

Spring 2021

International Water Law and Fresh Water Dispute Resolution: A Cosean Perspective

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INTERNATIONAL WATER LAW AND FRESH WATER DISPUTE RESOLUTION: A COSEAN PERSPECTIVE

TAMAR MESHEL AND MOIN A. YAHYA*

International Water Law has developed a set of rules for resolving interstate fresh water disputes that govern both the substance of these disputes and the conduct of the disputing states. "Equitable and reasonable utilization" is commonly considered as the leading substantive rule, "no significant harm" as subsidiary to it, and the "duty to cooperate" as the central procedural rule. The purpose of this Article is to analyze the merits of these substantive and procedural rules under the lens of the celebrated Coase theorem. The "normative" part of the Coase theorem observes that if transaction costs are high, then the legal rule governing the resolution of a dispute between two parties should minimize these costs. Such a legal rule will ensure an optimal and efficient allocation of resources. International fresh water disputes usually involve high transaction costs such as unequal and asymmetric access to information, enforcement uncertainty, and unclear political goals of the parties. We argue that a legal rule such as "equitable and reasonable utilization" only increases uncertainty and transaction costs, whereas a rule such as "no significant harm" is better-suited to achieving efficient dispute resolution. Moreover, when a so-called procedural rule such as the "duty to cooperate" is imposed on the parties and gives rise to its own set of obligations, this ensures a better negotiation environment, which in turn leads to more efficient dispute resolution.

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INTRODUCTION

International fresh water disputes have arisen around the globe¹ and are likely to increase as a result of climate change and population growth. These disputes may deteriorate to violent conflict,² settle peacefully through negotiations or third-party facilitation,³ or remain deadlocked and unresolved for

1. This Article concerns international disputes between states over non-navigational water uses, to be distinguished from disputes related to navigation, maritime issues, and the High Seas.

2. Examples include the disputes concerning the Jordan River between Syria and Israel and the Euphrates-Tigris River between Iraq and Syria. See Pacific Institute, *Water Conflict Chronology*, WATER CONFLICT, <http://worldwater.org/water-conflict/> (last updated Oct. 2019) [<https://perma.cc/42SX-EJ5T>]; Aaron T. Wolf, *Conflict and Cooperation Along International Waterways*, 1 WATER POL'Y 251, 255-56 (1998).

3. Juha I. Uitto & Aaron T. Wolf, *Water Wars? Geographical Perspectives*, 168 GEOGRAPHIC J. 289 (2002); Patricia Wouters, *Universal and Regional Approaches*

years. Consider the ongoing fresh water dispute between Egypt and Ethiopia. Since 2011, the two countries have been engulfed in an intractable conflict surrounding Ethiopia's construction of the Grand Ethiopian Renaissance Dam ("GERD") on the Blue Nile River.⁴ While Ethiopia claims a right to build the GERD in order to harness the Nile waters, Egypt maintains that the dam will reduce the flow and quantity of water that it receives. Because the Nile River is Egypt's only source of water, it considers the GERD to be an "existential threat."⁵ The GERD is therefore not only shifting the two countries' water dynamic⁶ but also threatening political stability in the entire region.⁷

In their efforts to resolve the GERD dispute, Egypt and Ethiopia have turned to international law for assistance. Indeed, international law can provide well-defined rights and obligations to help overcome power imbalances, domestic constraints, and competing sovereign interests. These hurdles tend to play a prominent role in international fresh water disputes, and the

to Resolving International Water Disputes: What Lessons Learned from State Practice?, in RESOLUTION OF INTERNATIONAL WATER DISPUTES 111 (Int'l Bureau of the Permanent Ct. of Arb. ed., 2003).

4. The GERD is now complete, yet the parties continue to dispute related issues such as the rate of its filling. See *Egypt Declines Ethiopia's Suggestion to Discuss Contentious GERD Points Later*, EGYPT INDEP. (July 11, 2020), <https://egyptindependent.com/egypt-declines-ethiopias-suggestion-to-discuss-contentious-gerd-points-later/> [<https://perma.cc/3MPR-CTAP>]; Salem Solomon, *Tensions Reignite Between Ethiopia and Egypt Over Nile Dam*, VOA (July 14, 2020), <https://www.voanews.com/africa/tensions-reignite-between-ethiopia-and-egypt-over-nile-dam> [<https://perma.cc/Z6LP-XJZJ>]; *Tensions Mount as Egypt, Ethiopia Fail to Reach Dam Deal*, ANADOLU AGENCY (July 18, 2020), <https://www.aa.com.tr/en/africa/tensions-mount-as-egypt-ethiopia-fail-to-reach-dam-deal/1914514> [<https://perma.cc/MSQ8-WJWF>].

5. Amjad Tadros, *Ethiopia Filling Mega-Dam That Egypt Calls an "Existential" Threat*, CBS NEWS (July 17, 2020), <https://www.cbsnews.com/news/ethiopia-nile-dam-filling-reservoir-egypt-calls-existential-threat-in-3-way-dispute-sudan/> [<https://perma.cc/5JRX-DJGC>].

6. Historically, regional agreements allocated the lion's share of the Nile's waters to Egypt. These agreements include the 1902 Agreement between Britain and Ethiopia, the 1929 Agreement between Britain and Egypt, and the 1959 Nile Waters Agreement between Egypt and Sudan. See, e.g., Salman M.A. Salman, *The Grand Ethiopian Renaissance Dam: The Road to the Declaration of Principles and the Khartoum Document*, 41 WATER INT'L 512, 512-13 (2016).

7. Abhishek Mishra, *Water Wars: Could the Dispute Over GERD Project Push Egypt and Ethiopia Closer to an Armed Conflict?*, OBSERVER RSCH. FOUND. (July 2, 2020), <https://www.orfonline.org/expert-speak/water-wars-could-dispute-over-gerd-project-push-egypt-ethiopia-closer-armed-conflict-68933/> [<https://perma.cc/X7LE-BGY3>].

GERD dispute has proven no different.⁸ Legal principles can also provide a measure of predictability, objectivity, and stability to interactions between states, and can therefore serve as critical “reference points” and useful guiding tools in the resolution of international fresh water disputes.⁹ Indeed, Egypt and Ethiopia have included the principles of International Water Law (“IWL”)—the body of law governing non-navigational uses of international watercourses¹⁰—in a Framework Agreement.¹¹

Yet, the intractability of the GERD conflict demonstrates the limitations of the principles of IWL, as they are currently formulated, in providing an effective response to fresh water disputes. The three main principles of IWL are equitable and reasonable utilization, no significant harm, and the duty to cooperate. These principles aim to ensure the “utilization,

8. EYAL BENVENISTI, *SHARING TRANS-BOUNDARY RESOURCES* (2002); Beth Simmons, *See You in “Court”? The Appeal to Quasi-Judicial Legal Processes in the Settlement of Territorial Disputes*, in *A ROAD MAP TO WAR: TERRITORIAL DIMENSIONS OF INTERNATIONAL CONFLICT* 226 (Paul F. Diehl ed., 1999).

9. NAHID ISLAM, *THE LAW OF NON-NAVIGATIONAL USES OF INTERNATIONAL WATERCOURSES* 177 (2010); *see also* CHRISTINA LEB, *COOPERATION IN THE LAW OF TRANSBOUNDARY WATER RESOURCES* 30 (2013); Int’l Law Comm’n, *Rep. on the Work of Its Thirty-First Session*, U.N. Doc. A/34/10, at paras. 132, 134 (1979), *reprinted in* [1979] 2 Y.B. Int’l L. Comm’n 7, U.N. Doc. A/CN.4/SER.A/1979/Add.1 (Part 2).

10. Also referred to as the “law of international watercourses,” this body of law governs non-navigational water uses and is distinguished from international law governing navigation, maritime issues, and the High Seas. The Convention on the Law of the Non-Navigational Uses of International Watercourses arts. 2(a–b), May 21, 1997, G.A. Res. 51/229, annex, 2999 U.N.T.S. 1 [hereinafter UNWC], defines a “watercourse” as “a system of surface waters and groundwaters constituting by virtue of their physical relationship a unitary whole and normally flowing into a common terminus.” An “international watercourse” is defined as “a watercourse, parts of which are situated in different States.” Since the terminology is not consistent in various IWL instruments, we use the general term “shared fresh water resources.”

11. Framework for General Cooperation, Egypt-Eth., July 1, 1993, 2693 U.N.T.S. 71. The Framework Agreement provides that “the issue of the use of the Nile waters shall be worked out . . . on the basis of the rules and principles of international law.” *Id.* at art. 4. It then specifically requires the parties to refrain from causing “appreciable harm” (art. 5) and to “consult and cooperate” (art. 6), which are both principles of IWL. *See also* Mohamed Helal, *So Close, Yet So Far: An Account of the Negotiations on the Grand Ethiopian Renaissance Dam (Part I)*, OPINIOJURIS (May 4, 2020), <http://opiniojuris.org/2020/05/04/so-close-yet-so-far-an-account-of-the-negotiations-on-the-grand-ethiopian-renaissance-dam-part-i/> [<https://perma.cc/LYB4-NMZ9>]; Mohamed Helal, *So Close, Yet So Far: An Account of the Negotiations on the Grand Ethiopian Renaissance Dam (Part III)*, OPINIOJURIS (May 4, 2020), <http://opiniojuris.org/2020/05/04/so-close-yet-so-far-an-account-of-the-negotiations-on-the-grand-ethiopian-renaissance-dam-part-iii/> [<https://perma.cc/c/3R6J-NYTT>].

development, conservation, management and protection of international watercourses and the promotion of the optimal and sustainable utilization thereof for present and future generations.”¹²

The first principle, equitable and reasonable utilization, is rooted in the sovereign equality of states. It entitles each state sharing a fresh water resource to a reasonable and equitable share of that resource and obligates it to use its share in a manner that is equitable and reasonable vis-à-vis other states.¹³ “Equitable” utilization relates to benefit-sharing associated with the use of shared fresh water resources, while “reasonable” utilization “indicat[es] a suitable and beneficial use . . . applicable to the optimal and the sustainable elements of water utilization.”¹⁴

The second principle, no significant harm, has its roots in states’ general obligation to avoid using their territory in a way

12. UNWC, *supra* note 10, at 2. While these principles also form part of international law generally, in this Article, we focus on their particular meaning and content under IWL.

On equity in international law, see, for example, S. K. Chattopadhyay, *Equity in International Law*, 5 GA. J. INT’L & COMPAR. L. 381 (1975); Vaughan Lowe, *The Role of Equity in International Law*, 12 AUSTL. Y.B. INT’L L. 54 (1992); Anastasios Gourgourinis, *Delineating the Normativity of Equity in International Law*, 11 INT’L CMTY. L. REV. 327 (2009). On the no harm principle in international law see, for example, Jutta Brunnée, *Procedure and Substance in International Environmental Law*, 405 COLLECTED COURSES HAGUE ACAD. INT’L L. 75 (2020); TRANSBOUNDARY HARM IN INTERNATIONAL LAW (Rebecca M. Bratspies & Russell A. Miller eds., 2006); Benoit Mayer, *The Relevance of the No-Harm Principle to Climate Change Law and Politics*, 19 ASIA-PACIFIC J. ENV’T L. 79 (2016); Jelena Bäumle, *Implementing the No Harm Principle in International Economic Law*, 20 J. INT’L ECON. L. 807 (2018). On the duty to cooperate in international law see, for example, Margaret A. Young & Sebastián Rioseco Sullivan, *Evolution Through the Duty to Cooperate: Implications of the Whaling Case at the International Court of Justice*, 16 MELBOURNE J. INT’L L. 311 (2015). In the context of shared or common natural resources, the Charter of Economic Rights and Duties of States, for instance, provides that “each State must co-operate on the basis of a system of information and prior consultations in order to achieve the optimum use of such resources without causing damage to the legitimate interest of others.” G.A. Res. 3281 (XXIX), art. 3 (Dec. 14, 1974). See also Christina Leb, *One Step at a Time: International Law and the Duty to Cooperate in the Management of Shared Water Resources*, 40 WATER INT’L 21, 23 (2015).

13. Mohammed S. Helal, *Sharing Blue Gold: The 1997 UN Convention on the Law of the Non-Navigational Uses of International Watercourses Ten Years On*, 18 COLO. J. INT’L ENV’T L. & POL’Y 337, 342 (2007); Muhammad Mizanur Rahaman, *Principles of International Water Law: Creating Effective Transboundary Water Resources Management*, 1 INT’L J. SUSTAINABLE SOC’Y 207, 210 (2009).

14. Lilian del Castillo-Laborde, *Equitable Utilization of Shared Resources*, in MAX PLANCK ENCYC. OF PUBLIC INT’L L. para. 19 (2010), <https://opil.ouplaw.com/view/10.1093/law:epil/9780199231690/law-9780199231690-e1583> [<https://perma.cc/28H7-VJAV>].

that harms another state.¹⁵ It appears prominently in international environmental agreements and in decisions of international courts and tribunals.¹⁶ In the context of shared fresh water resources, states have interpreted the no significant harm principle as prohibiting such resources from being used “in such a way as to cause material injury to the interests of another.” Moreover, states may not oppose the use of shared fresh water resources by another state “unless this causes material injury to itself.”¹⁷

The third principle, the duty to cooperate, is the “linchpin for the peaceful relations between nation states” and applies to states’ conduct in relation to, *inter alia*, the environment, human rights, development, and dispute settlement.¹⁸ This general duty has given rise to a large body of norms of cooperation in the international environmental law context as a result of states’ common interest in the protection of the natural environment,¹⁹ as well as in the context of shared or common natural resources.²⁰ In relation to shared fresh water resources, the duty

15. Jutta Brunnée, *Sources of International Environmental Law: Interactional Law*, in OXFORD HANDBOOK ON THE SOURCES OF INTERNATIONAL LAW, 970–71 (Samantha Besson & Jean d’Aspremont eds., 2017).

16. See, for example, PHILIPPE SANDS ET AL., PRINCIPLES OF INTERNATIONAL ENVIRONMENTAL LAW 198 (3d. ed. 2012), for cited international agreements. International decisions include, for example, Trail Smelter (U.S. v. Can.), 3 R.I.A.A. 1905 (1941); Corfu Channel (Merits) (U.K. v. Alb.), Judgment, 1949 I.C.J. Rep. 4, at 22 (April 9) (“[E]very State’s obligation not to allow knowingly its territory to be used for acts contrary to the rights of other States.”).

17. IBRAHIM KAYA, EQUITABLE UTILIZATION: THE LAW OF NON-NAVIGATIONAL USES OF INTERNATIONAL WATERCOURSES 82 (2003) (citing J.L. BRIERLY, THE LAW OF NATIONS 204 (5th ed. 1955)).

18. Patricia Wouters, ‘Dynamic Cooperation’ in *International Law and the Shadow of State Sovereignty in the Context of Transboundary Waters*, 3 ENV’T LIABILITY 88, 89–92 (2013); Rahaman, *supra* note 13, at 210; Stephen McCaffrey, *The Law of International Watercourses: Present Problems, Future Trends*, in A LAW FOR THE ENVIRONMENT 114 (W. E. Burhenne et al. eds., 1994).

19. LEB, *supra* note 9, at 34. For international instruments, see generally, U.N. Conference on Human Rights, *Stockholm Declaration*, U.N. Doc. A/CONF.48/14/Rev.1, princ. 24 (June 16, 1972); U.N. Conference on Environment and Development, *Rio Declaration on Environment and Development*, U.N. Doc. A/CONF.151/26/Rev.1 (Vol. 1), annex 1 princ. 27 (Aug. 12, 1992); United Nations Convention on the Law of the Sea arts. 123, 197, Dec. 10, 1982, 1833 U.N.T.S. 397; Convention on Biological Diversity art. 5, June 5, 1992, 1760 U.N.T.S. 79; U.N. Env’t Programme, *Rep. on the Work of Its Fifth Session*, U.N. Doc. A/32/35, paras. 403–16 (1977). For international judicial and arbitral decisions, see generally, KAYA, *supra* note 17, at 125–26; SANDS ET AL., *supra* note 16, at 204–05.

20. G.A. Res. 3281 (XXIX) Charter of Economic Rights and Duties of States, art. 3 (Dec. 14, 1974) (“In the exploitation of natural resources shared by two or more countries, each State must co-operate on the basis of a system of information

to cooperate requires states to collaborate in the management and use of such resources and sets out concrete measures to enable such collaboration, such as information exchange, consultations, and the creation of joint institutions.²¹ The duty to cooperate has become increasingly more formalized in this context,²² culminating in a universal recognition that the duty to cooperate is crucial to IWL.²³

The main global instrument codifying these three IWL principles is the 1997 United Nations Convention on the Law of the Non-navigational Uses of International Watercourses ("UNWC").²⁴ Importantly, these principles also bind states that are not parties to the UNWC or other IWL treaties, since they are generally accepted as having customary international law status.²⁵ These principles have the potential to facilitate the res-

and prior consultations in order to achieve the optimum use of such resources without causing damage to the legitimate interest of others.").

21. See Wouters, *supra* note 18, at 89–92; LEB, *supra* note 9, at 78–79; Tamar Meshel, *Swimming Against the Current: Revisiting the Principles of International Water Law in the Resolution of Transboundary Fresh Water Disputes*, 61 HARV. INT'L L.J. 135 (2020) [hereinafter Meshel, *Swimming Against the Current*]; Tamar Meshel, *Unmasking the Substance Behind the Process: Why the Duty to Cooperate in International Water Law is Really a Substantive Principle*, 47 DENV. J. INT'L L. & POL'Y 29 (2020) [hereinafter Meshel, *Unmasking the Substance Behind the Process*].

