

Translating Legal Norms into Quantitative Indicators: Lessons from the Global Water, Sanitation, and Hygiene Sector

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TRANSLATING LEGAL NORMS INTO QUANTITATIVE INDICATORS: LESSONS FROM THE GLOBAL WATER, SANITATION, AND HYGIENE SECTOR

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Legal norms that are translated into quantitative indicators have the potential to shape behavior, even absent legal penalties, because numbers are easy to understand and provide a basis for accountability, comparability, and performance benchmarking. In the field of international environmental law, where legal enforcement options are often limited, quantitative indicators that facilitate comparison between nations can be a particularly important way of fostering compliance with emerging norms. However, quantitative indicators are like double-edged swords: the very simplicity that enables them to have strong communicative power often comes at the cost of a complete and accurate understanding of the problem. This Article analyzes both sides of this proverbial sword through a case study of the global water, sanitation, and hygiene sector.

Drawing on the environmental law literature on information disclosure and the social science and human rights literature on global indicators, I first develop a conceptual framework that examines (1) when information disclosure is more likely to promote legal compliance, which is described as a “governance effect;” and (2) how the form of the information disclosed, i.e., the choice of certain quantitative indicators, can shape policy options and alter—or even distort—the meaning of the original legal norm, which is known as a “knowledge effect.”

I then apply this new approach for studying the dynamic interaction between legal norms and statistics to a case study on global water. I argue that through quantitative information disclosure, these non-binding “soft law” declarations to expand access to water, sanitation, and

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hygiene have had a governance effect by influencing international and national development agendas. I also demonstrate how quantitative indicators can have unintended knowledge effects with perverse policy consequences; for example, a person with access to a water tap was considered to have met one global target even if the water was contaminated or the tap was broken. Finally, I show how the development of these statistical tools has been influenced by the conception of water and sanitation as human rights. An analysis of this unusual dialogue offers insights to human rights advocates who want to translate their ideas into numeric terms that policymakers can understand.

This Article makes a unique contribution through its original interdisciplinary conceptual framework and comparative analysis of domestic and international law. It underscores the importance of studying how quantitative indicators are created to ensure that the knowledge they impart reflects the original legal norms.

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INTRODUCTION

Legal norms that are translated into quantitative indicators have the potential to shape behavior, even absent legal penalties, because numbers are easy to understand and provide a basis for accountability, comparability, and performance benchmarking.¹ Consider, for example,

¹ Kevin E. Davis et al., *Indicators as a Technology Global Governance*, 46 LAW & SOC'Y

the power of numeric rankings—whether relating to schools, hospitals, neighborhoods, sports teams, or any other number of topics—to motivate conduct and spur competition.²

In the field of international environmental law, where legal enforcement options are often limited, quantitative indicators that facilitate comparison between nations can be a particularly important way of fostering compliance with emerging norms.³ The Environmental Sustainability Index, for example, is a scorecard that ranks 180 countries on over twenty parameters.⁴ The index, which seeks to be an alternative indicator to Gross Domestic Product and the Human Development Index, pulls information from numerous databases.⁵ As Daniel Esty has demonstrated, such rankings and scorecards can have powerful influences on behavior, even absent legally binding rules.⁶ Although there is no penalty for receiving a low score, countries vie to move up the rankings. As with corporate sustainability rankings, the transparent compilation and disclosure of information creates pressure to improve performance.⁷ By their very nature, rankings spur competition because everyone wants to lead, not lag behind.

Numeric metrics, however, often cannot capture the true complexity of a problem. For example, in a seminal study on water pollution in the Delaware River published in 1974, Bruce Ackerman and colleagues described how one indicator, dissolved oxygen, became used as a proxy

REV. 71, 73–74 (2012) (“An indicator is a named collection of rank-ordered data that purports to represent the past or projected performance of different units. The data are generated through a process that simplifies raw data about a complex social phenomenon. The data, in this simplified and processed form, are capable of being used to compare particular units of analysis (such as countries or institutions or corporations), synchronically or over time, and to evaluate their performance by reference to one or more standards.”).

