values impose very different costs on different polluters in accordance with their existing level of technology. This is apparent when one considers an entire nation as the object of fairness and the cost of pollution control as the yardstick. Countries with lower levels of existing water pollution control technology, like Britain, would bear a greater burden than others in attaining emissions standards.[138]

Which approach to environmental water quality standards should be considered fair? On one hand, Britain's preference for ambient standards focuses on ambient water quality as the significant 'good' or yardstick. From this perspective, the objects of fairness are the users of the river, who are entitled to an equal level of water quality. On the other hand, the other countries might argue that, using technological requirements as the yardstick, limit values are fair. Regardless, this example shows that the same fairness principle (equality) has very different implications depending on how one structures the problem.

C. Rhine Action Programme

In 1987, riparian states along the Rhine River agreed to a comprehensive Rhine Action Programme (RAP) to restore the river's ecological balance.[139] The RAP's objective is to achieve water quality improvement by the year 2000, such that (1) drinking water supplies are protected for the future; (2) survival of salmon runs is guaranteed; and (3) impurities in the river sediment are removed.[140] To reach these goals, participating countries agreed, among other things, to reduce their aggregate discharges by an average of fifty percent.[141]

This agreement to reduce total loading of certain pollutants is reminiscent of the Thirty Percent Club for sulfur dioxide reduction.[142] The object of fairness implied by such a proportional agreement is the riparian country. Unless pollution control costs are raised through a general tax, however, the burden of reducing pollutants by fifty percent falls not on the nation as a homogenous unit but rather on individual industries. Although initially the agreement appears fair, depending on how it is implemented, its allocations may, in fact, be unfair from the perspective of industries within the participating countries. For example, industries in some countries may have already invested

---

138. D. Taylor et al., *EC Environmental Policy and the Control of Water Pollution: The Implementation of Directive 76/464 in Perspective*, 24 J. COMMON MARKET STUD. 225, 226 (1986).

139. Lammers, *supra* note 50, at 449. *See also IRC Bases Action Plan on Approach Proposed by West Germany on Discharges*, 10 INT'L ENVTL. REP. (BNA) No. 10, at 491 (Oct. 14, 1987).

140. Lammers, *supra* note 50, at 450.

141. *Id.*

142. *See* Albin, *supra* note 2, at 8.

more heavily in pollution control than industries located in countries with less stringent domestic regulations. As McDonald notes, "sometimes an initial agreement on principles is possible as long as it avoids contentious specifics of how the principles are to be implemented."[143]

D. United States—Canada Agreements on Boundary Waters

The United States and Canada have a long history of negotiating over transboundary water resources[144] that began with the Boundary Waters Treaty of 1909.[145] This Treaty was signed during a time when primary concerns for both countries were navigation and development of water resources for hydropower and flood control. Although not emphasizing water quality, the treaty did note that neither country should cause damage to the property or health of the other through pollution.[146] Four guiding principles of the treaty included equality of rights, hierarchy of use, prior use, and compensation.[147] The prior use concept protecting existing uses of the water has not been applied to pollution. Although the treaty appears to embrace the Harmon doctrine,[148] actual practices under the treaty, including compensating for damages, do not reflect absolute territorial sovereignty.

The treaty's principle giving both countries similar rights in the use of boundary waters (equality) has been extremely influential with respect to water quality. The principle of equal rights and responsibilities is shared in many specific agreements between the two countries. For example, the 1961 Columbia River Treaty[149] stipulated that each country pay its share of development costs as based on the location of each of three projects. Additionally, for the three projects constructed on the Columbia, the United States paid half of the present value of avoided flood damages (up to $70

---

143. McDonald, *supra* note 8, at 13.

144. Graham, *supra* note 145, at 14–18.

145. Treaty Between the United States and Great Britain Relating to Boundary Waters, and Questions Arising between the United States and Canada, Jan. 11, 1909, 36 Stat. 2448 [hereinafter Boundary Waters Treaty]. *See generally* Gerald Graham, *International Rivers and Lakes: The Canadian-American Regime*, *in* THE LEGAL REGIME OF INTERNATIONAL RIVERS AND LAKES 3 (Ralph Zacklin & Lucius Caflisch eds., 1981); David G. LeMarquand, *Preconditions to Cooperation in Canada-United States Boundary Waters*, 26 NAT. RESOURCES J. 221 (1986).

146. Boundary Waters Treaty, *supra* note 145. "It is further agreed that the waters herein defined as boundary waters and waters flowing across the boundary shall not be polluted on either side to the injury of health or property on the other." *Id.* at Art. IV.

147. *Id.* at art. VIII. The order of preference in hierarchy of uses is: 1) domestic and sanitary uses, 2) navigation, 3) power and irrigation. This ordering reflects the priorities of 1909. *Id.* What is important for purposes here is that the treaty contains an expression of priority agreed upon through a political process.

148. *See supra* note 94.

149. Columbia River Treaty, Jan. 17, 1961, U.S.-Can., 15 U.S.T. 1555. *See generally* Neil A. Swainson, *The Columbia River Treaty: Where Do We Go From Here?*, 26 NAT. RESOURCES J. 243 (1986).

million), with each country receiving half of the power produced.

Extensive cooperative efforts between the United States and Canada have also been directed toward management of water quality in the Great Lakes.[150] Of the five lakes, all but Lake Michigan are physically shared by both countries. Although the Boundary Waters Treaty is in many ways outdated, Canada has tried to apply its principles to water quality in the Great Lakes, maintaining that each country deserves an equal share of assimilative capacity.[151] This principle has not worked in practice, since the United States has eighty three percent of the population surrounding the Great Lakes.[152] Not surprisingly, the two countries define equity differently. Canada argues for equality in total emissions allowed, while the United States prefers limits that are proportional to population. Under the United States' view, a 'fair' allocation would reflect its greater need for waste disposal capacity.[153] These parties used different interpretations of fairness to justify positions of self-interest. This demonstrates the importance of early agreement on the yardstick and object of fairness, as well as the principle to be applied.