22. See Stephen C. McCaffrey (Special Rapporteur), *Third Rep. on the Law of the Non-Navigational Uses of International Watercourses*, 45 U.N. Doc. A/CN.4/406 and Add.1 and 2 (1987), reprinted in [1987] 2 Y.B. Int'l L. Comm'n 1, U.N. Doc. A/CN.4/SER.A/1987/Add.1, for a list of international agreements containing provisions concerning cooperation on watercourses.

23. Christina LeB, *The UN Watercourses Convention: The Éminence Grise Behind Cooperation on Transboundary Water Resources*, 38 WATER INT'L 146, 147 (2013).

24. UNWC, *supra* note 10, at arts. 5–8. As of September 2020, the Convention had thirty-seven parties. *Id.* Neither Egypt nor Ethiopia are parties to the UNWC. See also Int'l Law Ass'n, Fourth Rep. on the Seventy-First Conference, *Berlin Rules on Water Resources*, at 3 (Aug. 21, 2004); Convention on the Protection and Use of Transboundary Watercourses and International Lakes, Mar. 17, 1992, 1996 U.N.T.S. 269 [hereinafter UNECE]; Int'l L. Comm'n, Rep. on the Work of the Sixtieth Session, U.N. Doc. A/63/10, at 19–79 (2008); Gabčíkovo-Nagymaros Project (Hung. v. Slov.), Judgment, 1997 I.C.J. Rep. 7 (Sept. 25); Pulp Mills on River Uruguay (Arg. v. Uru.), Judgment, 2010 I.C.J. Rep. 14 (Apr. 20); Indus Waters Kishenganga (Pak. v. India), 31 R.I.A.A. 3 (Perm. Ct. Arb. 2013).

25. Customary international law is "[i]nternational law that derives from the practice of states and is accepted by them as legally binding" *Customary International Law*, BLACK'S LAW DICTIONARY (11th ed. 2019). See, e.g., Stephen C. McCaffrey, *International Water Cooperation in the 21st Century*, 23 REV. EUR., COMPAR. & INT'L ENV'T L. 4, 5 (2014); Stephen C. McCaffrey, *The UN Convention on the Law of the Non-Navigational Uses of International Watercourses*, in INTERNATIONAL

olution of international fresh water disputes by providing default rules that are sufficiently clear to guide states while also flexible enough to accommodate the subtleties of such disputes.²⁶ However, they are currently not formulated or utilized in a way that maximizes their ability to do so.

As is frequently the case in disputes between upstream and downstream states, Ethiopia (the upstream state) claims an equitable and reasonable right to build the GERD, while Egypt (the downstream state) maintains its right to be free from significant harm that it claims would be caused to it by the dam. And despite countless consultations and cooperative initiatives, the parties appear as deadlocked as ever.²⁷ Therefore, one might question the potential for the equitable and reasonable utilization, no significant harm, and duty to cooperate principles in their current formulation to effectively guide the resolution of this, and other, international fresh water disputes.²⁸ Recalling,

WATERCOURSES: ENHANCING COOPERATION AND MANAGING CONFLICT 17, 26 (Salman M. A. Salman & Laurence Boisson de Chazournes eds., 1998); Gabriel Eckstein, *Water Scarcity, Conflict, and Security in a Climate Change World*, 27 WIS. INT'L L.J. 409, 434 (2009).

26. David N. Cassuto & Rômulo S. R. Sampaio, *Hard, Soft & Uncertain: The Guarani Aquifer and the Challenges of Transboundary Groundwater*, 24 COLO. J. INT'L ENV'T L. & POL'Y 1, 37 (2013).

27. Mohamed Helal, *So Close, Yet So Far: An Account of the Negotiations on the Grand Ethiopian Renaissance Dam (Part II)*, OPINIOJURIS (May 4, 2020), <http://opiniojuris.org/2020/05/04/so-close-yet-so-far-an-account-of-the-negotiations-on-the-grand-ethiopian-renaissance-dam-part-ii/> [<https://perma.cc/S3KK-Y459>].

28. See, e.g., Frederick W. Frey, *The Political Context of Conflict and Cooperation Over International River Basins*, 18 WATER INT'L 54, 58 (1993) (noting that in light of disagreements over the application of these principles, "the prospects for consensus on a legal doctrine for international rivers still seem slim"); Aaron T. Wolf, *International Water Conflict Resolution: Lessons from Comparative Analysis*, 13 INT'L J. WATER RES. DEV. 333, 336–37 (1997) (noting the problems involved in attempting to apply these principles to specific water conflicts); Erik Mostert, *A Framework for Conflict Resolution*, 23 WATER INT'L 206, 207 (1998) ("Uncertainty concerning the relevant laws results from the difficulties of proving the existence of some legal rules, the abstract nature of most legal rules, and conflicts between the rules. This applies especially to international water law, where rules of customary law are hard to prove and treaties are often vague."); Jutta Brunnée, *Law and Politics in the Nile Basin*, 102 AM. SOC'Y INT'L L. PROC. 353, 361 (2008) ("The opposition between these two principles promotes adversarial roles and also tends to promote absolute positions being taken by upstream and downstream states, respectively."); Anna Spain, *Beyond Adjudication: Resolving International Resource Disputes in an Era Of Climate Change*, 30 STAN. ENV'T L.J. 343, 360–61 (2011) (noting generally that treaty provisions "can be vague, leading to confusion about questions of breach or enforcement," and that the UNWC "calls for equitable and reasonable use, cooperation, exchange of information, and duty not to cause significant harm, but fails to clarify what constitutes an appreciable harm under the treaty");

however, that there is unlikely to be a lasting solution to such disputes without international law,²⁹ new approaches to the use of IWL's principles in this context should be developed.

In this Article, we explore one such approach based on the Coase theorem³⁰ developed by Ronald H. Coase.³¹ The Coase theorem is a useful analytical tool to evaluate the efficiency of legal rules in situations of conflicted interests.³² For present

Bruce Lankford, *Does Article 6 (Factors Relevant to Equitable and Reasonable Utilization) in the UN Watercourses Convention Misdirect Riparian Countries?*, 38 WATER INT'L 130, 130 (2013) ("Article 6 [of the UNWC], in its current formulation, cannot guide adjustments to current water shares between countries.").

29. Laurence Boisson de Chazournes, *Elements of a Legal Strategy for Managing International Watercourses*, in INTERNATIONAL WATERCOURSES: ENHANCING COOPERATION AND MANAGING CONFLICT, *supra* note 25, at 65, 67.

30. The term "Coase theorem" was coined by the Nobel laureate in Economics, George J. Stigler. Steven G. Medema, *The Coase Theorem at Sixty*, J. ECON. LITERATURE (forthcoming) (version 1.4 at 1). Medema lists sixteen versions of the Coase theorem. For this Article, the precise statement is not as important as are the implications of the second part of the theorem, also known as the normative Coase theorem. *Id.* See also Francesco Parisi, *Political Coase Theorem*, 115 PUB. CHOICE 1, 22 (2003).

Notwithstanding the widespread usage of the Coase theorem in its various forms, it has also been criticized. Criticisms are usually leveled at the applications of the theorem and its various implications, rather than at Coase's original paper. A complete discussion of these criticisms is beyond the scope of this paper, but for a few examples, see Daniel A. Farber, *Parody Lost/Pragmatism Regained: The Ironic History of the Coase Theorem*, 83 VA. L. REV. 397 (1997) (arguing with the modern interpretation of the Coase theorem because of its empirical assumptions); Daniel Q. Posin, *The Coase Theorem*, 37 WAYNE L. REV. 89 (1990) (arguing that the Coase theorem is not practicable because markets do not determine legal regimes).

31. Ronald H. Coase, 1910–2013, was an economist who won the Nobel Memorial Prize in Economics for effectively establishing the field of law and economics. His work focused on the role that transaction costs and contracting play in creating and developing institutions. His influence continues to be felt throughout the fields of law and economics alike, as citations to his work remain steady even today. See, e.g., William M. Landes & Sonia Lahr-Pastor, *Measuring Coase's Influence*, 54 J.L. ECON. S383 (2011) (documenting the growing citation count). Coase's earliest work on transaction costs was published in *The Nature of the Firm*, 4 ECONOMICA 386 (1937), where he argued that the reason some production is done inside a firm with many employees as opposed to by the same individuals acting as independent contractors is that it is more efficient to create a firm that minimizes the inefficiencies than having to create thousands of contracts and monitor their compliance. He also contributed to the theory of monopoly, public goods, and economic development. Each of his articles has created a research industry in and of itself. For more on his work, see, for example, John V. C. Nye, *Ronald Coase*, 19 INDEP. REV. 101 (2014); Richard A. Posner, *Nobel Laureate: Ronald Coase and Methodology*, 7 J. ECON. PERSPS. 195 (1993).

32. Numerous aspects of domestic law, including water law, have been studied using the Coase theorem. See, e.g., C. Carter Ruml, *The Coase Theorem and Western U.S. Appropriative Water Rights*, 45 NAT. RES. J. 169 (2005); Lin Crase & Ben Gawne, *Coase-Coloured Glasses and Rights Bundling: Why the Initial Specification*

purposes, the Coase theorem can be broken into two simple parts. Most relevant here is the part of the theorem known as the “normative Coase theorem.” It states that when transaction costs are high, established legal rights tend to determine the outcome of a conflict, and therefore these rights should be structured in a manner that leads to efficient outcomes—that is, outcomes that minimize the transaction costs.³³ This part of the

of *Water Rights in Volumetric Terms Matters*, 30 *ECON. PAPERS* 135 (2011); H.E. Frech III, *Pricing of Pollution: The Coase Theorem in the Long Run*, 4 *BELL J. ECON. MGMT.* 316 (1973); H. Stuart Burness & James P. Quirk, *Appropriative Water Rights and the Efficient Allocation of Resources*, 69 *AM. ECON. REV.* 25 (1979); H. Stuart Burness & James P. Quirk, *Water Law, Water Transfers, and Economic Efficiency*, 23 *J.L. ECON.* 111 (1980); Joseph W. Dellapenna, *Special Challenges to Water Markets in Riparian States*, 21 *GA. STATE U. L. REV.* 305 (2004); Joseph W. Dellapenna, *Markets for Water*, 131 *J. CONTEMP. WATER RSCH. & EDUC.* 33 (2005). Some have used the Coase theorem to study international law. For a detailed discussion of such studies, see Medema, *supra* note 30.

Some have also used the theorem to analyze international water law, with some recent articles looking at international freshwater dispute resolution. See, e.g., Guiliang Tian et al., *Water Rights Trading: A New Approach to Dealing with Transboundary Water Conflicts in River Basins*, 22 *WATER POL'Y* 133 (2020); Daniel Abebe, *Egypt, Ethiopia, and the Nile: The Economics of International Water Law*, 15 *CHI. J. INT'L L.* 27 (2014); Erik Ansink & Harold Houba, *The Economics of Transboundary River Management*, in *HANDBOOK OF WATER ECONOMICS* 434–68 (Ariel Dinar & Kurt Schwabe eds., 2015); INES DOMBROWSKY, *CONFLICT, COOPERATION AND INSTITUTIONS IN INTERNATIONAL WATER MANAGEMENT: AN ECONOMIC ANALYSIS* (2007); Ines Dombrowsky, *Revisiting the Potential for Benefit Sharing in the Management of Trans-Boundary Rivers*, 11 *WATER POL'Y* 125 (2009) [hereinafter Dombrowsky, *Revisiting the Potential for Benefit Sharing*]; Ariel Dinar & Getachew S. Nigatu, *Distributional Considerations of International Water Resources under Externality: The Case of Ethiopia, Sudan and Egypt on the Blue Nile*, 2 *WATER RES. & ECON.* 1 (2013); Joseph W. Dellapenna, *Treaties as Instruments for Managing Internationally-Shared Water Resources: Restricted Sovereignty vs. Community of Property*, 26 *CASE W. RES. J. INT'L L.* 27 (1994); Muserref Yetim, *Governing International Common Pool Resources: The International Watercourses of the Middle East*, 4 *WATER POL'Y* 305 (2002); Erik Ansink & Hans-Peter Weikard, *Contested Water Rights*, 25 *EUR. J. POL. ECON.* 247 (2009).

33. Parisi, *supra* note 30, at 22; Francesco Parisi, *Coase Theorem*, in *NEW PALGRAVE DICTIONARY OF ECONOMICS* 1724, 1729–32 (Steven N. Durlauf & Lawrence E. Blume eds., 3rd ed. 2018) (discussing the normative theorem and citing Harold M. Demsetz, *When Does the Rule of Liability Matter?*, 1 *J. LEGAL STUD.* 13 (1972)); Richard A. Epstein, *Holdouts, Externalities, and the Single Owner: One More Salute to Ronald Coase*, 36 *J.L. & ECON.* 553 (1993); Thomas W. Merrill & Henry E. Smith, *Making Coasean Property More Coasean*, 54 *J.L. & ECON.* S77, S94–95 (2011). Merrill and Smith do not quite state it in that manner, but the implication of their article is clear. Numerous scholars have made the point that the initial legal rules are allocated to minimize transaction. The most famous of these arguments are by (now Judge) Guido Calabresi in a series of articles including Guido Calabresi, *Transaction Costs, Resource Allocation and Liability Rules – A Comment*, 11 *J. L. & ECON.* 67 (1968); Guido Calabresi & A. Douglas Melamed, *Property Rules, Liability Rules and Inalienability*, 85 *HARV. L. REV.* 1089 (1972). In

Coase theorem will serve as our main analytical tool in this Article. The other part of the theorem, which will not be addressed in this Article, states that when transaction costs are zero, parties will reach a mutually satisfactory resolution of their conflict that maximizes value regardless of their respective legal rights. This part of the Coase theorem is less relevant in the context of international fresh water dispute resolution because the transaction costs involved in this process are incredibly high.³⁴ In the presence of these transaction costs, the normative Coase theorem posits that successful resolution of disputes may not be achieved absent clear and effective legal rules that minimize these costs. This is where the normative Coase theorem and IWL principles intersect, and it is this intersection that we set out to explore in this Article. Coase himself used conflicting interests arising from the contamination of a stream as an example of his proposed theory, remarking:

If we assume that the harmful effect of the pollution is that it kills the fish, the question to be decided is: is the value of the fish lost greater or less than the value of the product which the contamination of the stream makes possible.³⁵

We identify two problems with the current formulation of the three IWL principles set out above that hinder their ability to facilitate the resolution of international fresh water disputes, and apply the normative Coase theorem to fix them. The first problem is the tension between the equitable and reasonable utilization and no significant harm principles. These principles "leave sufficient ambiguity to permit both states to view [them] as supportive of their respective legal positions," effectively leaving states with "no binding principle of international law that compels a particular result."³⁶ As noted above, this problem is

the Calabresi & Melamed article, the authors demonstrate how various legal rules achieve efficient outcomes given the existence of transaction-impeding factors. Other articles have since discussed which legal rules are more efficient, given various scenarios and possible transaction costs. See, e.g., Louis Kaplow & Steven Shavell, *Property Rules versus Liability Rules: An Economic Analysis*, 109 HARV. L. REV. 713 (1996).

34. Dombrowsky, *Revisiting the Potential for Benefit Sharing*, *supra* note 32, at 128–29 (explaining coordination costs, negotiation costs, political costs, opportunity costs, information costs, monitoring costs, implementation costs, and enforcement costs).

35. R. H. Coase, *The Problem of Social Cost*, 3 J.L. ECON. 1, 2 (1960).

36. Abebe, *supra* note 32, at 39.

clearly evident in the GERD dispute between Egypt and Ethiopia, in which the parties have adopted polar opposite positions based on these two principles. To avoid such contradictory interpretations, the prevailing approach in IWL is to treat equitable and reasonable utilization as the governing principle and no significant harm as subsidiary to it. Yet this approach has failed to resolve the tension between these two principles. We propose, in line with the normative Coase theorem, that no significant harm should be treated as the guiding principle of IWL in the resolution of international fresh water disputes.³⁷ This approach would provide disputing states with a clear and effective rule that can reduce transaction costs and facilitate dispute resolution.

The second problem with the current formulation of the three IWL principles is that the duty to cooperate in IWL has been largely limited to the *prevention* of international fresh water disputes,³⁸ while playing a much smaller role in their actual *resolution*. Moreover, it is not clear whether a violation of the duty to cooperate would in and of itself give rise to an internationally wrongful act absent violation of the no significant harm principle. As a result, the duty to cooperate is unable to reduce transaction costs and assist states in reaching a mutually satisfactory outcome. We propose, again in line with the normative Coase theorem, to recognize the duty to cooperate as an independent principle imposing on states specific obligations both prior to and during the dispute resolution process. This approach would lower transaction costs and facilitate dispute settlement.

The distinction that we draw between the equitable and reasonable utilization and no significant harm principles, on the one hand, and the duty to cooperate, on the other, is rooted in their different *purposes* in the resolution of international fresh water disputes.³⁹ From this purposive perspective, we view the

37. See also Meshel, *Swimming Against the Current*, *supra* note 21.

38. David Grey & Dustin Garrick, *Water Security, Perceptions and Politics*, in *INTERNATIONAL LAW AND FRESHWATER: THE MULTIPLE CHALLENGES* 46 (Laurence Boisson de Chazournes et al. eds., 2013).