² *Id.* at 77.

³ DANIEL BODANSKY, *THE ART AND CRAFT OF INTERNATIONAL ENVIRONMENTAL LAW* 87 (2010) (“A norm of international environmental law is a community standard that aims to guide or influence behavior—traditionally, the behavior of states, but also, more recently, the behavior of institutions and private actors.”); *see also* Davis et al., *supra* note 1 (noting that effective global governance requires mechanisms for holding states accountable and statistical indicators provide such a tool); SALLY ENGLE MERRY, *THE SEDUCTIONS OF QUANTIFICATION: MEASURING HUMAN RIGHTS, GENDER VIOLENCE, AND SEX TRAFFICKING* 11 (2016) (noting that “countries that fail to meet targets or are ranked below others on key indicators are to be ‘shamed’ into improving their records.”).

⁴ Tanja Srebotnjak & Daniel C. Esty, *Measuring Up: Applying the Environmental Sustainability Index*, 1 *YALE J. INT’L L.* 156, 156–68 (2005); Daniel C. Esty, *Red Lights to Green Lights: From 20th Century Environmental Regulation to 21st Century Sustainability*, 47 *ENV’T L.* 1, 56 (2017).

⁵ Srebotnjak & Esty, *supra* note 4.

⁶ *Id.*; Esty, *supra* note 4, at 28.

⁷ Srebotnjak & Esty, *supra* note 4; Esty, *supra* note 4, at 56.

for water quality.⁸ Because it was easy to calculate with precision, the quantitative measure became synonymous with overall water quality, even though it could not predict whether the water was actually suitable for use.⁹ With an aura of technocratic intelligence and scientific rigor, the indicator distorted how lawmakers perceived the problem and ultimately led to an expensive, but ineffective, pollution control strategy.¹⁰

Quantitative indicators are like double-edged swords: the very simplicity that enables them to have strong communicative power can come at the cost of a complete and accurate understanding of the problem. This Article analyzes both sides of this proverbial sword through a case study of the global drinking water, sanitation, and hygiene sector. I discuss how efforts to quantitatively monitor progress on global water goals have helped to generate compliance with international declarations but also highlight how the numeric indicators have provided a somewhat misleading picture of this progress. A careful study of these global monitoring efforts reveals both the power of information disclosure, and the challenges and potential pitfalls of translating legal norms into quantitative indicators.

An estimated 844 million people worldwide lack access to basic drinking water, and 2.3 billion people lack access to basic sanitation.¹¹

⁸ B. A. ACKERMAN ET AL., *THE UNCERTAIN SEARCH FOR ENVIRONMENTAL QUALITY: A CASE STUDY IN THE FAILURE OF MODERN POLICY MAKING 18–19* (1974) (describing how dissolved oxygen is an important measure of river health because it enables fish and other aquatic organisms to breathe, and also allows organic waste to degrade without causing offensive odors).

⁹ *Id.* at 18, 25, 30 (noting that dissolved oxygen cannot tell policymakers whether a treatment plant will be able to process water for consumption, nor can it indicate whether the water is suitable for swimming, fishing or boating).

¹⁰ *Id.* at 30, 136–45.

¹¹ Compare WHO/UNICEF JOINT MONITORING PROGRAMME, *PROGRESS ON DRINKING WATER, SANITATION AND HYGIENE: 2017 UPDATE AND SDG BASELINES 3–4* (2017), <http://www.unwater.org/new-publication-whounicef-joint-monitoring-programme-2017-report/> [<https://perma.cc/BJV7-ZAQC>] [hereinafter WHO/UNICEF JMP 2017 UPDATE], with WHO/UNICEF JOINT MONITORING PROGRAMME FOR WATER SUPPLY AND SANITATION, *PROGRESS ON SANITATION AND DRINKING WATER: 2015 UPDATE AND MDG ASSESSMENT 5, 7* (2015), <https://washdata.org/reports> [<https://perma.cc/5M86-4DC9>] [hereinafter WHO/UNICEF JMP 2015 UPDATE]. The term “basic” access means that the water may not necessarily be safe to drink and that the sanitation facilities may not safely separate the excreta. In fact, nearly one-third (29%) of the world’s population does not have access to safely managed drinking water and nearly two-thirds (61%) does not have access to safely managed sanitation. Moreover, because a newer methodology was used to measure water and sanitation access in the 2017 report (as discussed in Section II.C.2 of this Paper), the estimates for access to drinking water are more conservative than previously reported. In the 2015 update, for example, it was reported that an estimated 663 million people worldwide lacked access to drinking water. The more recent figures paint a more accurate and realistic, albeit grimmer, picture of progress. The 2017 report also provided some information on hygiene, such as handwashing, but global figures were not available.