The international water quality management cases described above indicate that all three fairness principles were appealed to in negotiations. Without a detailed examination of the process of negotiations, it is difficult to trace how different fairness principles were chosen. Nonetheless, a summary of these cases contributes valuable information about the range of principles considered. The Great Lakes water quality agreements show how fairness arguments can be used for strategic purposes. The European Community debate over the choice of ambient standards limit values also employs different fairness principles to support positions of self-interest. The Rhine Action plan reaches beyond self-interest by adopting common goals for each participating country. It shows how the objects of fairness (individuals versus nation-state) can affect the fairness implications of a distribution. The Rhine Chlorides Convention is an interesting mixture of the polluter pays principle (in proportion to

---

150. D.J. Williams, *Great Lakes Water Quality: A Case Study, in* THE SCIENCE OF GLOBAL CHANGE: THE IMPACT OF HUMAN ACTIVITIES ON THE ENVIRONMENT 207, 209 (David A. Dunnette & Robert J. O'Brien eds., 1992).

151. LeMarquand, *supra* note 145, at 228–29.

152. Leonard B. Dworsky, *The Great Lakes 1955–1985*, 26 NAT. RESOURCES J. 291, 294 (1986).

153. *See generally* LeMarquand, *supra* note 145, at 225–28.

> The two countries see water resources and boundary waters differently. Americans tend to look at boundary water resource issues from the point of view of equity and equitable utilization, in which the rights and obligations of the individual water user are recognized. Canadians see boundary water issues in terms of equality, and the rights and responsibilities of the two states. The American approach aims to secure the advantages of the larger population, the Canadian the advantages of geography and the rigid application of the notion of territorial integrity.

Id. at 228.

contribution) with side payments reflecting the "victim pays principle" (in proportion to need). Detailed case studies of the negotiations leading to these agreements might reveal which alternative conceptions of fairness were considered and why the observed principles prevailed.

VI. CONCLUSIONS AND RECOMMENDATIONS

This examination of fairness principles in international water quality agreements is only a beginning. To refine understanding of fairness in water quality agreements, further work should be done in three areas. First, the process by which stakeholders invoke and promote various fairness frameworks in water quality issues should be investigated. Such a study would provide valuable information regarding the evolution of each party's initial position through the agreement process to the final settlement stage. This method might reveal whether given frameworks for fairness are useful for generating new, acceptable alternatives.

Second, the database of fair solutions that have arisen in both domestic and international agreements should be expanded. In the field of water quality, administrative actions and judicial decisions from different cultures should be analyzed with respect to the framework for fairness. Attention should be paid to similarities and differences in legal tradition, geography, economy, and development. Of particular interest will be arrangements in which the distribution cannot be explained solely as a function of economic or political power of the parties involved. Attention should also be paid to the relationship between national, local, and international water quality agreements. These relationships are becoming more relevant with the rise of the concept of the river basin for management and planning.

Third, the changing role of fairness in a negotiation over time deserves exploration. It might be fruitful to examine how fairness principles are invoked in the process of negotiated decision making. The framework for fairness could be used to analyze negotiations to identify why potential solutions were suggested and perhaps to explain why certain solutions succeeded. Case studies of decision making might shed light on whether the fairness principles reflected in final agreements are purely a product of power and economic rationality or if the principles themselves have inherent appeal and persuasive ability. Ongoing water quality disputes should be observed closely so that the emergence of new fairness rationales during the course of the discussion are noted. In addition to simply describing the progression of fairness concepts advocated during the decision making process, it would be useful to document the evolution of the decision makers' preferences and to experiment with providing new alternatives in the future. Hopefully, this experience will allow us to facilitate future negotiations by providing alternative distributions from our "tool box" of fairness principles.

Despite the extensive work that should be done in this field, it is unlikely that significant changes will occur in how we understand the application of

fairness to environmental problems. Environmental agreements will not succeed unless they are perceived as fair by the parties involved. What is seen as fair, however, will depend upon the lens through which the problem is viewed. Altering the lens could result in an entirely different solution. Using a descriptive approach, this Note has examined different concepts of fairness. By applying Young's principles of equality, proportionality, and priority along with his object, baseline, and yardstick framework, this Note has identified in existing water quality agreements a few principles of fairness that can be placed into a "tool box" of fairness concepts.[154] As future researchers utilize the approach outlined in this paper to analyze other agreements, the list of available concepts will multiply. And as the tool box develops, it will become an increasingly useful resource for negotiators, planners, and participants who seek to construct lasting and fair solutions to environmental problems.

154. Although the cases reviewed in this Note are predominantly international, the concepts derived from these agreements can be applied to either domestic or international water quality management issues.

Duke Law Journal

Published six times per year by students of the Duke University School of Law, the *Duke Law Journal* contains articles of legal scholarship on topics of current interest. Annual features include a special issue focusing on current topics in administrative law. Subscriptions: $36.00 ($42.00 foreign).

RECENT ISSUE

VOLUME 43 APRIL 1994 NUMBER 6

TWENTY-FIFTH ANNUAL ADMINISTRATIVE LAW ISSUE

CONTENTS

Address Subscription Requests and Inquiries to:
Business Manager, Duke Law Journal
Duke University School of Law
Science Drive at Towerview Road, Box 90364
Durham, North Carolina 27708–0364