39. Our distinction is in contrast to the distinction adopted in recent scholarship and decisions of the International Court of Justice, which is rooted in the “substantive” nature of the equitable and reasonable utilization and no significant harm principles and the “procedural” nature of the duty to cooperate. See, e.g., STEPHEN C. McCaffrey, *THE LAW OF INTERNATIONAL WATERCOURSES* 526 (3d ed. 2019) (although McCaffrey does note that “the line separating obligations that are substantive from those that are procedural is not always a clear one . . . the ‘substantive’ obligation of equitable and reasonable utilization may itself be thought of as a

equitable and reasonable utilization and no significant harm principles as designed to reconcile states' competing rights and interests, and the duty to cooperate as an independent principle that is intended to achieve cooperative dispute resolution.⁴⁰

Through the lens of the normative Coase theorem, we therefore aim to revamp these three principles of IWL so that they can operate to reduce transaction costs and thereby facilitate the resolution of international fresh water disputes.⁴¹ In Part II of the Article, we set out the basics of the Coase theorem and introduce the normative Coasean approach generally, as well as in the context of fresh water dispute resolution. In this regard, we analyze the United States Supreme Court's ("Supreme Court") jurisprudence concerning fresh water disputes between U.S. states through the normative Coasean lens. The American example is instructive because fresh water disputes between states of the Union implicate similar interests as those implicated in international disputes, and since the principles applied by the Supreme Court in their resolution parallel at least some of IWL's principles. In Part III, we return to the international sphere and

process; and the 'substantive' obligation not to cause significant harm also serves to trigger a process"); *Pulp Mills on River Uruguay* (Arg. v. Uru.), Judgment, 2010 I.C.J. Rep. 14 (Apr. 20); *Certain Activities Carried out by Nicaragua in Border Area* (Costa Rica v. Nicar.) and *Construction of a Road in Costa Rica along the San Juan River* (Nicar. v. Costa Rica), Judgment, 2015 I.C.J. Rep. 665 (Dec. 16). We depart from this dichotomy, which seems unhelpful and confusing since it forecloses on the prospect of utilizing the duty to cooperate as an independent principle of IWL, giving rise to rights and obligations in and of itself. Judge Donoghue pointed out the futility of such a distinction in *Certain Activities Carried out by Nicaragua in Border Area* and *Construction of a Road in Costa Rica along the San Juan River*. 2015 I.C.J. Rep. 665, ¶ 9 (separate opinion by Donoghue, J.) ("I do not find it useful to draw distinctions between 'procedural' and 'substantive' obligations, as the Court has done."). See also Attila M. Tanzi, *Substantializing the Procedural Obligations of International Water Law Between Retributive and Distributive Justice*, in *A BRIDGE OVER TROUBLED WATERS* (Hélène Ruiz Fabri, et al. eds., 2020) (on file with authors); Owen McIntyre, *The World Court's Ongoing Contribution to International Water Law*, 4 WATER ALTS. 124, 143 (2011); Patricia Wouters & Dan Tarlock, *The Third Wave of Normativity in Global Water Law – The Duty to Cooperate in the Peaceful Management of the World's Water Resources: An Emerging Obligation Erga Omnes?*, 23 J. WATER L. 51 (2013).

40. For a general overview of the interplay between the various substantive and procedural principles, including the duty to cooperate, see, for example, Tamar Meshel, *The Dual Role of Procedure in International Water Law*, in *INTERNATIONAL LAW AND LITIGATION: A LOOK INTO PROCEDURE* 65 (Hélène Ruiz Fabri ed., 2019).

41. We do not engage in this Article with antecedent questions such as whether states see themselves as compelled to adhere to these principles of IWL where they have not committed to doing so via treaty obligations. Our working assumption is that if these principles are clear and efficient, states will use them and will hold each other accountable for their violation since it will be in their interest to do so.

apply the normative Coasean approach to the two problems identified above concerning the current formulation of IWL's principles and their use in the resolution of international fresh water disputes. In Part IV, we summarize our arguments and offer brief concluding remarks.

I. THE COASE THEOREM AND U.S. INTERSTATE FRESH WATER DISPUTE RESOLUTION

In this Part, we first introduce the basic tenets of the Coase theorem before delving into the application of the normative Coase theorem to the resolution of fresh water disputes between U.S. states. The way in which the Supreme Court has approached the resolution of these disputes provides a useful example of a normative Coasean approach that could be replicated in the international context.

A. *The Coase Theorem: A General Introduction*

The simple question that Coase attempted to answer with his theorem was the following: what is the optimal distribution of liability, with the resulting payment of damages or imposition of restrictions between a party who inflicts harm and an injured party?⁴²

Consider, for instance, a scenario where a company owns a train that travels on tracks adjacent to a farmer's field. The sparks from the train harm the farmer by burning some of his crops, but installing a spark guard or stopping the operation of the train would harm the company. According to Coase, to optimize the distribution of liability between the company and the farmer, what must be determined is not how to restrain the company, but rather whether the company should be allowed to harm the farmer or vice versa. This is because the situation is reciprocal in nature and avoiding the harm to the farmer would inflict harm on the company. The answer, from a Coasean perspective, depends on which is the more serious harm to be avoided.

If there were no transaction costs, the company and the farmer would presumably arrive at a mutually satisfactory solution that maximizes value for both. If running the train, even

42. Coase, *supra* note 35, at 2.

with some burnt crops, generates a higher total value⁴³ than not running the train at all,⁴⁴ then one of two solutions would emerge, depending on the applicable legal regime. If the legal regime provides that the farmer has a right to be free of burnt crops, then the company would either pay the farmer to compensate him for the burnt crops or install a spark guard, depending on which costs less. If the legal regime provides that the company has a right to operate its train regardless of its impact on the farmer, then the farmer would either pay the company to install the spark guard or live with the lost crops, depending on whether the value of the burnt crops is less than the cost of the spark guard. The result is that the parties always reach a resolution that achieves a total maximization of value. Under either legal regime, the train runs and the farmer gets most of the crop. But the difference is that under the first regime, the company compensates the farmer or installs a spark guard if less costly, while under the second regime the farmer pays the company for the spark guard or absorbs the loss from the burnt crops if the spark guard is more costly. In other words, the legal regime only impacts the income distribution between the two parties but not the output or economic activity.

According to the Coase theorem, reaching such an optimal resolution requires knowledge of whether the company is legally liable for the damage caused to the farmer, because "without the establishment of this initial delimitation of rights there can be no market transactions to transfer and recombine them."⁴⁵ But as the above scenario demonstrates, the ultimate result, presuming a system without transaction costs, is independent of the parties' respective legal rights. In such a system, "a rearrangement of rights will always take place if it would lead to an increase" in value for the parties.⁴⁶

43. As will be explained further below, the Coasean approach examines the total value of a given activity for society as a whole, rather than its value to individual actors.

44. Of course, if running the train generates a lower total value than not running it, the optimal solution would be not to run it at all.

45. Coase, *supra* note 35, at 8.

46. *Id.* at 15.

The outcome would of course be different in the presence of transaction costs that exceed the value gained from such "a rearrangement of rights."⁴⁷ As Coase noted, an assumption of no transaction costs is "a very unrealistic assumption."⁴⁸ Rather,

[I]n order to carry out a market transaction it is necessary to discover who it is that one wishes to deal with, to inform people that one wishes to deal and on what terms, to conduct negotiations leading up to a bargain, to draw up the contract, to undertake the inspection needed to make sure that the terms of the contract are being observed, and so on.⁴⁹

High transaction costs can therefore prevent bargaining between parties that could have resulted in an economically efficient outcome. In our company-farmer scenario, suppose the applicable legal regime provides that the farmer has the right to unburnt crops. The company may want to pay the farmer compensation, in the event the spark guard is more expensive than the cost of the crops. If the two parties are unable to bargain, however, the company may stop the train altogether or install a more expensive spark guard. Similarly, if the company had the right to run its train with no regard to the impact on the farmer, the farmer may wish to pay the company to put a spark guard if it costs less than the lost crops. Bargaining costs may again prevent that payment from happening, and the result will be that the farmer will have to live with more costly crop losses.⁵⁰

In light of the high transaction costs associated with any rearrangement of rights, Coase argued that such rights should be established and delimited by the legal system⁵¹ and should, ideally, increase efficiency⁵² and decrease transaction costs.⁵³ This is not to say, Coase went on to state, that formulating legal rules or rights is costless, as "[a]ll solutions have costs."⁵⁴ Furthermore, there is no assurance that it would be appropriate to

47. *Id.* at 10.

48. *Id.* at 15.

49. *Id.*

50. *Id.* at 15-16.

51. *Id.* at 16.

52. *Id.* at 18.

53. The idea that legal rules should minimize transaction costs and facilitate Coasean bargains is one version of the normative Coase theorem. Medema, *supra* note 30, at 61.

54. Coase, *supra* note 35, at 18.

apply general rules in every specific case,⁵⁵ or that these rules would be effective in resolving a particular conflict. However, to the extent that such legal rules and rights already exist, they ought to be able “to reduce the need for [market] transactions [to change them] and thus reduce the employment of resources in carrying them out.”⁵⁶ To do so, Coase posited, such rules and rights should not simply restrain the party that has caused harm, but should rather enable the disputing parties or an adjudicator to weigh “the gains that would accrue from eliminating . . . harmful effects against the gains that accrue from allowing them to continue.”⁵⁷

Coase’s theory spurred lawyers and economists to search for an optimal legal rule to impose in the presence of transaction costs in order to achieve efficient outcomes.⁵⁸ Of course, the first step is to identify the source of the transaction costs. One major category of transaction costs reflects the time and effort that goes into a transaction.⁵⁹ This category includes “get-together costs” associated with the bargaining process itself as well as

55. *Id.*

56. *Id.* at 19.

57. *Id.* at 26.

58. Medema, *supra* note 30, provides a comprehensive survey of the literature deploying the Coase theorem to analyze various legal and economic scenarios. In the example above, while costless bargaining yields an efficient outcome in terms of allocation of resources and outputs, there are income transfer consequences. Depending on the legal regime, either the company must pay for the crops (or a spark guard) or the farmer must pay the company for a spark guard (or absorb the cost of burnt crops). These income transfers raise inequality and fairness concerns that are the subject of extensive literature on the trade-offs between efficiency and fairness. The classic article is Louis Kaplow & Steven Shavell, *Fairness Versus Welfare*, 114 HARV. L. REV. 961 (2001) (arguing that efficiency should be the main criterion for policy-making because fairness is hard to define and operationalize in economic theory). In response to this article, numerous articles claimed that fairness can be measured and that policy-makers can assess the trade-offs between the two. See, e.g., Howard F. Chang, *A Liberal Theory of Social Welfare*, 110 YALE L.J. 173 (formally demonstrating that fairness can be properly assessed with efficiency concepts); Daniel A. Farber, *What (If Anything) Can Economics Say About Equity*, 101 MICH. L. REV. 1791 (2003) (arguing that economic theory can properly assess the trade-offs); Mark Kelman, *Consumption Theory, Production Theory, and Ideology in the Coase Theorem*, 52 S. CAL. L. REV. 669 (1979) (arguing that ignoring income effects on consumers and producers undermines the Coase theorem); Ansink & Houba, *supra* note 32, at 434.

59. Robert D. Cooter, *The Coase Theorem*, in THE NEW PALGRAVE DICTIONARY OF ECONOMICS 457 (John Eatwell et al. eds., 1987); see also Carl J. Dahlman, *The Problem of Externality*, 22 J.L. & ECON., 141–62 (1979); R. H. COASE, THE FIRM, THE MARKET, AND THE LAW 9 (1988) (“[S]earch and information costs, bargaining and decision costs, policing and enforcement costs.”); Douglas W. Allen, *What are Transaction Costs?*, 14 RES. L. & ECON. 1 (1991).

"decision and execution costs."⁶⁰ Strategic behavior by parties, for instance, may prevent them from reaching a mutually acceptable resolution and is costly to overcome. Holdouts, bad faith bargaining, and other behavior may impede negotiations, notwithstanding the parties' ultimate desire to enter into a bargain. Even if the parties reach an agreement, the costs of monitoring compliance, which would be factored by the parties upfront both in terms of deciding what bargain they would accept and whether to come to the bargaining table in the first place, can also be a source of transaction costs.⁶¹

The second category of transaction costs reflects asymmetric information between the parties, or between the parties and an adjudicator. When there is private information that each party possesses and the other party does not, this affects how the bargaining is conducted (that is, the rules of the game), as well as the outcome or even the existence of the bargaining.⁶² For example, asymmetric information can impede successful bargaining when the parties assess the payoff of a bargain differently, or when one party does not know what the payoff will be. This can lead to failed bargaining or costly delays imposed on the other side—a strategy that may be pursued to force the other side to agree to a disadvantageous deal.⁶³

The presence of these transaction costs raises the question of how to design mechanisms that incentivize parties to avoid strategic behavior and reveal their information in a mutually-beneficial manner.⁶⁴ There are numerous articles dedicated to this question, and two leading articles in particular illustrate the relevance of the normative Coase theorem to the development of such mechanisms.

In the first article, Professor Richard Epstein examined a variety of legal scenarios in property and tort law, and asked the

60. Robert C. Ellickson, *The Case for Coase and Against Coaseanism*, 99 YALE L.J. 611, 615 (1989).

61. Medema, *supra* note 30 at 76, 80; see also NICHOLAS L. GEORGAKOPOULOS, ILLUSTRATING FINANCE POLICY WITH *MATHEMATICA* 4–9 (2018).

62. Indeed, there may be no bargaining outcome due to there being no acceptable outcome for either party or because of endless negotiation due to the inability of the parties to find a proper outcome. See Varouj A. Aivazian & Jeffrey L. Callen, *The Coase Theorem and the Empty Core*, 24 J.L. ECON. 175 (1981).

63. Joseph Farrell, *Information and the Coase Theorem*, 1 J. ECON. PERSP. 113, 115 (1987).

64. *Id.* at 116–18; see also Friedrich A. Hayek, *The Use of Knowledge in Society*, 35 AM. ECON. REV. 519 (1945).

following question⁶⁵: when two property owners are disputing each other's behavior, how would one single owner act if that single owner owned both parties' properties? Going back to our company-farmer example, the question would be how the company would behave if it were the sole owner of both the train and the crops. The company would account for the "externalities"⁶⁶ it would otherwise impose on the farmer and would not engage in any strategic behavior, especially holdout behavior. Therefore, the behavior of the company as a single owner indicates the ideal outcome if the company and the farmer were to bargain in the absence of transaction costs,⁶⁷ or, in the presence of high transaction costs, the ideal legal rule to minimize such costs. Epstein argued that the ideal legal rule would allow low-level damage that the company would have accepted if it were a single owner but would prohibit significant harm that the company would have avoided.⁶⁸ The law, therefore, would protect the farmer's property right to be free from sparks that cause fires in his fields but not from occasional smoke coming from the train.⁶⁹

In the second article, then Professor and now Judge Guido Calabresi and Professor Douglas Melamed also examined how

65. Epstein, *supra* note 33, at 553.

66. Economists define externalities as the "indirect effects of consumption or production activity, that is, effects on agents other than the originator of such activity which do not work through the price system." J.J. Laffont, *Externalities*, THE NEW PALGRAVE DICTIONARY OF ECONOMICS (2d ed. 2008). For example, when party A engages in an activity such as producing electricity in a power plant, the electricity production results in pollution that affects party A and party B when it crosses over into B's property. If A does not account for the harm it has caused B, then economists call the harm to B an externality. The cost of producing the electricity to A and any harm that A's pollution causes A itself is known as the private cost or harm to A, while A's private cost or harm plus the extra harm caused to B, and any other parties, is known as the public cost or harm. An externality is a situation where the public cost of the harm is different from the private cost of the harm. In other words, the harm imposes costs on society greater than the costs imposed on the party causing the harm. There can be positive externalities as well, such as when the public cost is less than the private cost, that is, the public benefit is greater than the private benefit. An example of this is a party whose house has a well-maintained garden that increases the value of the neighbors' property values, in addition to the increase in the house's increase in value.

67. Epstein, *supra* note 33, at 555–59.

68. *Id.* at 574–75.

69. *Id.* Epstein's article gives the example of someone barbequing meat and the smoke crossing into the neighbor's yard, which a single owner (and the common law) would allow, and someone whose activities cause flooding to the neighbor's property, which a single owner (and the law) would disallow.

the law handles various legal entitlements as well as the enforcement of such entitlements.⁷⁰ Returning to our company and farmer, the law can decide that the farmer has the entitlement to be free from the company's harmful operation of the train, or vice versa. In terms of enforcing his entitlement, the law can allow the farmer to prevent the company from operating the train (through an injunction or what the authors called a "property rule"), or simply require the company to pay compensation to the farmer (through what they called a "liability rule").⁷¹ What determines the entitlement and the mode of enforcement is, according to Calabresi and Melamed, a function of how efficient it is to bring the parties together. For example, when the company's train damages only one farmer's crops, the two possible solutions are both efficient. The law could give the farmer an entitlement to be free from the damage and enforce it via a property rule (an injunction). The law could also allow the company to pay off the farmer if the benefit to the company from operating the train is greater than the harm to the farmer. In either case, the two parties can reach an efficient solution.

In contrast, when the company's train damages many farmers' crops, the outcome may not be efficient. While the law could allow the farmers to shut down the company's operation of the train through a property rule (an injunction), such a rule would not result in an efficient bargaining outcome. To illustrate this, consider what would happen if there were ten farmers along the train tracks. If a property rule were in place and the farmers were entitled to be free of the damage, the company could stop operating the train or pay off the farmers, especially if the economic activity (the operation of the train) is worth more to the company than the costs to the farmers. But if there were ten farmers, an efficient resolution could be prevented by a holdout. The company could approach the first nine farmers and pay them the value of their harm, but the tenth farmer could hold out for a higher value. Of course, once other farmers figure this out, the inability to coordinate the payoffs could make it impossible for the company to pay all the farmers an amount that keeps its operations economically viable. To prevent inefficient holdout problems, the law tends to give the entitlement to be free

70. Calabresi & Melamed, *supra* note 33.

71. *Id.* at 1092.

from pollution to the farmers but enforces it through a liability rule (damages).⁷²

These two examples illustrate the main goal of the normative Coasean approach—to use legal rules to reduce transaction costs, and thereby resolve disputes efficiently. We now proceed to examine the operation of the normative Coasean approach in the context of fresh water disputes between U.S. states, before turning to international fresh water dispute resolution in Part III.