Lack of access to water for basic needs has profound environmental and public health consequences, leading to higher rates of infectious disease, worse nutrition, increased child mortality, childhood stunting, less productivity in the workplace, and inferior quality of life.¹² There have been declarations on expanding access to water since the 1970s, but it was not until the Millennium Development Goals (“MDGs”)¹³ were adopted after the turn of the century that a large monitoring apparatus developed to measure global progress on several key development priorities, including expanding access to water, sanitation and hygiene.¹⁴ The MDGs expired in 2015, and a broader set of goals, the Sustainable Development Goals (“SDGs”), were adopted by the United Nations (U.N.) General Assembly in 2015.¹⁵

¹² WORLD BANK GRP. & INT’L MONETARY FUND, GLOBAL MONITORING REPORT 2015/2016: DEVELOPMENT GOALS IN AN ERA OF DEMOGRAPHIC CHANGE 75, 93 (2016), <http://www.worldbank.org/en/publication/global-monitoring-report> [<https://perma.cc/2VVK-JHFV>] [hereinafter WORLD BANK GRP.]; Ramnath Subbaraman et al., *Off the map: the health and social implications of being a non-notified slum in India*, 24 ENV’T URB. 643, 646, 651, 660–61 (2012), <http://journals.sagepub.com/doi/pdf/10.1177/0956247812456356> [<https://perma.cc/JY8U-Y9JB>]; Thomas Clasen et al., *Comment on “Household Water Treatment in Poor Populations: Is There Enough Evidence for Scaling up Now?”*, 43 ENV’T. SCI. TECH. 5542, 5542–44 (2009), <http://pubs.acs.org/doi/pdf/10.1021/es9008147> [<https://perma.cc/3BKY-FSZD>]; GUY HOWARD & JAMIE BARTRAM, DOMESTIC WATER QUANTITY, SERVICE LEVEL AND HEALTH: EXECUTIVE SUMMARY (2003), http://www.who.int/water_sanitation_health/diseases/WSH0302exsum.pdf [<https://perma.cc/C9PD-HC37>]; see generally Dean Spears et al., *Open Defecation and Childhood Stunting in India: An Ecological Analysis of New Data from 112 Districts*, 8 PLOS ONE e73784 (2013), <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0073784> [<https://perma.cc/V7JC-968E>]; Jeffrey S. Hammer & Dean Spears, *Village Sanitation and Children’s Human Capital Evidence from a Randomized Experiment by the Maharashtra Government* 2, 4–5 (2013), <https://papers.ssrn.com/abstract=2313535> [<https://perma.cc/5EN5-C5YP>] (last visited Jan. 21, 2018); Lisa C. Smith & Lawrence Haddad, *Reducing Child Undernutrition: Past Drivers and Priorities for the Post-MDG Era*, 68 WORLD DEV. 180, 182–85 (2015); see also JAMES SALZMAN, DRINKING WATER: A HISTORY 195 (2012) (noting that “researchers estimate that diarrheal diseases are responsible for the death of one child every eighteen seconds. . . . [I]magine the outcry to the equivalent of a classroom of children in America dying from waterborne diseases every six minutes, and an entire elementary school dying every hour.”).

¹³ UNITED NATIONS, *Millenium Development Goals and Beyond 2015* (last visited Jan. 21, 2018), <https://www.die-gdi.de/uploads/media/EST92130.pdf> [<https://perma.cc/YTM3-S5EG>].