B. The Normative Coasean Approach and U.S. Interstate Fresh Water Dispute Resolution

In this Section, we first introduce the main water law doctrines operating in the United States and then turn to the Supreme Court's approach to interstate fresh water disputes. We argue that the normative Coasean approach is reflected both in the development of U.S. water law according to riparian rules in the eastern states and prior appropriation rules in the western states,⁷³ and in the Supreme Court's jurisprudence.

Eastern states, which follow riparian law, treat water as common property that belongs to all. Each landowner whose property borders a body of water is allowed to use the water in a reasonable manner.⁷⁴ In the event of conflicting uses, a harmful use may continue if its "utility outweigh[s] [the] gravity of the harm."⁷⁵ This rule makes sense in eastern states where water is abundant, and as such the landowners adjacent to a body of water are less likely to have disputes.⁷⁶

72. *Id.* at 1105–06 (citing *Boomer v. Atlantic Cement Co.*, 257 N.E.2d 870 (N.Y. 1970) (holding that the cement company could avoid an injunction against its pollution in exchange for paying permanent damages to the homeowners)).

73. A survey of various water laws across states is beyond the scope of this Article, but it is well documented in terms of the present state of the laws and their evolution. See, e.g., Norman K. Johnson & Charles T. DuMars, *A Survey of the Evolution of Western Water Law in Response to Changing Economic and Public Interest Demands*, 29 NAT. RES. J. 347 (1989).

74. ROBIN KUNDIS CRAIG ET AL., WATER LAW 15 (2017); Margaret Vick, *The Law of International Waters*, 12 CHI.-KENT J. INT'L & COMP. L. 143, 148–52 (2012).

75. Vick, *supra* note 74, at 152.

76. This is, of course, dependent on the relative abundance of water in the eastern states. As water has become scarcer in these states due to droughts or a rise in consumption, eastern states have also had to modify their riparian rules. See Joseph W. Dellapenna, *Water Law in the Eastern United States*, 26 ENERGY & MIN. L. INST. 367, 367 (2005) ("Historically, water disputes have been common in the 17 western states and rare in the rest of the United States. The reason for this is pretty

In western states, where water is more scarce and the climate is arid, the law developed to solve what economists call the “tragedy of the commons”—when there is a common resource that many have access to, there is no incentive for anyone to conserve it.⁷⁷ Indeed, the incentive is for all to deplete the resource before anyone else does. The solution economists usually propose for the tragedy of the commons is to privatize the commons, or at least generate a system of incentives so that stakeholders are encouraged to manage and preserve the resource efficiently.⁷⁸ Accordingly, water law in the western states has developed a rule of prior appropriation, which has two basic principles: “first in time, first in right” and “use it or lose it.”⁷⁹ This means that the first person who obtains the right to use a common water resource always has first rights of usage up to the amount that person owns. Once that amount has been used, the next owner can use any remaining water to fulfill their allotted amount. To prevent speculative holding, the law requires the first owner to actually use the water or the next owner gets to step in and use it.⁸⁰ This legal regime has overcome much of the common-pool problem that riparian law created in the arid western states, and has resulted in a more efficient usage of the water in these states.⁸¹

obvious: in the 17 western states, water often was relatively scarce, and demand for water quickly outstripped supplies.”). The growing scarcity of water in these eastern states has led to the development of what Dellapenna calls “regulated riparianism.” *Id.* at 395; *see also* Vick, *supra* note 74, at 152–54.

77. Garrett Hardin, *The Tragedy of the Commons*, 162 *SCIENCE* 1243 (1968).

78. Mike Ellerbrock et al., *Sustaining the Commons: The Tragedy Works Both Ways*, 28 *BULL. SCI., TECH. & SOC'Y* 256, 256 (2008) (“[E]conomists . . . have wrestled with solving the [tragedy of the commons] and settled on two main approaches: privatize ownership or restrict access via government or communal regulation. The assumption is that private property owners have a strong incentive to manage natural assets . . . in a sustainable manner . . .”).

79. CRAIG ET AL., *supra* note 74, at 43.

80. *Id.* at 43–44.

81. Bryan Leonard & Gary D. Libecap, *Collective Action by Contract*, 62 *J.L. & ECON.* 67 (2019) (providing empirical evidence that when western states switched to prior appropriation from the riparian rules, “prior appropriation facilitated cooperation through contracting, increasing infrastructure investment, and promoting irrigated agriculture”); Mark T. Kanazawa, *Efficiency in Western Water Law, 1850–1911*, 27 *J. LEGAL STUD.* 159, 159 (1998) (providing empirical evidence that in the development of early California water law, which was a hybrid of both riparian and prior appropriation rules, “jurists selectively promoted appropriative claims in situations of high transactions costs in order to encourage reallocation of water from existing riparian uses”).

Of course, there is no uniform prior appropriation rule for all western states, or even within each state. Different prior appropriation rules have evolved as a result of judicial and legislative mandates to address deficiencies in existing rules and to encourage efficient water use in the face of changing availability, consumption, and climate conditions.⁸² This is all to say that water law can develop along the lines of efficient legal rules, per the normative Coase theorem. No doubt the frequency of litigation over water, especially in the western states, has led to the development of, or at least a convergence towards, an efficient set of rules.⁸³

When it comes to fresh water disputes between U.S. states, the situation is more complicated. The stakes are higher, and because the litigants are sovereigns, the suits are subject to the Supreme Court's original jurisdiction.⁸⁴ The Supreme Court has attempted to formulate a set of rules for adjudicating fresh water disputes between states. The main rule is known as "equitable apportionment,"⁸⁵ which has been developed in a long series of

82. J. David Aiken, *Development of the Appropriation Doctrine Adapting Water Allocation Policies to Semiarid Environs*, 507 GREAT PLAINS Q. 38, 40–41 (1988); David H. Getches, *Water Use Efficiency: The Value of Water in the West*, 8 PUB. LAND L. REV. 1, 5 (1987).

83. There is a school of thought within the Law and Economics literature that one of the reasons the common law is efficient is the frequency of litigation, especially over inefficient legal rules. See RICHARD POSNER, *ECONOMIC ANALYSIS OF THE LAW* (9th ed. 2007); Paul H. Rubin, *Why Is the Common Law Efficient?*, 6 J. LEGAL STUD. 51 (1977); George L. Priest, *The Common Law Process and the Selection of Efficient Rule*, 6 J. LEGAL STUD. 65 (1977); Jeffrey E. Stake, *Evolution of Rules in a Common Law System*, 32 FLA. STATE U. L. REV. 401 (2005). In response to this literature, some have argued that the common law, especially today, has evolved in a manner that rewards litigating rent-seekers. See, e.g., Nuno Garoupa & Carlos G. Ligüerre, *The Syndrome of the Efficiency of the Common Law*, 29 B.U. INT'L L.J. 287 (2011); Todd J. Zywicki, *The Rise and Fall of Efficiency in the Common Law*, 97 NW. U. L. REV. 1551 (2003).

84. U.S. CONST. art. III, § 2 (giving the Supreme Court original jurisdiction over disputes "between two or more states").

85. The guiding principles underlying the application of this rule are as follows: (1) states possess "an equal right to make a reasonable use" of shared fresh water resources; (2) in the face of competing claims to such resources, the Supreme Court's "effort always is to secure an equitable apportionment without quibbling over formulas"; (3) "a complaining State's burden is 'much greater' than the burden ordinarily shouldered by a private party seeking an injunction. Among other things, it must demonstrate, by 'clear and convincing evidence,' that it has suffered a 'threatened invasion of rights' that is 'of serious magnitude,'" and that it has "a right with a corresponding benefit"; (4) equitable apportionment is "flexible" and not "formulaic," and the Supreme Court seeks to "arrive at a 'just and equitable apportionment' of an interstate stream" by "consider[ing] 'all relevant factors.'" *Florida v. Georgia*, 138 S. Ct. 2502, 2506 (2018) (internal citations omitted).

cases starting with *Kansas v. Colorado*.⁸⁶ In that dispute, Kansas challenged Colorado's diversion of water from the Arkansas River.⁸⁷ Despite Kansas being a riparian state and Colorado a prior appropriation state, the Supreme Court declined to adopt either regime in resolving the dispute.⁸⁸ Rather, it held that "the diminution of the flow of water in the river by the irrigation of Colorado has worked some detriment to the southwestern part of Kansas."⁸⁹ Nonetheless, "the amount of this detriment," when compared "with the great benefit . . . to the counties in Colorado," weighed against "any interference with the present withdrawal of water in Colorado for purposes of irrigation."⁹⁰

This statement reflects a Coasean-like approach to water apportionment between states. It focuses on the objectively assessable balance of harms to the exclusion of other, more subjective considerations that are difficult to define. However, this statement of the Court was followed by the observation that "if the depletion of the waters of the river by Colorado continues to increase there will come a time when Kansas may justly say that there is no longer an equitable division of benefits."⁹¹ This injection of "equity" into the analysis signaled the birth of the equitable appropriation doctrine. Putting the doctrine into practice has proved very difficult to do, as subsequent disputes at the Supreme Court have demonstrated.⁹² While the equitable appropriation approach seems fair and flexible, it is also "imprecise,

86. *Kansas v. Colorado*, 206 U.S. 46 (1907). We note that three legal regimes govern interstate water disputes in the United States. The first is the equitable apportionment doctrine that governs when two states seek a judicial remedy from the Supreme Court. The second is congressional apportionment, which is a legislative approach whereby Congress legislatively allocates the water. The third is interstate compacts, where states agree among themselves on the allocation. Rhett B. Larson, *Inter-State Water Law in the United States of America: What Lessons for International Water Law?*, 2 INT'L WATER L. 1, 6 (2017). We only address equitable apportionment since Congressional apportionment is less relevant to the normative Coasean approach while interstate compacts, while very Coasean-like, are beyond the scope of this Article.

87. CRAIG ET AL., *supra* note 74, at 175.

88. *Kansas*, 206 U.S. at 46.

89. *Id.* at 113–14.

90. *Id.*

91. *Id.* at 117. The Court could have simply noted that if the depletion by Colorado continues to increase, there may come a time when the harm to Kansas would outweigh the benefit to Colorado, thereby shifting the balance of harms in favor of Kansas.

92. ITZCHAK KORNFIELD, TRANSBOUNDARY WATER DISPUTES, 132–237 (2019) (finding that the various cases he analyzed have taken decades to resolve between

unpredictable, and perhaps above all unlawyerlike—when the law says, in effect, that the Supreme Court should do whatever is fair”⁹³ Partly because the Supreme Court has been reluctant to step in and apportion interstate fresh water resources,⁹⁴ the equitable apportionment rule has resulted in protracted interstate negotiations, demonstrating that the rule is not well designed. Some have called equitable appropriation a “vague, if not meaningless, standard” that renders the Supreme Court incapable of dealing with “the mass of technical data introduced into evidence litigation.”⁹⁵

One of the latest interstate water disputes, which arose between Florida and Georgia, is illustrative of the equitable apportionment rule’s failings. The two states signed an agreement in 1992 in which they “committed to a process for cooperative management and development” of their shared water resources.⁹⁶ The agreement ultimately expired, and Florida and Georgia failed to settle their disputes, despite the Court’s preference, if not admonition, for them to do so.⁹⁷ In 2013, Florida filed a lawsuit at the Supreme Court.⁹⁸ The Court appointed a special mas-

initial evidentiary hearings and appeals). Indeed, the original dispute between Kansas and Colorado dragged on for over 100 years.

93. Josh Patashnik, *Arizona v. California and the Equitable Apportionment of Interstate Waterways*, 56 ARIZ. L. REV. 1, 3, 17 (2014) (“For more than forty years, the Court had resolved equitable apportionment cases—original jurisdiction actions between states seeking a division of shared water resources—principally by applying the doctrine of prior appropriation, the longstanding principle of Western water law that earlier-in-time water users have priority over those who come later. In 1963, the Justices understood that faithful adherence to that doctrine would have dictated an outcome in favor of already-developed California.”).

94. “This Court has recognized for more than a century its inherent authority, as part of the Constitution’s grant of original jurisdiction, to equitably apportion interstate streams between States. But we have long noted our ‘preference’ that States ‘settle their controversies by mutual accommodation and agreement.’” *Florida v. Georgia*, 138 S. Ct. 2502, 2509 (2018) (quoting *Arizona v. California*, 373 U.S. 546, 564 (1963)) (internal citations omitted).

95. Charles J. Meyers, *The Colorado River*, 19 STAN. L. REV. 1, 50 (1966). See also George W. Sherk, *Equitable Apportionment After Vermejo: The Demise of a Doctrine*, 29 NAT. RES. J. 565, 583 (1989) (“Because of the burden of proof requirements established by the Supreme Court . . . equitable apportionment actions are no longer viable alternatives by which interstate water conflicts may be resolved. Consequently, existing dispute resolution mechanisms such as interstate stream compacts and federal legislation have taken on new importance. New dispute resolution mechanisms (arbitration, mediation, marketplace) are sure to emerge.”).

96. *Florida*, 138 S. Ct. at 2509–10 (quoting Joint Exh. 004, at 1).

97. *Id.*

98. *Id.*

ter to collect evidence and submit a report with recommendations on the outcome of the case.⁹⁹ The master presided over eighteen months of discovery that produced “7.2 million pages of documents.”¹⁰⁰ The master concluded that “[a]s a *threshold matter*, equitable apportionment is only available to a state that has suffered ‘real and substantial injury’ as a result of proposed or actual upstream water use,” and “*the injury must be redressable by the Court.*”¹⁰¹ The master then found that Florida had been harmed by Georgia’s usage of their shared rivers, but that any order issued against Georgia could not be guaranteed to help Florida’s depletion of water resources.¹⁰²

The Supreme Court determined that the master had improperly applied the law when it came to the question of the proper remedy for Florida and remanded the case back for further evidentiary proceedings.¹⁰³ Insisting on the application of the equitable apportionment rule, the Court noted that “equitable apportionment is ‘flexible,’ not ‘formulaic,’ [and] will seek to arrive at a ‘just and equitable apportionment of an interstate stream’ by considering ‘all relevant factors.’”¹⁰⁴ The Court went on to list numerous factors that must be considered when fashioning a remedy, including:

[P]hysical and climatic conditions, the consumptive use of water in the several sections of the river, the character and rate of return flows, the extent of established uses, the availability of storage water, the practical effect of wasteful uses

99. *Id.* at 2510–11.

100. *Id.* at 2511 (internal citations omitted).

101. *Id.* at 2512 (quoting Report of the Special Master at 24, *Florida*, 138 S. Ct. 2502 (No. 142), 2017).

102. *Id.* at 2512. The reason was that the master found that the United States (through the United States Army Corps of Engineers) was a key player in the control of water between the two states. Because the United States had not waived its sovereign immunity, it could not be ordered to do anything. *Id.*

103. The Court remanded with instructions to make findings concerning the following questions: “(1) whether Florida suffered harm caused by decreased water flow into the Apalachicola River; (2) whether Florida showed that Georgia’s use of the Flint River is inequitable; (3) whether that potentially inequitable use harmed Florida; (4) whether an equity based cap on Georgia’s use of Flint River waters would materially increase streamflow in the Apalachicola River given the Corps’ operational rules or reasonable modifications that could be made to those rules; and (5) whether such additional streamflow in the Apalachicola River may significantly redress the economic and ecological harm that Florida has suffered.” Report of the Special Master, *supra* note 101, at 3.

104. *Florida*, 138 S. Ct. at 2515 (quoting *South Carolina v. North Carolina*, 558 U.S. 256, 271 (2010) (internal citations omitted)).

on downstream areas, [and] the damage to upstream areas as compared to the benefits to downstream areas if a limitation is imposed on the former.¹⁰⁵

Recognizing that these varied considerations cannot be easily balanced, the Court noted, in a rather Coasean fashion, that ultimately “Florida will be entitled to a decree only if it is shown that ‘the benefits of the [apportionment] substantially outweigh the harm that might result.’”¹⁰⁶ This balancing exercise was still to be undertaken, however, to attain the elusive goal of “equitable apportionment.”¹⁰⁷

In dissent, Justice Clarence Thomas noted the complex evidence that was produced during the proceedings before the special master. He observed that while Florida had shown harm from Georgia’s actions, it could not show concrete benefits from any remedy ordered by the master or, ultimately, the Court. Rejecting the majority’s remand for more evidentiary hearings, he stated that the “balance-of-harms analysis” required Florida to “prove[] that its requested cap on Georgia’s water use would appreciably benefit it.”¹⁰⁸

Today, the case is no closer to being resolved than when the suit was filed in 2013.¹⁰⁹ The Florida-Georgia dispute therefore illustrates that when a vague principle laden with multiple factors is the governing legal rule, even sensible jurists, including the special masters who are privy to all the evidence and specialize in the resolution of interstate fresh water disputes,¹¹⁰

105. *Id.* (citation omitted).

106. *Id.* at 2527 (quoting *Colorado v. New Mexico*, 459 U.S. 176, 187 (1982)).

107. *Id.* at 2511 (noting that the “ordinary balance-of-harms test” is required for equitable apportionment); *id.* at 2513 (“Where, as here, the Court is asked to resolve an interstate water dispute raising questions beyond the interpretation of specific language of an interstate compact, the doctrine of equitable apportionment governs our inquiry.”).

108. *Id.* at 2535 (Thomas, J., dissenting).

109. The second special master issued a Report on remand on December 11, 2019, and it is before the Supreme Court at the time of writing. It recommends that “the Supreme Court [not] grant Florida’s request for a decree equitably apportioning the waters of the ACF Basin because the evidence has not shown harm to Florida caused by Georgia; the evidence has shown that Georgia’s water use is reasonable; and the evidence has not shown that the benefits of apportionment would substantially outweigh the potential harms.” Report of the Special Master at 81, *Florida v. Georgia*, 140 S. Ct. 951 (2020) (Mem.) (No. 142), 2019.

110. Larson, *supra* note 86, at 24; see Anne-Marie Carstens, *Lurking in the Shadows of Judicial Process: Special Masters in the Supreme Court’s Original Jurisdiction Cases*, 86 MINN. L. REV. 625, 641–58 (2002) (providing an overview of all

cannot seem to agree on the proper outcome. This hardly makes for a successful recipe for the efficient resolution of interstate water disputes.¹¹¹

The American equitable apportionment doctrine ultimately permeated into IWL in the form of the equitable and reasonable utilization principle¹¹² discussed previously. As we argue in the next Part, the prospects of this principle operating effectively in the resolution of international fresh water disputes are even lower than in the domestic context. Even if bargaining can take place between states internationally, there is a difference between bargaining in the shadow of hard law, as in domestic legal regimes where ultimately a legal rule may be applied and enforced, and in the shadow of soft law or no law at all, as is the case in some areas of international law where ultimately enforcement is voluntary.¹¹³ Therefore, it is even more important to properly design the starting point for soft legal regimes if the goal is to achieve a result that will ensure a resolution of the dispute and compliance by all.

II. THE NORMATIVE COASE THEOREM IN INTERNATIONAL FRESH WATER DISPUTE RESOLUTION

In the context of international fresh water dispute resolution, transaction costs can manifest in various forms. For instance, states may not have an accurate sense of what their own valuation of a shared water resource is when deciding what bargain to enter into with another state.¹¹⁴ States may also wish to

special masters that the Supreme Court has appointed and their expertise and backgrounds).

111. See KORNFELD, *supra* note 92 (discussing three other interstate water disputes at the Supreme Court). All of his case studies were marred by prolonged proceedings resulting from large uncertainty over how to apply the equitable apportionment rule between the states' shared water resources. It is not surprising that states have pursued alternative solutions through congressional action or Coasean interstate compacts. See Larson, *supra* note 86, at 291.

112. McCaffrey, *supra* note 39, at 291.

113. The terms "soft" and "hard" law are well known in the legal literature. See, e.g., Gregory C. Shaffer & Mark A. Pollack, *Hard vs. Soft Law*, 94 MINN. L. REV. 706, 712-26 (2009) (surveying the various definitions and theories surrounding the concepts of soft and hard law).

114. That a government lacks accurate information is an old problem identified by economists and others. See, e.g., Hayek, *supra* note 64, at 519. There can also be strategic reasons why governments cannot obtain such information. See, e.g.,

engage in strategic behavior to achieve the most favorable outcome, leading to a deadlock in negotiations. Monitoring, implementation, and enforcement costs are very real costs even after an agreement is reached or a judgment is rendered by an adjudicator.¹¹⁵ And of course, the lack of a "supranational authority for monitoring and enforcement, . . . a common methodology for information gathering, and . . . [a] standard procedure to determine quantities and prices" are also sources of transaction costs, regardless of whether states wish to negotiate or submit to binding adjudication.¹¹⁶ In the presence of such high transaction costs, bargaining may break down and an optimal allocation of the disputed water resource may not be achieved. This is where the normative Coasean approach may prove useful.

As explained previously, the normative Coase theorem suggests that existing legal rules should lower transaction costs and thereby facilitate the efficient resolution of disputes.¹¹⁷ In this Part, we return to the two problems set out in the Introduction concerning the current formulation of the three principles of IWL. We first discuss the tension between the equitable and reasonable utilization and no significant harm principles. We apply the normative Coasean approach and suggest treating no significant harm as the guiding principle of IWL in the resolution of international fresh water disputes. We then turn to the limited role of the duty to cooperate in the actual dispute resolution process. We again apply the normative Coasean approach and suggest treating the duty to cooperate as an independent principle that imposes obligations on states both prior to and during the dispute resolution process.

Wendy E. Wagner, *Commons Ignorance: The Failure of Environmental Law to Produce Needed Information on Health and the Environment*, 53 DUKE L.J. 1619 (2004).

115. Dombrowsky, *supra* note 32, at 129.

116. Ansink & Houba, *supra* note 32, at 447.

117. In the international water law arena, when two countries are arguing over the allocation of water, economically efficient allocations would undoubtedly also impact the incomes of the two nations. Assessing how to evaluate income transfers and fairness concepts in the aggregate becomes quite complicated. We note that because this Article aims to develop rules that lower transaction costs and allow the parties to reach an optimal solution through bargaining, such fairness concerns will most likely be part of this bargaining and any final resolution of a dispute.

A. *Problem 1: The Equitable and Reasonable Utilization and No Significant Harm Principles*

As noted above, the concurrent application of the equitable and reasonable utilization and no significant harm principles to international fresh water disputes gives rise to tensions in the resolution of such disputes.¹¹⁸ To resolve these tensions, the prevailing view in IWL treats no significant harm as subordinate to equitable and reasonable utilization, and considers the latter as the governing principle of IWL. Accordingly, any harm caused or sustained by a state only plays a subsidiary role in the process of arriving at an equitable allocation, whatever such an allocation might entail.¹¹⁹ This view was adopted, for instance, in the

118. A dominant approach in IWL scholarship treats the two principles as complementary, applying them in tandem. See, e.g., Int'l Law Ass'n, *supra* note 24, art. 12(1); Int'l Law Comm'n, *Rep. on Its Sixtieth Session*, at 22, 40–41, U.N. Doc. A/63/10 (2008), reprinted in [2008] 2 Y.B. Int'l L. Comm'n 1, U.N. Doc. A/CN.4/SER.A/2008/Add.1 (Part 2); *Pulp Mills on River Uruguay (Arg. v. Uru.)*, Judgment, 2010 I.C.J. Rep. 14, ¶¶ 139, 175, 177 (Apr. 20) (“[U]tilization could not be considered to be equitable and reasonable if the interests of the other riparian State in the shared resource and the environmental protection of the latter were not taken into account.”).

However, as already noted, international fresh water disputes, such as the GERD dispute between Egypt and Ethiopia, often invoke conflicting claims under the no significant harm and the equitable and reasonable utilization principles. In such scenarios, the concurrent application of these principles risks states clinging to contradictory interpretations that suit their unilateral interests, thereby aggravating the dispute rather than resolving it. Some members of the ILC identified early on the potential conflict between these principles. Stephen C. McCaffrey (Special Rapporteur), *Preliminary Rep. on the Law of the Non-Navigational Uses of International Watercourses*, at 95, ¶ 43, U.N. Doc. A/CN.4/393 (1985) (“[C]ertain representatives referred to a potential conflict between the determination of reasonable and equitable use of a watercourse . . . and the prohibition of activities causing appreciable harm . . .”). Therefore, this approach to the relationship between the equitable and reasonable utilization and no significant harm principles is inefficient from a Coasean perspective.

119. See MCCAFFREY, *supra* note 39 at 385; Stephen C. McCaffrey (Special Rapporteur), *Second Rep. on the Law of the Non-Navigational Uses of International Watercourses*, at 133, ¶ 181, U.N. Doc. A/CN.4/399 (1986), reprinted in [1986] 2 Y.B. Int'l Law Comm'n 87, U.N. Doc. A/CN.4/SER.A/1986/Add.1 (Part 1). See also Salman M.A. Salman, *The Future of International Water Law*, in LOOKING TO THE FUTURE: ESSAYS ON INTERNATIONAL LAW IN HONOR OF W. MICHAEL REISMAN 907, 915 (Mahnoush H. Arsanjani et al. eds., 2011); Alistair Rieu-Clarke & Flavia Rocha Loures, *Still Not in Force: Should States Support the 1997 UN Watercourses Convention?*, 18 REV. EUR., COMPAR. & INT'L ENV'T L. 185 (2009); OWEN MCINTYRE, ENVIRONMENTAL PROTECTION OF INTERNATIONAL WATERCOURSES UNDER INTERNATIONAL LAW (2007); Lucius Caflisch, *The Law of International Watercourses: Achievements and Challenges*, in INTERNATIONAL LAW AND FRESHWATER: THE MULTIPLE CHALLENGES, *supra* note 38, at 24, 31; Owen McIntyre, *International Water Resources Law and the International Law Commission Draft Articles*

UNWC—the main global instrument codifying the principles of IWL.¹²⁰

However, this approach has proven unhelpful in guiding the resolution of international fresh water disputes and, from a normative Coasean perspective, fails both the “single owner” and the “liability/property” approaches discussed in the previous Part. Therefore, we propose that the no significant harm principle should be the guiding principle of IWL in the resolution of international fresh water disputes. As we will explain below, doing so avoids the deficiencies of the equitable and reasonable utilization principle. It also reduces transaction costs by focusing

on *Transboundary Aquifers*, 13 INT'L CMTY. L. REV. 237, 244 (2011); *User's Guide Fact Sheet Series: Number 5, No Significant Harm Rule*, UN WATERCOURSES CONVENTION, <https://www.unwatercoursesconvention.org/documents/UNWC-Fact-Sheet-5-No-Significant-Harm-Rule.pdf> [<https://perma.cc/3EFE-3H7S>].

120. See Alistair Rieu-Clarke, *International Freshwater Law*, in ROUTLEDGE HANDBOOK OF INTERNATIONAL ENVIRONMENTAL LAW 243, 253 (Shawkat Alam et al. eds., 2013); Salman M.A. Salman, *The Helsinki Rules, the UN Watercourses Convention and the Berlin Rules*, 23 INT'L J. WATER RES. DEV. 625, 633 (2007); Charles B. Bourne, *The Case Concerning the Gabčíkovo-Nagymaros Project: An Important Milestone in International Water Law*, 8 Y.B. INT'L ENV'T L. 6, 10 (1997), but see ATTILA TANZI & MAURIZIO ARCARI, *THE UNITED NATIONS CONVENTION ON THE LAW OF INTERNATIONAL WATERCOURSES* 179 (2001) (arguing that the fact that significant harm appears merely as one factor in the determination of the equitable nature of a use was not intended to render the no harm rule subservient to the equitable utilization principle. Rather, it only stresses that the latter is inherent in the former and vice versa).

Some view any subordination of the no significant harm principle to the equitable and reasonable utilization principle under the UNWC as limited to water allocation and use issues. Pollution or environmental protection issues fall under Part IV of the Convention, which provides in Article 21 that states shall “prevent, reduce and control the pollution of an international watercourse that may cause significant harm to other watercourse States or to their environment, including harm to human health or safety, to the use of the waters for any beneficial purpose or to the living resources of the watercourse.” UNWC, *supra* note 10, at art. 21. MCCAFFREY, *supra* note 39, at 430 (“[P]roblems of allocation rather than pollution or environmental protection were foremost in the minds of those formulating the text” of art. 7(2) of the UNWC). This argument seems to be undermined, however, by the commentary to the UNWC, which states that Part IV is “a specific application of the general principles contained in articles 5 and 7.” Attila Tanzi, U.N. Econ. Comm'n for Eur., *The Economic Commission for Europe Water Convention and the United Nations Watercourses Convention: An Analysis of Their Harmonized Contribution to International Water Law*, at 30, U.N. Doc. ECE/MP.WAT/42 (2015), http://www.unece.org/fileadmin/DAM/env/water/publications/WAT_Comparing_two_UN_Conventions/ece_mp_wat_42_eng_web.pdf [<https://perma.cc/MU5Q-4AK3>], and in light of the “interconnection between water quantity and water quality issues and the indivisibility of international regulation thereof.” Int'l Law Comm'n, *Rep. on the Work of Its Forty-sixth Session*, U.N. Doc. A/49/10, at 122 (1994), *reprinted in* [1994] 2 Y.B. Int'l L. Comm'n 1, U.N. Doc. A/CN.4/SER.A/1994/Add.1 (Part 2).

the dispute resolution process on the harm that is greater overall and should thus be avoided.

1. The Equitable and Reasonable Utilization Principle

Much like the equitable apportionment rule in U.S. water law, the value of equitable and reasonable utilization as the leading principle of IWL is questionable from a normative Coasean perspective. The practical challenge of determining what constitutes each state's "fair share," and what conduct or use should be considered "equitable and reasonable," is formidable. It is also susceptible to subjective and contradictory interpretations,¹²¹ which increase the cost of reaching a mutually acceptable solution. Even where referenced in water agreements, "existing formulations of the principle of equitable utilization provide little or no guidance as to the different weights to be given to alternative interpretations of law, competing legal provisions or competing preexisting rights."¹²² This principle may therefore, in Coase's words, "lead to the protection of those responsible for harmful effects being carried too far."¹²³

Moreover, equitable and reasonable utilization was intended to govern the apportionment of shared fresh waters rather than prevent adverse effects on other states or the environment, which are often the issues giving rise to international fresh water disputes.¹²⁴ Since this principle permits significant

121. HILAL ELVER, PEACEFUL USES OF INTERNATIONAL RIVERS 136–37 (2002); Stephen M. Schwebel (Special Rapporteur), *Third Rep. on the Law of the Non-Navigational Uses of International Watercourses*, at 87, ¶ 92, U.N. Doc. A/CN.4/345 and Corr.1 (Dec. 11, 1981), reprinted in [1982] 2 Y.B. Int'l L. Comm'n 65, U.N. Doc. A/CN.4/SER.A/1982/Add.1 (Part 1).

122. Owen McIntyre, *Utilization of Shared International Freshwater Resources*, 38 WATER INT'L 112, 121 (2013). For instance, the UNWC provides in Article 6, a non-exhaustive list of factors to be considered in determining whether a particular use of a shared fresh water resource is "equitable and reasonable." UNWC, *supra* note 10. However, this list does not provide sufficient detail on how to arrive at an acceptable water allocation and runs the risk of steering states towards equalization rather than equitable water allocation. See Bruce Lankford, *Does Article 6 (Factors Relevant to Equitable and Reasonable Utilization) in the UN Watercourses Convention Misdirect Riparian Countries?*, 38 WATER INT'L 130, 131 (2013); Meredith A. Giordano & Aaron T. Wolf, *Transboundary Freshwater Treaties*, in INTERNATIONAL WATERS IN SOUTHERN AFRICA 71, 74–75 (Mikiyasu Nakayama ed., 2003).

123. Coase, *supra* note 35, at 28.

124. MCCAFFREY, *supra* note 39, at 445 ("[E]quitable utilization is chiefly a doctrine governing apportionment, or allocation, of water between states sharing an

harm whenever it is “inflicted in the endeavour to achieve equitable and reasonable utilization of an international watercourse,” it risks compromising the environmental protection of shared fresh water resources.¹²⁵

The International Court of Justice’s (ICJ) 1997 decision in the *Gabčíkovo-Nagymaros* dispute between Hungary and Slovakia is a case in point. The parties’ dispute concerned the joint construction and operation of a barrage system on the trans-boundary Danube River. Hungary suspended and subsequently abandoned the project, in response to which Slovakia proceeded to complete the project unilaterally. In the process, Slovakia dammed the Danube River, diverting its waters. Slovakia challenged before the Court Hungary’s suspension of the project, while Hungary challenged Slovakia’s damming of the river. The Court found, *inter alia*, that Hungary was not entitled to suspend and subsequently abandon the project and that Slovakia was not entitled to put into operation the barrage system by damming the river. The Court also held that Hungary and Slovakia must negotiate in good faith and compensate each other for their unlawful acts.¹²⁶

In its reasoning, the Court declared equitable and reasonable utilization as the guiding principle of IWL¹²⁷ while making no explicit reference to the no significant harm principle,¹²⁸ even

international watercourse . . . any harm sustained by one state or another, as a result of an insufficient quantity of water, plays only a subsidiary role in the process of arriving at an equitable allocation . . . [t]he preferable approach would clearly be a holistic one, which explicitly takes into account considerations of both allocation and protection. On the international plane the concept of equitable utilization itself has, to some extent, been asked to perform both of these functions, which has resulted in a degree of confusion and perhaps in an overloading of a principle whose implementation is already a complex matter.”).

125. Helal, *supra* note 13, at 364.

126. There are many more important aspects to the *Gabčíkovo-Nagymaros* dispute and ICJ decision. See, e.g., THE GABČÍKOVO-NAGYMAROS JUDGMENT AND ITS CONTRIBUTION TO THE DEVELOPMENT OF INTERNATIONAL LAW (Serena Forlati et al. eds., 2020).

127. *Gabčíkovo-Nagymaros Project* (Hung./Slovk.), Judgment, 1997 I.C.J. Rep. 7, ¶ 78 (Sept. 25) (“The suspension and withdrawal of that consent . . . cannot mean that Hungary forfeited its basic right to an equitable and reasonable sharing of the resources of an international watercourse.”); *id.* ¶ 85 (“Czechoslovakia, by unilaterally assuming control of a shared resource, . . . thereby depriv[ed] Hungary of its right to an equitable and reasonable share of the natural resources of the Danube. . .”).