¹⁴ Jamie Bartram et al., *Global Monitoring of Water Supply and Sanitation: History, Methods and Future Challenges*, 11 INT’L. J. ENV’T. RES. PUB. HEALTH 8137–65 (2014) (noting that global monitoring began in the 1930s but became more robust after the adoption of the MDGs).

¹⁵ Among other goals, the SDGs now commit states to achieving by 2030 “universal and equitable access to safe and affordable drinking water for all” and “access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations.” These are targets 6.1 and 6.2, respectively. G.A. Res. 70/1, at 14–27, <https://sustainabledevelopment.un.org>

The SDGs have been accompanied by an even more robust monitoring scheme that relies heavily on quantitative indicators.

The MDGs, SDGs, and other global commitments to expanding access to water, sanitation, and hygiene are best described as “soft law,” a term that generally refers to declarations, statements, standards, and guidelines that are not enforceable and binding in the same manner as formal international law but that nevertheless exert influence over the behavior of countries and other key actors.¹⁶ Soft law instruments can help to articulate an emerging consensus towards a new norm.¹⁷ The definition of soft law that I adopt here reflects a positivist view of international law, i.e., that the international rules derive from legitimately constituted political processes instead of natural law.¹⁸ Soft law instruments have been especially important in the field of international environmental law, with U.N. conference resolutions and declarations often serving as the bases for eventual treaties.¹⁹

The first key question that this Article grapples with is whether these non-binding declarations adopted by the international community on expanding water, sanitation, and hygiene access are legally meaningful. Do they help to shape the behavior of nations and thereby result in an expansion of access to these vital services? A rich literature exists in the fields of international law and international relations on why nations comply with international law.²⁰ However, because soft law is not yet formal law,

/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf [https://perma.cc/2H7P-46BN].

¹⁶ ALAN BOYLE & CHRISTINE CHINKIN, *THE MAKING OF INTERNATIONAL LAW* 212 (2007) (“From a law-making perspective the term [‘soft law’] is simply a convenient description for a variety of non-legally binding instruments used in contemporary international relations.”); Dinah Shelton, *Soft Law*, in *ROUTLEDGE HANDBOOK OF INTERNATIONAL LAW* 70 (J. D. Armstrong & Jutta Brunée eds., 2009) (“Common forms of soft law include normative resolutions of international organizations, concluding texts of summit meetings or international conferences, recommendations of treaty bodies overseeing compliance with treaty obligations, bilateral or multilateral memoranda of understanding, executive political agreements, and guidelines or codes of conduct adopted in a variety of contexts.”); Pierre-Marie Dupuy, *Soft Law and the International Law of the Environment*, 12 *MICH. J. INT’L L.* 420, 434 (1991) (“A ‘soft’ norm can help to define the standards of good behavior corresponding to what is nowadays to be expected from a ‘well-governed State’ without having been necessarily consecrated as an in force customary norm.”).

¹⁷ BOYLE & CHINKIN, *supra* note 16, at 215; Shelton, *supra* note 16, at 8.

¹⁸ DAVID HUNTER ET AL., *INTERNATIONAL ENVIRONMENTAL LAW AND POLICY* 282 (5th ed. 2015); JOSÉ E. ALVAREZ, *INTERNATIONAL ORGANIZATIONS AS LAW-MAKERS* 46 (2006); Samuel Murumba, *Foxes and Hedgehogs at the Intersection of Human Rights and Intellectual Property*, 38 *MONASH UNIV. L. REV.* 119, 137 (2012).

¹⁹ BOYLE & CHINKIN, *supra* note 16, at 119; HUNTER ET AL., *supra* note 18.

²⁰ See, e.g., LOUIS HENKIN, *HOW NATIONS BEHAVE: LAW AND FOREIGN POLICY* 47 (2d ed. ed.

this Article offers a different perspective on the compliance question by drawing comparative lessons from the U.S. environmental law literature on using information disclosure as an alternative to traditional command-and-control regulation.²¹ This body of scholarship is an example of the “new governance” approach to regulation, which recognizes that traditional top-down rules and adversarial enforcement have, at times, been counterproductive at regulating private industry.²² Instead, new governance focuses on the powerful impact that informal rules and legal norms can have on shaping behavior.²³ In some contexts, the term new governance has even

1979) (“It is probably the case that almost all nations observe almost all principles of international law and almost all of their obligations almost all of the time.”); Harold Hongju Koh, *Why Do Nations Obey International Law?* (Book Review), 106 YALE L. J. 2599, 2603 (1997) (“Like most laws, international rules are rarely enforced, but usually obeyed.”); Kal Raustiala, *Compliance & Effectiveness in International Regulatory Cooperation*, 32 CASE WES. RES. J. INT’L L. 387, 391 (2000) (noting that compliance “refers to a state of conformity or identify between an actor’s behavior and specified rule.”); DURWOOD ZAEELKE ET AL., MAKING LAW WORK: ENVIRONMENTAL COMPLIANCE & SUSTAINABLE DEVELOPMENT 371 (Durwood Zaelke et al. eds., 2005) (discussing enforcement approaches to compliance); Kal Raustiala & Anne-Marie Slaughter, *International Law, International Relations and Compliance* 19 HANDBOOK OF INTERNATIONAL RELATIONS (Walter Carlsnaes et al. eds., 2002); Oran R. Young, *Hitting the Mark*, 41 ENV’T SCI. POLICY SUSTAIN. DEV. 20, 21–23, 25 (Oct. 1999).

²¹ See, e.g., Douglas A. Kysar & James Salzman, *Making Sense of Information for Environmental Protection*, 86 TEX. L. REV. 1347, 1350 (June 2008) (proposing a model of information processes for environmental protection with three phases: “collection and construction of information,” “use and abuse,” and “access and dissemination.”); Gregg P. Macey, *The Architecture of Ignorance*, 2013 UTAH L. REV. 1627, 1630–32 (2013) (arguing that our current environmental regulatory structure developed at a point in time when data was scarce, but that we now need to shift a more “data-intensive” approach to regulation that harnesses the ever-evolving means of gathering information, including through the help of the public); David B. Spence & Lekha Gopalakrishnan, *Bargaining Theory and Regulatory Reform: The Political Logic of Inefficient Regulation*, 53 VAND. L. REV. 599, 597 (2000) (discussing regulatory reforms in response to substantive and procedural inefficiency critiques of administrative efficiency and suggesting another explanation grounded in bargaining theory); David B. Spence, *The Shadow of the Rational Polluter: Rethinking the Role of Rational Actor Models in Environmental Law*, 89 CAL. L. REV. 917 (2001) (discussing EPA’s experiments with collaborative regulation to help explain why complexity of regulation, and not rational self-interest, often leads to non-compliance by private actors).

²² See generally Orly Lobel, *New Governance As Regulatory Governance*, OXFORD HANDBOOK OF GOVERNANCE 72 (David Levi-Four ed., 2012); Orly Lobel, *The Renew Deal: The Fall of Regulation and the Rise of Governance in Contemporary Legal Thought*, 89 MINN. L. REV. 342, 347–50 (2004).

²³ As Lobel observes, new governance theory posits that “law has a norm-generating expressive value in addition to its direct control over individuals and corporations.” Lobel, *supra* note 22, at 7. The field “explores empirically and calls normatively for improved regulatory design and a shift from command-and-control regulation to more collaborative public-private standard setting.” *Id.* at 14.

been used interchangeably with soft law, which further suggests the value in this comparative approach.²⁴ In particular, I rely on scholars such as Bradley Karkkainen and Daniel Esty who have examined how the disclosure of quantitative information by private and public actors can generate compliance with environmental norms by enabling peer review and greater public scrutiny.²⁵

It would be a mistake to assume, however, that information disclosure is necessarily effective in all circumstances. For example, an important literature exists on the failure of mandated disclosure to help consumers make effective decisions—which is clear to anyone who has attempted to read the disclosures provided by credit card companies.²⁶ Rather, the focus of this paper's analysis is on how information disclosed as quantitative indicators can have a "governance effect" by shaping the behavior of the disclosing party.²⁷ To understand when such disclosure is likely to be effective,

²⁴ Lobel, *supra* note 22, at 8.