128. *Id.* ¶ 140 (“[V]igilance and prevention are required on account of the often irreversible character of damage to the environment.”); *id.* ¶ 53 (“The existence of the general obligation of States to ensure that activities within their jurisdiction and control respect the environment of other States or of areas beyond national

though the latter was heavily relied upon by Hungary in its submissions to the Court.¹²⁹ Yet, the Court failed to actually apply equitable and reasonable utilization to assess the impacts of the Danube's diversion on the region's ecology, or to seriously evaluate the data concerning the quantity and quality of water required to maintain a balanced natural and human environment.¹³⁰ Instead, the Court left it up to Hungary and Slovakia to determine how, precisely, the equitable and reasonable principle should be applied in the resolution of their dispute.¹³¹ Coase would likely have been unsurprised to find that Hungary and Slovakia have yet to agree on how to implement the Court's judgment.

In sum, the right of states to share equitably in the use of international fresh water resources may be "indisputable and undisputed" in theory, but the application of the equitable and reasonable utilization principle to the actual resolution of international disputes concerning such resources is less obvious.¹³² The equitable and reasonable utilization principle may prove inapt to achieve a balancing of economic and ecological imperatives and to assist states in considering the actual harm that is,

control is now part of the corpus of international law relating to the environment.") (citing *Legality of the Threat or Use of Nuclear Weapons*, Advisory Opinion, 1996 ICJ 2 (July 8, 1996)). However, the ICJ so noted specifically regarding "environmental protection," *id.* ¶ 140, and the defense of necessity, *id.* ¶ 53, and did not address the parties' arguments regarding the no significant harm principle in international water law.

129. *Gabčíkovo-Nagymaros Project*, Memorial of Republic of Hungary, 1994 I.C.J. 1, ¶¶ 1.04, 3.93, 5.44, 5.139, 7.44–7.56, 7.81 (May 2).

130. Stephen Stec & Gabriel E. Eckstein, *Of Solemn Oaths and Obligations: The Environmental Impact of the ICJ's Decision in the Case Concerning the Gabčíkovo-Nagymaros Project*, 8 Y.B. INT'L ENV'T L. 41, 45 (1997); A.E. Boyle, *The Gabčíkovo-Nagymaros Case: New Law in Old Bottles*, 8 Y.B. INT'L ENV'T L. 13, 18 (1997). For a contrary view on the contribution of the decision to international environmental law, see, for example, Leslie-Anne Duvic-Paoli, *Vigilance and Prevention: The Contribution of the Gabčíkovo-Nagymaros Judgment*, in *THE GABČÍKOV-NAGYMAROS JUDGMENT AND ITS CONTRIBUTION TO THE DEVELOPMENT OF INTERNATIONAL LAW*, *supra* note 126, at 193.

131. Awn S. Al-Khasawneh, *Do Judicial Decisions Settle Water-Related Disputes?*, in *INTERNATIONAL LAW AND FRESHWATER: THE MULTIPLE CHALLENGES*, *supra* note 38, at 341, 353; Mari Nakamichi, *The International Court of Justice Decision Regarding the Gabčíkovo-Nagymaros Project*, 9 FORDHAM ENV'T L. REV. 337 (2017); Jana Liptáková, *Gabčíkovo Turns 25*, SLOVAK SPECTATOR (Nov. 3, 2017), <https://spectator.sme.sk/c/20686327/gabcikovo-turns-25.html> [<https://perma.cc/G4EB-VWAD>].

132. Schwebel, *supra* note 121, ¶ 85.

or might be, caused.¹³³ According to Coase, such a balancing exercise should result in “practical arrangements which will correct defects in one part of the system without causing more serious harm in other parts.”¹³⁴

From a normative Coasean perspective, the equitable and reasonable utilization principle therefore fails both approaches set out in the previous Part and is unlikely to lead to the efficient resolution of international fresh water disputes. It fails the “single owner” approach because it provides no objective benchmark for determining what use is in fact “equitable and reasonable,” and thus what a state owning the entire fresh water resource might do. Because it fails to provide an objective benchmark, different states interpret the equitable and reasonable utilization principle in contradicting ways—thus limiting its ability to resolve disputes efficiently. The equitable and reasonable utilization principle also cannot operate as either a property or a liability rule. It does not provide for specific legal entitlements of disputing states, for instance by prioritizing the various factors that could be considered in determining whether a particular use is “equitable and reasonable.” The principle also does not provide for the manner in which such entitlements could be enforced by way of a property or a liability rule to achieve an efficient resolution of disputes. In contrast, the no significant harm principle better reflects these normative Coasean approaches and should thus be viewed as the guiding principle of IWL in the resolution of fresh water disputes.

2. The No Significant Harm Principle

Contrary to some popular perceptions of the no significant harm principle, it is not designed to unilaterally protect against harm caused to a state’s prior uses by the new activities of another state. Rather, it is aimed at striking a balance between one state’s development possibilities and another state’s existing uses by preventing unilateral actions that cause significant

133. Paulo Canelas De Castro, *The Judgment in the Case Concerning the Gabčíkovo-Nagymaros Project: Positive Signs for the Evolution of International Water Law*, 8 Y.B. INT’L ENV’T L. 21, 22 (1997); Gabriel E. Eckstein & Yoram Eckstein, *International Water Law, Groundwater Resources and the Danube Dam Case*, in GAMBLING WITH GROUNDWATER—PHYSICAL, CHEMICAL, AND BIOLOGICAL ASPECTS OF AQUIFER-STREAM RELATIONS 243, 247 (John Van Barahana et al. eds., 1998).

134. Coase, *supra* note 35, at 34.

harm,¹³⁵ an approach that is in line with the Coase theorem. The no significant harm principle achieves this balance by imposing on states obligations of conduct rather than result,¹³⁶ and by requiring states to take “all measures [they] could reasonably be expected to take” to prevent significant harm.¹³⁷ These obligations of conduct, or due diligence obligations, are beneficial from a Coasean perspective because they provide a useful tool for dealing with the lack of uniformity in the standard of conduct expected of states.¹³⁸

Moreover, the due diligence standard imposed by the no significant harm principle protects the interests of all states sharing a fresh water resource by shifting the emphasis from an amorphous negative duty to avoid harm to a positive duty to take concrete steps to protect the resource.¹³⁹ The reciprocal protection provided by the no significant harm principle recognizes disputing states’ common interest in preventing harm to each other, to the environment, and to the shared fresh water resource, whether the harm arises qualitatively through pollution or quantitatively through water allocation. As a concrete and positive duty, it can therefore guide the efficient resolution of

135. MCCAFFREY, *supra* note 39, at 471; Malcolm J. Gander, *International Water Law and Supporting Water Management Principles in the Development of a Model Transboundary Agreement Between Riparians in International River Basins*, 39 WATER INT’L 315 (2014).

136. TIM STEPHENS & DUNCAN FRENCH, ILA STUDY GROUP ON DUE DILIGENCE IN INTERNATIONAL LAW 2 (2016).

137. *Id.* at 8.

138. *Id.* at 2. On due diligence in international law generally, see, for example, JOANNA KULESZA, DUE DILIGENCE IN INTERNATIONAL LAW (2016).

139. Brunnée, *supra* note 15, at 970–71. In *Responsibilities and Obligations of States Sponsoring Persons and Entities with Respect to Activities in the Area*, the International Tribunal for the Law of the Sea (ITLOS) emphasized the contextual nature of the due diligence standard, which it predicted “may change over time as measures considered sufficiently diligent at a certain moment may become not diligent enough in light, for instance, of new scientific or technological knowledge. [They] may also change in relation to the risks involved in the activity . . . [and] be more severe for the riskier activities.” Moreover, states must “take all appropriate measures to prevent damage . . . [even] where scientific evidence concerning the scope and potential negative impact of the activity in question is insufficient but where there are plausible indications of potential risks.” Case No. 17, Advisory Opinion of Feb. 1, 2011, ¶¶ 117, 131, https://www.itlos.org/fileadmin/itlos/documents/cases/case_no_17/17_adv_op_010211_en.pdf [<https://perma.cc/4JQE-T99V>]. In the transboundary fresh water context, see UNECE, *supra* note 24, arts. 3.1(f), (g), 3.3 (providing that, in carrying out their due diligence obligations, states must use “best available technology” and “best environmental practices,” define “water-quality objectives,” and adopt “water-quality criteria”).

international fresh water disputes.¹⁴⁰ Doing so would resolve the tension between the no significant harm and equitable and reasonable utilization principles and facilitate efficient—Coasean—outcomes to international fresh water disputes.

As a guiding principle, how does no significant harm align with the normative Coasean approach described above, and how should it be implemented in the resolution of international fresh water disputes? To answer these questions, we propose a three-stage operational framework, and apply it to the Egypt-Ethiopia GERD dispute.

In the first stage—the “significant harm” stage—the no significant harm principle reflects what the state planning to undertake a particular activity would do if it were the sole owner of the disputed fresh water resource. Such a state would presumably only avoid causing harm to the resource that is significant, rather than trivial. This significance threshold is therefore the evidentiary benchmark that the state invoking the no significant harm principle must meet. Accordingly, in the context of the GERD, Ethiopia should only avoid causing harm to the Nile River that is “significant,” and Egypt, which is invoking the no significant harm principle, must prove by clear and convincing evidence¹⁴¹ that the GERD carries “a risk of significant harm.”¹⁴² Such a showing generally requires a risk of harm that

140. Int'l Law Comm'n, *Rep. on the Work of Its Twenty-Eighth Session*, at 162, ¶ 160, U.N. Doc. A/31/10 (1976), reprinted in [1976] 2 Y.B. Int'l L. Comm'n 1, U.N. Doc. A/CN.4/SER.4/1976/Add.1 (Part 2) (“[I]f the Commission could affirm that the old maxim *sic utere tuo ut alienum non laedas* applied to the law of the non-navigational uses of international watercourses, it would be able to give valuable guidance. For although States had a duty to co-operate with one another, they were sometimes reluctant to agree on the principles of such co-operation because, in many disputes, they were not sure how far such co-operation should go and to what extent they had to share their water resources.”). The maxim *sic utere tuo ut alienum non laedas* means “use your own property in such a manner as not to injure that of another.” Jutta Brunnée, *Sic Utere Tuo Ut Alienum Non Laedas*, MAX PLANCK ENCYCL. OF INT'L L. (2010), <https://opil.ouplaw.com/view/10.1093/law:epil/9780199231690/law-9780199231690-e1607?rskey=B1U40o&result=1&prd=OPIL> [<https://perma.cc/HL2E-9QME>]. The ILC incorporated this maxim in the UNWC in the form of the no significant harm principle.

141. The allegedly injured state is not required to prove that the harm was caused with the intent to injure, unlike the doctrine of “abuse of rights.” ULRICH BEYERLIN & THILO MARAUHN, *INTERNATIONAL ENVIRONMENTAL LAW* 42 (2011).

142. A “risk of significant harm” refers to “the combined effect of the probability of occurrence of an accident and the magnitude of its injurious impact.” It requires a “high probability of causing significant harm.” Int'l Law Comm'n, *Draft Articles with Commentaries on the Prevention of Transboundary Harm from Hazardous Activities*, at 152, ¶ 2, U.N. Doc. A/CN.4/516 (2001), reprinted in [2001] 2 Y.B. Int'l L.

is more than “trivial,” but it need not be at the level of “substantial.”¹⁴³ It is also not limited to harm directly related to the flow of the disputed fresh water resource or its use. Rather, it includes “harm resulting from activities indirectly affecting a watercourse, and harm that is itself not necessarily connected with the use of the watercourse.”¹⁴⁴ For instance, if the GERD risks negative environmental¹⁴⁵ or social¹⁴⁶ impacts not directly related to the flow of the Nile waters, these should be taken into account. Accordingly, harm that is “significant” may lead to a detrimental effect on matters such as human health, industry, property, environment, or agriculture, so long as such effects may be measured by factual and objective standards.¹⁴⁷ If it is not possible to establish at least a risk of such “significant harm,” the no significant harm principle would not be triggered.

If Egypt can establish at least a risk of significant harm, the second stage of the operational framework is triggered. This stage—the “due diligence” stage—entails an assessment of whether the acting state has complied with the due diligence standard required by the no significant harm principle.¹⁴⁸ The burden of proof at this stage shifts to the acting state, which must show that it has acted diligently to prevent or minimize the risk of harm.¹⁴⁹ Requiring states to comply with this due dil-

Comm’n 1, U.N. Doc. A/CN.4/SER.A/2001/Add.1 (Part 2) [hereinafter Int’l Law Comm’n, Rep. on the Work of Its Fifty-Third Session].

143. *User’s Guide Fact Sheet*, *supra* note 119.

144. Such as deforestation in one country that causes flooding in another, or air pollution in one country that results in the pollution of a river or lake in another. MCCAFFREY, *supra* note 39, at 470–71.

145. On the potentially negative environmental impacts of dams, *see, e.g.*, Danae Azaria, *Fresh Water and Energy in International Courts and Tribunals*, in RESEARCH HANDBOOK ON FRESHWATER LAW AND INTERNATIONAL RELATIONS 215 (Mara Tignino & Christian Bréthaut eds., 2018).

146. Such as human migration. *See, e.g.*, Tamar Meshel, *Transboundary Watercourses, Dams, and Human Migration*, 9 CAMBRIDGE INT’L L.J. (forthcoming 2020).

147. Int’l Law Comm’n, Rep. on the Work of Its Fifty-Third Session, *supra* note 142, at 152.

148. *See* Attila Tanzi, *Liability for Lawful Acts*, MAX PLANCK ENCYCL. OF INT’L L. (Feb. 2013), <https://opil.ouplaw.com/view/10.1093/law:epil/9780199231690/law-9780199231690-e1065?rskey=CRI4iD&result=1&prd=OPIL> [<https://perma.cc/RP9Q-BYXA>] (“The standard of due diligence against which the conduct of the state of origin should be examined [under the no significant harm principle] is that which is generally considered to be appropriate and proportional to the degree of risk of transboundary harm in a particular instance.”).

149. This reversal of the burden of proof is increasingly accepted in international law. *See, e.g.*, Tanzi, *supra* note 120, at 55–56 (Stephen C. McCaffrey et al. eds., 2019) (noting that it has been argued in legal scholarship that “the burden of proof

igence standard considerably reduces the likelihood that significant harm will be caused. It also makes the no significant harm principle a useful starting point for the efficient resolution of disputes relating to planned measures or new uses of shared fresh water resources, such as the GERD, by reducing the transaction costs involved in determining the responsibilities and obligations of each state. Accordingly, in the context of the GERD dispute, Ethiopia would have to show that it has acted diligently to prevent or minimize the risk of harm that the dam might cause.

If the due-diligence stage of the operational framework reveals that Ethiopia has failed to comply with its due diligence obligations, it would be “internationally responsible” for this failure. This means Ethiopia would have to eliminate or minimize the harm and compensate Egypt for any harm sustained.¹⁵⁰ In the less likely event that Ethiopia has satisfied its due diligence obligations but there remains a risk of significant harm, the analysis would continue to the third stage, the “harm balancing” stage.

This third stage calls for a Coasean-style balancing exercise to determine which is the greater harm that should be avoided—the overall harm that would result from allowing Ethiopia to proceed with the GERD, or the overall harm that would result from prohibiting it. This analysis may involve factors similar to those currently viewed as falling under the equitable and reasonable utilization principle, such as the hydrological, environmental, social, or economic impacts on Egypt, Ethiopia, and other states sharing the Nile, and the availability of alternatives.¹⁵¹ However, the question guiding this analysis is not the

should be reversed, establishing a presumption of the origin State’s violation of its international obligation of control over private operators under its jurisdiction”). In contrast, see the ICJ’s decision in the *Pulp Mills* case, finding that a precautionary approach does not operate as a reversal of the burden of proof. *Pulp Mills on River Uruguay* (Arg. v. Uru.), Judgment, 2010 I.C.J. 14, ¶ 164 (Apr. 20).

150. MCCAFFREY, *supra* note 39, at 501 (“If the source state is internationally ‘responsible’ . . . it would have a duty to cease the wrongful conduct and make reparation”); see also Owen McIntyre, *Responsibility and Liability in International Law for Damage to Transboundary Freshwater Resources*, in RESEARCH HANDBOOK ON FRESHWATER LAW AND INTERNATIONAL RELATIONS, *supra* note 145, at 335. Conforming with the no significant harm principle does not mean, necessarily, that the challenged activity will be allowed. If there remains a risk of significant harm, the next stage of the analysis would be triggered.

151. It may seem that determining which harm is greater carries as much uncertainty as determining what is “equitable and reasonable.” However, this balancing exercise takes place only in the third step of the analysis—in the unlikely event that a state complies with its due diligence obligations—but there is still a risk of

elusive, subjective, and endless inquiry into whether the GERD is "equitable and reasonable" and should therefore be allowed regardless of the resulting harm. Rather, recognizing that both allowing and prohibiting the GERD is likely to cause harm, this analysis objectively assesses what is the greater harm to be avoided. The formula is therefore "flexible and allows for a comparison of the utility of an act with the harm it produces," in line with Coase's theorem.¹⁵²

If Ethiopia can show that the GERD's overall benefits outweigh its costs, it should be allowed. However, Ethiopia would remain obligated to continuously cooperate with Egypt and the other states sharing the Nile concerning the operation of the GERD.¹⁵³ In contrast, if the overall harm caused by the GERD is greater than its benefits, an additional due diligence obligation would be imposed on Ethiopia to eliminate, mitigate, or compensate for the harm caused by the dam, in consultation

significant harm. Moreover, harm must be "susceptible of being measured by factual and objective standards," so a state has to show an actual risk of harm, rather than merely claim that something is "inequitable." From a Coasean perspective, most measurable harms would be capable of quantification. The cost of environmental remediation or relocating and resettling communities, for instance, is quantified in many cases. Thus, this harm balancing stage allows disputing parties to use the same criteria when assessing the harms and benefits and to bargain for an efficient outcome. While we are not claiming that a Coasean approach based on the no significant harm is a panacea, it is an alternative worth considering that might work better than IWL's principles as currently formulated. Some authors have suggested a similar approach. See, e.g., Michael A. Hyman, *Under the Danube Canopy: The Future of International Waterway Law*, 23 WM. & MARY ENV'T L. & POLY REV. 355, 362 (1998-1999); Albert E. Utton, *International Water Quality Law*, in INTERNATIONAL ENVIRONMENTAL LAW 282, 286 (Ludwik A. Teclaff & Albert E. Utton eds., 1974) (viewing the no significant harm principle as a "broad principle that demands that the user must balance the negative effects of his actions against the benefits obtained").

Harm can be assessed, for instance, in terms of waste and efficiency. Helal, *supra* note 13, at 369 ("Wasteful existing uses should not be accorded priority when confronted with needs from other riparian States."). Harm to the environment, such as pollution, and to the fresh water resource itself, such as rate of return flows and availability of storage water, could also be considered. Another relevant, and perhaps determinative, consideration is vital human water needs. Some have suggested that "the priority to be accorded to vital human needs is part of customary international law." Tanzi, *supra* note 149, at 53.

152. Coase, *supra* note 35, at 38.

153. The relevant states must cooperate continuously regarding the challenged activity by exchanging information, notifying each other of expected changes or events, and consulting, per their due diligence obligations and the duty to cooperate. UNWC, arts. 9, 11-12, and 17.

with Egypt and other affected states.¹⁵⁴ While this additional due diligence obligation remains a duty of conduct rather than of result, its violation would give rise to “state liability for acts not prohibited by international law.”¹⁵⁵ Such an outcome would be efficient from a normative Coasean perspective since, if Ethiopia values the GERD, it would prefer to compensate Egypt rather than discontinue its operation. The harm balancing analysis therefore allows the no significant harm principle to operate as either a property rule or a liability rule, depending on what is most efficient in the circumstances.

Our proposed tripartite operational framework reflects the normative Coasean approach in several ways. Most generally, incorporating all relevant considerations within a single guiding criterion—no significant harm—makes the goal of harm prevention central to the analysis. This goal provides disputing states, such as Egypt and Ethiopia, with a common objective of mutual harm prevention and a more concrete and structured principle that imposes on them uniform due diligence obligations. The no significant harm principle can therefore serve as a useful starting point for negotiations or third-party adjudication and encourage cooperative resolution of disputes,¹⁵⁶ which in turn lowers transaction costs both at the bargaining stage and in the actual transaction.

More specifically, our proposed operational framework prevents contradictory interpretations and potential conflicts in the application of the equitable and reasonable utilization and no significant harm principles that increase transaction costs. Instead, the proposed framework makes clear that the greater harm is to be prevented, regardless of whether the activity is otherwise “equitable and reasonable.” Ultimately, significant

154. Compensation could take the form of monetary compensation, restitution in kind, or satisfaction. MCCAFFREY, *supra* note 39, at 501–02.

155. Tanzi, *supra* note 120, at 32–33. For instance, a state that has caused or is likely to cause the greater harm would be held responsible for wrongful conduct if it rejects a request for compensation, including in the form of a distribution of benefits in kind. *Id.* at 36. This obligation is similar to Article 7.2 of the UNWC, under which an acting state must “take all appropriate measures . . . in consultation with the affected State, to eliminate or mitigate such harm and, where appropriate, to discuss the question of compensation.” UNWC, *supra* note 10. This provision, however, also requires the acting state to “hav[e] due regard” for the equitable and reasonable utilization articles provided in Articles 5 and 6. *Id.* Therefore, it continues to subordinate the acting state’s obligations under the no significant harm principle to the equitable and reasonable utilization principle.

156. McIntyre, *supra* note 122, at 120.

harm may be caused either because the benefits of the activity outweigh its costs or because the acting state would rather compensate for it than eliminate it.¹⁵⁷

The harm balancing stage also serves to balance the frequently conflicting interests of downstream and upstream states such as Egypt and Ethiopia by recognizing, in Coase's words, that "the cost of exercising a right . . . is always the loss which is suffered elsewhere in consequence of the exercise of that right."¹⁵⁸ It may be easier to visualize harm caused by an upstream state such as Ethiopia to a downstream state such as Egypt. However, by weighing the *overall* harm associated with a challenged activity, the harm balancing analysis allows an upstream state to show that prohibiting the activity would cause greater harm than allowing it. For instance, an upstream activity that reduces the amount of water to a downstream state may be allowed if the downstream state is not making use of the available water supply because it has other sources of water. Conversely, a harmful upstream activity may also be allowed where the downstream state is fully consuming the water, thereby causing greater harm to the upstream state.¹⁵⁹ In addition, activities undertaken by a downstream state may result in harm to an upstream state, such as pollution, obstruction of fish migration, or foreclosure of future uses to the upstream state, and such harms may not be outweighed by their benefits to the downstream state. Indeed, "[j]ust as a downstream state may be harmed by uses upstream, so also may an upstream state be harmed if its present or future use is limited in favor of a state downstream."¹⁶⁰ Ultimately, therefore, our proposed harm balancing approach reflects the fact that "measures undertaken by

157. Valuing harm can be a challenging prospect, especially for non-market goods. Nonetheless, economists have developed techniques to value public goods such as environmental and natural resource amenities. The most common is contingent valuation. For a good introduction to this concept, see Richard T. Carson, *Contingent Valuation: A Practical Alternative When Prices Aren't Available*, 26 J. ECON. PERSP. 27 (2012). For an example of the application of contingent valuation to rivers, especially in developing countries, see Md. Ariful Islam et al., *Estimating Willingness to Pay for Improving River Water Quality Using Contingent Valuation Method*, 5 INTL. J. MGMT. ACCT. & ECON. 643 (2018).

158. Coase, *supra* note 35, at 44.

159. MCCAFFREY, *supra* note 39, at 470, 457.

160. *Id.* at 474.

any riparian, regardless of its location on the shared watercourse, will have effects on all other riparians.”¹⁶¹

In sum, our proposed tripartite operational framework offers a structured, yet flexible, Coasean tool for applying no significant harm as the guiding principle of IWL by giving weight to existing uses while avoiding the grant of “a perpetual vested right to the first user.”¹⁶² This framework is sufficiently flexible to accommodate new concerns and interests, while at the same time is “concrete enough” to prevent states from justifying extreme positions with ambiguous legal standards that only serve to create further conflict.¹⁶³ In line with the normative Coasean approach, our framework can resolve the frequent clash between new unilateral water uses and established long-standing uses in international fresh water disputes¹⁶⁴ by requiring states to eliminate and/or compensate for the most significant harm.¹⁶⁵

B. Problem 2: The Duty to Cooperate

We now turn to the duty to cooperate in IWL, its current role in the resolution of international fresh water disputes, and how the normative Coasean approach could strengthen this role. Intuitively, the duty to cooperate seems the most relevant for reducing transaction costs in the resolution of international

161. Salman M.A. Salman, *Downstream Riparians Can Also Harm Upstream Riparians*, 35 WATER INT'L 350, 363 (2010).

162. Helal, *supra* note 13, at 371.

163. Jutta Brunnée & Stephen J. Toope, *Environmental Security and Freshwater Resources*, 91 AM. J. OF INT'L L. 26, 42 (1997).

164. A. Dan Tarlock, *Water Security, Fear Mitigation and International Water Law*, 31 HAMLINE L. REV. 704, 718 (2008).

165. The distinction between the “no significant harm” and “equitable and reasonable utilization” principles is analogous to the distinction between a bright-line rule and a case-by-case analysis, respectively. Those who have advocated for certainty in the law do so under the rule of law or morality. Friedrich Hayek laid down certain conditions on what rules conformed to the rule of law. He argued that laws should be universally accepted, known, certain and predictable, and equally applied to all. FRIEDRICH A. HAYEK, *THE CONSTITUTION OF LIBERTY* 205–11 (1960). Lon Fuller further argued that there are eight requirements for laws to be considered true moral laws. Among these are the requirements that laws be general so that no issue “be decided on an ad hoc basis,” that laws should not constantly be changing, and that there is a “congruence between rules as announced and their actual administration.” LON L. FULLER, *THE MORALITY OF LAW* 39 (1963). As we argue, the “no significant harm” principle is sufficiently general that it allows for its equal and certain application to the resolution of international fresh water disputes. At the same time, it does not require subjective and unpredictable analysis by the tribunal regarding what is an equitable and reasonable use. Therefore, it satisfies both Hayek’s notions of the rule of law and Fuller’s ideals of moral laws.

fresh water disputes. This duty gives rise to procedural obligations where there are new uses or modifications to existing uses of a shared fresh water resource, such as the GERD, which frequently spark disputes. These obligations include, for instance, notification, consultation, and preparation of an environmental impact assessment.¹⁶⁶ These duties arise regardless of the disputing states' legal rights or positions, and generally operate to reduce transaction costs by requiring states to cooperate in the management of shared fresh water disputes. Yet it is currently not clear whether the violation of these duty-to-cooperate obligations gives rise, in and of itself, to an internationally wrongful act, or whether a violation of the no significant harm principle is required in order to trigger a state's international responsibility. Moreover, the role of the duty to cooperate in the actual *resolution* of fresh water disputes, rather than in their *prevention*, remains limited. These ambiguities and limitations hinder the ability of the duty to cooperate to operate as a property or liability rule and to facilitate Coasean efficient outcomes for disputing states.¹⁶⁷

1. The Duty to Cooperate as an Independent Principle

There are some indicators that obligations arising under the duty to cooperate exist independently and may be invoked regardless of violation of the no significant harm principle.¹⁶⁸ Under the UNWC, for instance, states are required to negotiate with regard to "the possible effects of planned measures," rather than only when there is a risk of significant harm.¹⁶⁹ Similarly,

166. UNWC, *supra* note 10, at arts. 11–19; UNECE, *supra* note 24, at arts. 9–10; MCCAFFREY, *supra* note 39, at 465. While these obligations are not explicitly set out under the general duty to cooperate in the UNWC, they are best understood "as a specific application of the general principle of cooperation." *Id.* at 533. It may be useful to group them under this duty since it is well established both in international law generally and international water law. Grouping these procedural obligations under the duty to cooperate would also clearly distinguish them from the due diligence requirements of the no significant harm principle, and clarify that they come into play regardless of such harm. Failure to comply with them would constitute an internationally wrongful act. *Id.* at 533–34.

167. Labor law experts have also made the argument that imposing a duty to cooperate can lower transaction costs. Some have argued that the duty to bargain leads to more information sharing and honest contracting. See, e.g., Keith N. Hylton, *An Economic Theory of the Duty to Bargain*, 83 GEO. L.J. 19 (1994).

168. MCCAFFREY, *supra* note 39, at 470, 473–75.

169. UNWC, *supra* note 10, at art. 11.

the obligation to notify potentially affected states of the results of environmental impact assessments is triggered before the implementation of “planned measures which may have a significant adverse effect.”¹⁷⁰

The view that the duty to cooperate is an independent principle is supported by the ICJ’s judgment in the *Pulp Mills* case between Argentina and Uruguay. In this dispute, Argentina claimed that Uruguay had breached its procedural obligations by unilaterally constructing two pulp mills on the transboundary Uruguay River without notifying and consulting with Argentina. Argentina further argued that Uruguay had breached its substantive obligations since the mills were likely to cause significant harm to Argentina. The Court recognized that states’ “procedural” obligations under the duty to cooperate exist independently and can be violated regardless of any violation of their “substantive” obligation to prevent significant harm.¹⁷¹ Moreover, the Court confirmed that the requirement to conduct an environmental impact assessment applies when the planned activity “may have a significant adverse impact in a transboundary context,”¹⁷² which is a lower threshold than the “risk of significant harm” that is required to trigger the no significant harm principle.

However, the ICJ’s latest international fresh water decision in the *San Juan River* cases between Costa Rica and Nicaragua seems to question whether this is indeed the Court’s approach. In this dispute, Costa Rica contended that Nicaragua’s construction of a canal from the transboundary San Juan River would affect the flow of water to Costa Rica and would cause damage to wetlands and national wildlife protected areas in Costa Rica. Nicaragua, in turn, contended that Costa Rica’s roadworks along the border area between the two countries would cause serious environmental damage.

The Court found, *inter alia*, that “[i]n light of the absence of risk of significant transboundary harm, Nicaragua was not required to carry out an environmental impact assessment.”¹⁷³ This suggests that the Court views the threshold for triggering

170. *Id.* at art. 12.

171. *Pulp Mills on River Uruguay* (Arg. v. Uru.), Judgment, 2010 I.C.J. Rep. 14, ¶¶ 78–79 (Apr. 20).

172. *Id.* ¶ 204.

173. *Certain Activities Carried out by Nicaragua in Border Area* (Costa Rica v. Nicar.) and *Construction of a Road in Costa Rica along the San Juan River* (Nicar. v. Costa Rica), Judgment, 2015 I.C.J. Rep. 665, ¶ 105 (Dec. 16).

the environmental impact assessment obligation under the duty to cooperate to be the same standard required to trigger the no significant harm principle, rather than the lower “significant adverse impact” set out in *Pulp Mills*.¹⁷⁴ The Court further found that “[i]f the environmental impact assessment confirms that there is a risk of significant transboundary harm, the State planning to undertake the activity is required . . . to notify and consult in good faith with the potentially affected State, where that is necessary to determine the appropriate measures to prevent or mitigate that risk.”¹⁷⁵ The Court, therefore, applied a high threshold to the obligations to notify and consult as well, finding that they require a “risk of significant transboundary harm.” The Court’s reasoning seems circular, however, as it only requires states to notify and consult if there is a risk of significant harm, but the environmental impact assessment conducted to determine whether there is such a risk is only required where there is a risk of significant harm.

From a normative Coasean perspective, the approach of the ICJ in the *Pulp Mills* decision is preferable to the *San Juan River* decision because it establishes a lower threshold for triggering the independent obligations to notify, consult, and conduct an environmental impact assessment.¹⁷⁶ One of the main transaction costs preventing disputing states from reaching efficient resolutions of fresh water disputes is the lack or imbalance of information. For instance, it would be difficult, if not impossible, for Egypt to assess the risk of significant harm presented by the GERD if Ethiopia does not inform it of its plans to construct the dam and its technical specifications. At the same time, without undertaking an environmental impact assessment of the GERD, it would be difficult for Ethiopia to comply with its due diligence obligations under the no significant harm principle or to negotiate effectively with Egypt about how to minimize or

174. In addition to UNWC, *supra* note 10, and the ICJ decisions mentioned above, the threshold of “adverse effect” has been incorporated in various forms in many international agreements. For a list see, Draft Articles with Commentaries on the Prevention of Transboundary Harm from Hazardous Activities, *supra* note 142, at 158 n.900.

175. Certain Activities Carried out by Nicaragua in Border Area, 2015 I.C.J. Rep. ¶ 104.

176. There are, of course, also costs to comply with these obligations. However, these costs are “built in” to any dispute resolution process. Higher costs that can be avoided are those associated with bringing the parties to the table in the first place, and inefficient negotiations resulting from information imbalances and strategic behavior.

compensate for any environmental harm. The *Pulp Mills* decision is also more practical and realistic than the *San Juan River* decision because it is difficult to imagine how Ethiopia could conclude whether there is a risk of significant transboundary harm without first undertaking an environmental impact assessment and consulting with Egypt and other potentially affected states sharing the Nile. In addition, it is unclear when Ethiopia would ever be required to notify and consult with Egypt if these obligations are conditioned on an environmental impact assessment that Ethiopia can unilaterally decide not to undertake because there is no “risk of significant harm.” These obligations are intended to prevent or mitigate risk of significant harm and should therefore be triggered independently of the existence of such a risk. The *Pulp Mills* approach is also more likely to encourage early and continuous information exchange between disputing states such as Egypt and Ethiopia, which would enable them to implement the no significant harm principle in the resolution of the GERD dispute.

Moreover, the ICJ’s approach in *Pulp Mills* reduces transaction costs in the resolution of fresh water disputes such as the GERD in at least two more ways. First, it detaches the duty to cooperate from the no significant harm principle and turns it into a liability rule. Therefore, regardless of whether a risk of harm exists, Ethiopia would remain obligated to comply with this duty or be internationally responsible for its violation, and it could not argue that in the absence of risk of significant harm there was no duty to cooperate.¹⁷⁷ Second, this approach lowers transaction costs by facilitating a resolution if Egypt and Ethiopia, or a third party adjudicator, are reluctant or unable to establish that significant harm has been, is being, or is likely to be caused.¹⁷⁸ Violations of procedural obligations can be more easily established than violations of substantive obligations, and holding Ethiopia and Egypt responsible for such obligations may prompt them to cooperate, correct harmful conduct, and take more effective preventive measures in the future.¹⁷⁹

177. Certain Activities Carried out by Nicaragua in Border Area, 2015 I.C.J. Rep. ¶ 9–10, 19 (separate opinion by Dugard, J.) (taking a similar approach).

178. Jutta Brunnée, *Procedure and Substance in International Environmental Law: Confused at a Higher Level?*, EUR. SOC’Y OF INT’L L. (June 2016), https://esil-sedi.eu/post_name-123/ [<https://perma.cc/PFH4-PW8D>].