²⁵ Bradley C. Karkkainen, *Information as Environmental Regulation: TRI and Performance Benchmarking, Precursor to a New Paradigm*, 89 GEO. L. J. 259, 261 (2000); Daniel C. Esty, *Environmental Protection in the Information Age*, 79 N. Y. UNIV. L. REV. 115, 138 (2004).

²⁶ See, e.g., OMRI BEN-SHAHAR & CARL SCHNEIDER, MORE THAN YOU WANTED TO KNOW: THE FAILURE OF MANDATED DISCLOSURE 651 (2014) (arguing that mandated consumer disclosure is a useless and ineffective form of regulation); Jeffrey M. Lipshaw, *Dissecting the Two-Handed Lawyer: Thinking Versus Action in Business Lawyering*, 10 BERKELEY BUS. L. J. 231, 247 (2014) (noting that information disclosure to individuals would be effective only if they experienced a rare "epiphany of cathartic rationality," but that the use of information as a regulatory device could work "the more 'macro' the problem is," such as "making an entire market more efficient or transparent"); Michael D. Guttentag, *Evolutionary Analysis in Law: On Disclosure Regulation Symposium on the Society for Evolutionary Analysis in Law*, 48 ARIZ. STATE L.J. 963, 974–76 (2016) (discounting traditional justifications for disclosure theory and suggesting other ways to evaluate when disclosure regulation is likely to be effective); Paula J. Dalley, *The Use and Misuse of Disclosure as a Regulatory System*, 34 FLA. ST. U. L. REV. 1089, 1090–91 (2006) (discussing the failure of traditional disclosure schemes in the securities law context).

²⁷ This term is widely used in the social science literature on indicators. See Sakiko Fukuda-Parr et al., *The Power of Numbers: A Critical Review of Millennium Development Goal Targets for Human Development and Human Rights*, in THE MDGs, CAPABILITIES AND HUMAN RIGHTS: THE POWER OF NUMBERS TO SHAPE AGENDAS 1–13, (Sakiko Fukuda-Parr & Alicia Ely Yamin eds., 2015); Davis et al., *supra* note 1, at 92; MERRY, *supra* note 3; Davis, et al., *Indicators as a Technology of Global Governance*, 46 L. SOC. REV. 71, 92 (2012). A review of the legal literature suggests that the term governance effect has been most widely used in studies on corporate global governance. See, e.g., Larry Cata Backer, *From Institutional Misalignments to Socially Sustainable Governance: The Guiding Principles for Implementation of the United Nations' "Protect, Respect and Remedy" and the Construction of Inter-Systemic Global Governance*, 25 PAC. MCGEORGE GLOB. BUS. & DEV. L. J. 69, 71 (2012). To the extent the term governance effect has been used in the environmental literature, it has been primarily in studies of private environmental governance.

I comparatively analyze the U.S. Toxics Release Inventory (“TRI”), a seminal case study in the environmental literature on alternatives to command-and-control regulation,²⁸ and the global water monitoring system.²⁹

The second key issue that this Article examines is how the form of the information disclosed, i.e., the choice of certain quantitative indicators, can shape the subsequent policy options and alter—or even distort—the meaning of the original legal norm.³⁰ I describe this phenomenon as a “knowledge effect.”³¹ My ideas were influenced by the social science and legal literature on the use of global indicators to measure human rights, including scholarship by Sally Engle Merry, Sakiko Fukuda-Parr, Alicia Ely Yamin, and Margaret Satterthwaite.³² I also draw on the work of William Boyd,³³ who highlights the importance of understanding how knowledge practices shape environmental regulatory options, and on the environmental law literature debating the merits of cost-benefit analysis, including the work of Lisa Heinzerling and Frank Ackerman,³⁴ as well as that of Richard Revesz and Michael Livermore.³⁵

See, e.g., Steph Tai, *Private Environmental Governance and the Trans-Pacific Partnership*, 29 GEO. ENVTL. L. REV. 111, 111 (2016).