179. *Id.*

2. The Duty to Cooperate in the Dispute Resolution Process

The duty to cooperate can also lower transaction costs by playing a more meaningful role in the dispute resolution process itself, whether that process is in the form of bilateral negotiations or third-party resolution. Cooperation, which is crucial for a Coasean efficient outcome, may be more difficult to achieve once a dispute has arisen. Lack of cooperation may be further exacerbated where there is no agreement that governs the fresh water resource at issue.¹⁸⁰ But even where an agreement is in place and refers to the duty to cooperate, as Egypt and Ethiopia's Framework Agreement does, such reference may be general and fail to specifically address cooperation in the actual dispute resolution *process*.¹⁸¹

We therefore propose that the duty to cooperate imposes two specific obligations on state parties in the dispute resolution process to assist in reducing transaction costs and reaching a mutually acceptable and efficient resolution. These obligations are, first, to make every effort to enter into provisional arrangements, and second, not to jeopardize a final agreement. These obligations have developed in the maritime boundary delimitation¹⁸² context under the dispute resolution regime set out in the 1982 *United Nations Convention on the Law of the Sea*

180. Salman M.A. Salman, *Mediation of International Water*, in INTERNATIONAL LAW AND FRESHWATER, *supra* note 39, at 360–61. There are agreements in place to govern less than half of interstate surface water resources, and only about one-fourth of such agreements include all relevant states. Ken Conca, *Five Focal Points for U.S. Global Water Strategy (and Submit Your Own Too)*, NEW SEC. BEAT (Nov. 3, 2016), <https://www.newsecuritybeat.org/2016/11/5-focal-points-u-s-global-water-strategy-and-submit-too/> [<https://perma.cc/PVC6-DLPU>]. Only a handful of international aquifers and groundwater basins in the world are subject to a legal arrangement, and some of these arrangements are not binding. For a representative list of such arrangements, see Francesco Sindico & Stephanie Hawkins, *The Guarani Aquifer Agreement and Transboundary Aquifer Law in the SADC*, 24 REV. EUR., COMPAR. & INT'L ENV'T L. 318, 319 (2015).

181. Egypt and Ethiopia's Framework Agreement provides that "[t]he two parties agree on the necessity of the conservation and protection of the Nile waters. In this regard, they undertake to consult and cooperate in projects that are mutually advantageous, such as projects that would enhance the volume of flow and reduce the loss of Nile waters through comprehensive and integrated development schemes." Framework for General Cooperation, *supra* note 11, at art. 6.

182. "Maritime delimitation" has been defined as "the process of establishing lines separating the spatial ambit of coastal State jurisdiction over maritime space where the legal title overlaps with that of another State." YOSHIFUMI TANAKA, *THE INTERNATIONAL LAW OF THE SEA* 187 (2d ed. 2015).

("UNCLOS").¹⁸³ In light of the similarities between maritime boundary delimitation disputes and international fresh water disputes, principles developed in the former may prove useful in the latter.¹⁸⁴ We will address each of these proposed obligations in turn.

a. The Duty to Make Every Effort to Enter into Provisional Arrangements

We propose to include within the duty to cooperate an obligation to make every effort to enter into provisional arrangements. This obligation has two complementary goals. First, it aims to promote interim regimes and measures for the utilization of shared fresh water resources. Second, it aims to restrict certain harmful activities that could affect the final resolution of the dispute.¹⁸⁵ These arrangements would be temporary, would not finally bind the parties, and would not have to be taken into account in the final resolution of the dispute.¹⁸⁶ The rationale for this obligation is the fact that resolving a fresh water dispute

183. United Nations Convention on the Law of the Sea, *supra* note 19, at arts. 74(3) and 83(3). For a detailed discussion of these obligations in the UNCLOS context, see, for example, Meshel, *Unmasking the Substance Behind the Process*, *supra* note 21.

184. As with international water law, the body of international law governing maritime boundary delimitation disputes initially developed based on unilateral, exclusive, and sovereign rights, and involves competing rights and claims to the use of waters, unilateral state action, and politically sensitive and highly complex issues. See Ian Townsend-Gault, *Rationales for Zones of Co-operation*, in BEYOND TERRITORIAL DISPUTES IN THE SOUTH CHINA SEA 114, 118 (Robert Beckman et al. eds., 2013); Robert Beckman, *International law, UNCLOS and the South China Sea*, in BEYOND TERRITORIAL DISPUTES IN THE SOUTH CHINA SEA, *supra* note 184, at 47.

A caveat should be noted with respect to the parallels drawn here between international water law and the UNCLOS system. The substantive and procedural rules governing the UNCLOS are practically universal and are more robust and developed than those of international water law. Disputes relating to maritime delimitation, moreover, are subject to an elaborate, compulsory, and binding dispute resolution system that includes a specialized tribunal and benefit from established case law. Therefore, the two cooperative obligations we propose above might be more easily applied in the maritime boundary delimitation context than in the context of transboundary fresh water dispute resolution. Nonetheless, international water law can and should draw lessons from the UNCLOS experience in order to develop its own cooperative dispute resolution rules and practices, and the principles we discuss here could serve as a useful starting point.

185. *Guy. v. Surin.*, 30 R.I.A.A. 1, ¶ 460 (2007); Rainer Lagoni, *Interim Measures Pending Maritime Delimitation Agreements*, 78 AM. J. INT'L L. 345, 354 (1984).

186. Lagoni, *supra* note 185, at 359.

can be time consuming, as the nine-year (and counting) GERD dispute demonstrates. Some form of interim solution may therefore be useful to avoid the suspension of other beneficial uses of a shared fresh water resource. Moreover, such an interim solution would also prevent a “tragedy of the commons” situation in which states attempt to maximize their usage of the resource before a more restrictive permanent regime is put in place or the resource is depleted by other states.¹⁸⁷

To comply with this obligation in the context of the GERD dispute, Ethiopia and Egypt could explore various interim arrangements. For instance, they could craft an interim joint plan for the shared use of the Nile waters while they work to resolve their dispute. Such a regime would place a temporary moratorium on unilateral construction of the dam until the two states agree on a mutually acceptable way forward. Alternatively, the two states could negotiate a benefit-sharing regime that would allow the construction of the GERD to proceed but would ensure that its benefits are shared by both states.¹⁸⁸ Such schemes could prevent a *fait accompli* scenario (which has, in fact, materialized), in which the GERD is completed before the parties have reached an agreement on how it should be completed. Had Egypt and Ethiopia submitted their dispute to binding third-party resolution, they could have also requested the court or arbitral tribunal to decide on the terms of such interim arrangements.¹⁸⁹

Since states’ obligation to make every effort to enter into provisional arrangements is a duty of conduct rather than result, a failure to create such arrangements does not necessarily breach the duty to cooperate.¹⁹⁰ Therefore, as long as Egypt and Ethiopia negotiate in good faith,¹⁹¹ they would not violate this duty, even if they were ultimately unable to agree on an interim

187. Tara Davenport, *The Exploration and Exploitation of Hydrocarbon Resources in Areas of Overlapping Claims*, in BEYOND TERRITORIAL DISPUTES IN THE SOUTH CHINA SEA *supra* note 184, at 93, 100; Guy, 30 R.I.A.A. 1, ¶ 460.

188. Davenport, *supra* note 187, at 100, 102.

189. IGOR KARAMAN, DISPUTE RESOLUTION IN THE LAW OF THE SEA 198 (2012).

190. Dispute Concerning Delimitation of the Maritime Boundary between Ghana and Côte d’Ivoire in the Atlantic Ocean (Ghana/Côte d’Ivoire), Case No. 23, Judgment of Sept. 23, 2017, ¶ 604, https://www.itlos.org/fileadmin/itlos/documents/cases/case_no.23_merits/C23_Judgment_20170923.pdf [<https://perma.cc/JS5R-NEEF>] (“[T]he obligation to negotiate in good faith is an obligation of conduct and not one of result. Therefore, a violation of this obligation cannot be based only upon the result expected by one side not being achieved.”).

191. Guy, 30 R.I.A.A. 1, ¶ 461.

arrangement. In contrast, the duty to engage in good faith negotiations is a mandatory rule, and its breach would violate international law.¹⁹² Indeed, many IWL instruments provide for good faith negotiation in the context of fresh water dispute resolution.¹⁹³ However, the general obligation to negotiate in good faith has not been extended to the corollary duty to negotiate in good faith provisional arrangements pending the final resolution of an international fresh water dispute.

Such a specific duty is warranted from a normative Coasean perspective. Both provisional arrangements themselves, and the process of their negotiation, could facilitate the final resolution of the underlying dispute and ease tensions between the parties, thereby reducing transaction costs. The act of negotiating and being at the table creates an environment where parties are more likely to share information and reveal their negotiating starting points, or even their endpoints. Negotiations generate better, more stable, and easier to implement outcomes,¹⁹⁴ as well as “trust, confidence and consensus building in the process.”¹⁹⁵ Therefore, getting disputing states to negotiate early in an attempt to conclude provisional arrangements promises to shorten the overall negotiation process and reduce its costs.

b. The Duty Not to Jeopardize a Final Agreement

The second obligation that we propose to include within the duty to cooperate is the obligation not to jeopardize a final agreement, also known as the “obligation of mutual restraint” or the

192. Lagoni, *supra* note 185, at 354.

193. Stephen M. Schwebel, Special Rapporteur, *Second Rep. on the Law of the Non-Navigational Uses of International Watercourses*, U.N. Doc. A/CN.4/332 and Add.1 (1980) reprinted in [1980] 2 Y.B. Int'l L. Comm'n 1, U.N. Doc. A/CN/SER.A/1980/Add.1 (Part 1), ¶¶ 170, 172; *Lake Lanoux Award* (Fr. v. Spain), 12 R.I.A.A. 285 (1957).

194. Charles C. Caldart & Nicholas A. Ashford, *Negotiation as a Means of Developing and Implementing Environmental and Occupational Health and Safety Policy*, 23 HARV. ENV'T L. REV. 141 (1999) (arguing in the context of domestic environmental regulation for negotiated rulemaking to reduce litigation and disputes).

195. Cameron Hutchison, *The Duty to Negotiate International Environmental Disputes in Good Faith*, 2 MCGILL INT. J. SUSTAINABLE DEV. L. 117, 153 (2006). See also Robin Hahnel & Kristen A. Sheeran, *Misinterpreting the Coase Theorem*, 43 J. ECON. ISSUES 215 (2009) (arguing that parties lacking information about the other parties can generate incentives not to negotiate in good faith and concluding that “bargaining protocol” plays a role in how parties strike a bargain).

“non-aggravation” duty.¹⁹⁶ This obligation aims to prevent unilateral actions that might permanently affect other parties’ rights without preventing beneficial uses of the disputed fresh water resource.¹⁹⁷ It is therefore particularly useful in the absence of a provisional arrangement.¹⁹⁸ This duty does not preclude all unilateral activities related to a disputed fresh water resource—only those that would irreparably prejudice a final resolution of the dispute, that is, lead to permanent physical impact on, or change in, the disputed resource. For instance, such activities include military actions directly related to the disputed fresh water resource.¹⁹⁹

Indeed, Article 17(3) of the UNWC provides—with regard to planned measures such as the GERD—that “the notifying State shall, if so requested by the notified State at the time it makes the communication, refrain from implementing or permitting the implementation of the planned measures for a period of six months unless otherwise agreed.”²⁰⁰ Incorporating such a non-aggravation obligation within the general duty to cooperate would ensure that it continues to apply when an actual dispute arises, rather than only temporarily at the stage when measures are being planned and discussed.

In order to comply with this duty, Egypt and Ethiopia would have to, first, refrain from changing the *de facto* situation that

196. This non-aggravation duty also forms part of general international law. See, e.g., 1928 General Act (Pacific Settlement of International Disputes) art. 33(3), Sept. 26, 1928, 93 L.N.T.S. 343; G.A. Res. 2625 (XXV), U.N. Doc. A/5217, at Principle 2(d) (Oct. 24, 1970); G.A. Res. 37/10, Manila Declaration on the Peaceful Settlement of International Disputes art. 8 (Nov. 15, 1982); U.N. GAOR, 21st Sess., at para. 237, U.N. Doc. A/6230 (June 27, 1966). For a list of conventions and treaties referencing this duty see, South China Sea Award (Phil. v. China), PCA Case No. 2013-19 at 459 n.1468–69, (Perm. Ct. Arb. 2016).

197. *Guy. v. Surin.*, 30 R.I.A.A. 1, ¶ 470 (2007).

198. *Id.* ¶ 469 (2007). The non-aggravation duty has also been applied in the judicial resolution of international disputes. See, e.g., *Electricity Company of Sofia and Bulgaria (Belg. v. Bulg.)*, Order, 1939 P.C.I.J. (ser. A/B) No. 75, ¶ 24 (Dec. 05) (“[T]he parties to a case must abstain from any measure capable of exercising a prejudicial effect in regard to the execution of the decision to be given and, in general, not to allow any step of any kind to be taken which might aggravate or extend the dispute.”); *LaGrand (Ger. v. U.S.)*, Judgment, 2001 I.C.J. 466, ¶ ¶ 102–03 (June 27); *Concerning United States Diplomat and Consular Staff in Tehran (U.S. v. Iran)*, Judgment, 1980 I.C.J., ¶ 93 (May 24) (“[N]o action was to be taken by either party which might aggravate the tension between the two countries.”). See also other ICJ decisions cited in the South China Sea Award, PCA Case No. 2013–19 at 458 n.1464.

199. *Guy.*, 30 R.I.A.A. 1, ¶¶ 467, 470; Lagoni, *supra* note 185, at 365–66.

200. UNWC, *supra* note 10, at art. 17(3).

gave rise to the dispute and, second, take preventive measures to avoid or lessen tensions.²⁰¹ Accordingly, Ethiopia would not be permitted to cause “irreparable prejudice to the final . . . agreement,”²⁰² such as unilaterally completing the GERD, and Egypt would be required to refrain from threatening to use force or make declarations such as “if our share of the Nile water decreases by a single drop, our blood will be the alternative.”²⁰³ At the same time, possible measures other than complete suspension of the GERD, such as compensation or sharing of benefits, could also be considered where relevant, and unilateral activities that do not represent “irreparable prejudice” to the final agreement would be allowed.²⁰⁴

As with the duty to make every effort to conclude provisional arrangements, the incorporation of the non-aggravation duty within IWL’s duty to cooperate would serve to reduce tensions and transaction costs and thus facilitate a Coasean-efficient resolution of fresh water disputes.²⁰⁵ The non-aggravation duty would prevent states from exacerbating an ongoing dispute by taking unilateral action that could cause irreversible harm, such as polluting a shared fresh water resource or exhausting it. It would also prevent states from taking unilateral action that would render moot the final resolution of the dispute, such as completing a dam or diversion project. The non-aggravation duty could also incentivize disputing states to cooperate and reach a mutually beneficial agreement that would allow them to move forward and plan their future activities concerning the shared resource. The value of a non-aggravation duty in this context is evident, for instance, in the mediation of the *Indus River* dispute by the World Bank in the 1950s, which led to the signing of the 1960 *Indus Waters Treaty*. Although India and Pakistan were not subject to a duty of mutual restraint under IWL at the time, the success of the World Bank in facilitating the adoption of the Treaty was partially credited to the fact that it managed to get

201. Lagoni, *supra* note 185, at 365–66.

202. *Id.*

203. Jenny R. Kehl, *Water Security in Transboundary Systems: Cooperation in Intractable Conflicts and the Nile System*, in *WATER SECURITY IN THE MIDDLE EAST ESSAYS IN SCIENTIFIC AND SOCIAL COOPERATION* 39, 40 (Jean A. Cahan ed., 2017).

204. Lagoni, *supra* note 185, at 366.

205. Davenport, *supra* note 187, at 104.

both sides to agree not to take any action to reduce the flow of the waters until a final agreement was reached.²⁰⁶

CONCLUSION

As fresh water resources are rapidly depleting while human dependency on them grows, international fresh water disputes such as the GERD dispute between Egypt and Ethiopia are increasingly likely to arise.²⁰⁷ The normative Coase theorem presents a useful way of approaching these disputes because it “highlights the inefficiencies generated by transaction costs and the contribution that legal rules can make to increasing or reducing these costs.”²⁰⁸

In light of the high transaction costs involved in resolving international fresh water disputes, reaching efficient outcomes depends on the availability of clear and definitive legal rules that can guide states in determining and implementing their legal entitlements. No significant harm should be the guiding principle of IWL in this regard, both in light of the deficiencies of the equitable and reasonable utilization principle and because of its ability to reduce transaction costs by focusing states on which harm is greater overall and should thus be avoided. Moreover, the duty to cooperate should be applied as an independent principle giving rise to liability for its breach both prior to and during the dispute resolution process. Reconfigured through the lens of the normative Coase theorem, these principles are better situated to reduce transaction costs and facilitate the efficient resolution of international fresh water disputes.

206. Salman, *supra* note 180, at 373. The Indus Treaty has been successful in resolving many of the parties' disputes concerning their shared rivers. See, e.g., Brian E. Concannon, *The Indus Waters Treaty*, 2 GEO. INT'L ENV'T L. REV. 55 (1989).

207. Asit K. Biswas, *Global Water Scene Not as Rosy as Officially Painted*, BUS. TIMES 18 (Aug. 15, 2014), https://www.academia.edu/17100236/Global_water_scene_not_as_rosy_as_officially_painted [<https://perma.cc/37Z5-487S>]; Hussam Hussein & Mattia Grandi, *Dynamic Political Contexts and Power Asymmetries: the Cases of the Blue Nile and the Yarmouk Rivers*, INT'L ENV'T AGREEMENTS 4 (2017), <https://link.springer.com/article/10.1007/s10784-017-9364-y/fulltext.html> [<https://perma.cc/X55U-MNP5>].

208. Medema, *supra* note 30, at 61.