²⁸ *See, e.g.,* Karkkainen, *supra* note 25; *see also* MICHAEL E. KRAFT ET AL., COMING CLEAN: INFORMATION DISCLOSURE AND ENVIRONMENTAL PERFORMANCE 65 (2011).

²⁹ As discussed in Part II, these efforts have largely been led by the Joint Monitoring Program, a joint initiative of the World Health Organization and UNICEF.

³⁰ Fukuda-Parr et al., *supra* note 27, at 2; *see also* Steve D. Charman & Vanessa Quiroz, *Blind Sequential Lineup Administration Reduces Both False Identifications and Confidence in Those False Identifications*, 40 LAW & HUM. BEHAV. 477, 477 (2016); Cass R. Sunstein, *Group Judgments: Statistical Means, Deliberation, and Information Markets*, 80 N.Y.U. L. REV. 962, 962 (2005).

³¹ Fukuda-Parr et al., *supra* note 27, at 2. A review of the legal literature indicates that this term has been used primarily in studies on law and behavior. *See, e.g.,* Charman & Quiroz, *supra* note 30; Sunstein, *supra* note 30.

³² MERRY, *supra* note 3; SAKIKO FUKUDA-PARR & ALICIA ELY YAMIN, THE MDGs, CAPABILITIES AND HUMAN RIGHTS: THE POWER OF NUMBERS TO SHAPE AGENDAS (2015); Ann Janette Rosga & Margaret L. Satterthwaite, *The Trust in Indicators: Measuring Human Rights*, 27 BERKELEY J. INT'L L. 253, 256 (2009).

³³ William Boyd, *Ways of Seeing in Environmental Law: How Deforestation Became an Object of Climate Governance*, 37 ECOLOGY L.Q. 843, 856, 916 (2010).

³⁴ FRANK ACKERMAN & LISA HEINZERLING, PRICELESS: ON KNOWING THE PRICE OF EVERYTHING AND THE VALUE OF NOTHING 35 (2004); Frank Ackerman & Lisa Heinzerling, *Pricing the Priceless: Cost-Benefit Analysis of Environmental Protection*, 150 UNIV. PA. L. REV. 1553, 1553 (2002); Lisa Heinzerling, *Risking It All Meador Lecture Series 2004–2005: Risk and the Law*, 57 ALA. L. REV. 103, 107 (2005); Lisa Heinzerling, *The Rights of Statistical People Comment*, 24 HARV. ENVTL. L. REV. 189, 189 (2000).

³⁵ RICHARD L. REVESZ & MICHAEL A. LIVERMORE, RETAKING RATIONALITY: HOW COST-BENEFIT ANALYSIS CAN BETTER PROTECT THE ENVIRONMENT AND OUR HEALTH 17 (2008); Michael A. Livermore & Richard L. Revesz, *Rethinking Health-Based Environmental Standards*, 89

Part I of this Article develops this two-pronged approach for studying the dynamic interaction between legal norms and statistics. By identifying factors that mediate the governance effects and knowledge effects of quantitative indicators, the interdisciplinary conceptual model provides a useful framework for analyzing when information disclosure can promote compliance with non-binding legal norms. In Part II of this Article, I apply this framework to a detailed case study on the global drinking water, sanitation, and hygiene sector.

My argument in Part II on the role of global water indicators in shaping legal compliance with soft law declarations proceeds in three parts. First, I argue that although international commitments to expanding water, sanitation, and hygiene access are not enforceable as international law, they are influential in shaping international and national development agendas through the power of statistics, i.e., through information that is disclosed as numbers. Through a comparative analysis with the TRI, I analyze three factors that mediate the governance effect of the global water declarations: the communicative power of a simple quantitative indicator; the capacity and willingness of the target actor to change its behavior; and the ability of external stakeholders to influence the target actor, which is impacted by the power dynamics between the two groups.³⁶

Second, given the potential power of quantitative indicators to shape the behavior of disclosing parties, even absent binding legal penalties, I argue that it is imperative to understand exactly how legal norms are translated into statistics in order to avoid policy distortion. Through a detailed analysis of global efforts to monitor and measure progress on the global water goals, I demonstrate how quantitative indicators can take on a life of their own and thereby have knowledge effects that can inadvertently redefine the original normative goals. For example, when a legal norm is translated into a number, the “calculability”³⁷ of that metric is prioritized, which means that harder to quantify aspects of the problem can be neglected. Moreover, because information can be difficult to gather,

N. Y. UNIV. L. REV. 1184, 1184 (2014); Michael A. Livermore & Richard L. Revesz, *Interest Groups and Environmental Policy: Inconsistent Positions and Missed Opportunities*, 45 ENVTL. L. 1, 1 (2015).

³⁶ See *infra* Part II.

³⁷ I adopt the term “calculability” from Boyd, who employs it to describe techniques that facilitate the quantification, simplification and comparison of that problem. Boyd, *supra* note 33, at 902–03, n.250 (citing THEODORE M. PORTER, *TRUST IN NUMBERS: THE PURSUIT OF OBJECTIVITY IN SCIENCE AND PUBLIC LIFE* (1995); Clark A. Miller, *New Civic Epistemologies of Quantification: Making Sense of Indicators of Local and Global Sustainability*, 30 SCI. TECH. HUM. VALUES 403, 403–32 (2005), <http://journals.sagepub.com/doi/pdf/10.1177/0162243904273448> [<https://perma.cc/ZH69-PMSK>].

quantitative indicators may be structured around data that already exists and/or may be limited by the experiences of those tasked with developing them—concepts referred to as “data inertia” and “expertise inertia,” respectively.³⁸ For instance, when countries agreed in the 2000s to reduce by half the number of individuals “without sustainable access to safe drinking water,”³⁹ they used a quantitative indicator to measure progress that considered neither sustainability nor safety.⁴⁰ Thus, a person with access to a water tap was considered to have met the target even if the water was contaminated or the tap was broken.⁴¹

Finally, despite the emphasis on creating quantifiable indicators in the global water sector, I demonstrate how the development of these statistical tools has been influenced by the conception of water and sanitation as human rights.⁴² This unusual dialogue between the statistical and human rights communities has been facilitated by broader trends, such as the rise of human rights indicators,⁴³ and by specific efforts within the water community.⁴⁴ The inclusion of a human rights perspective into the global water monitoring apparatus may enhance state recognition of the

³⁸ MERRY, *supra* note 3, at 6–7.

³⁹ This is from Target 7.C of the Millennium Development Goal in the U.N. Millennium Project, which derived from the Millennium Declaration adopted by states in 2000. UNITED NATIONS, *supra* note 13.

⁴⁰ WHO/UNICEF JMP 2015 UPDATE, *supra* note 11; WHO/UNICEF, METHODOLOGICAL NOTE: PROPOSED INDICATOR FRAMEWORK FOR MONITORING SDG TARGETS ON DRINKING WATER, SANITATION, HYGIENE AND WASTEWATER (2015), http://www.who.int/water_sanitation_health/monitoring/coverage/wash-post-2015-rev.pdf [<https://perma.cc/YJ24-KE9C>] [hereinafter WHO/UNICEF, METHODOLOGICAL NOTE]; Bartram et al., *supra* note 14, at 8141–55; *infra* Section II.C.

⁴¹ Bartram et al., *supra* note 14; Malcolm Langford & Inga Winkler, *Muddying the Water? Assessing Target-based Approaches in Development Cooperation for Water and Sanitation*, in FUKUDA-PARR & YAMIN, *supra* note 32, at 144–45.

⁴² WHO/UNICEF, METHODOLOGICAL NOTE, *supra* note 40; IAEG-SDGs, GOAL 6 ENSURE AVAILABILITY AND SUSTAINABLE MANAGEMENT OF WATER AND SANITATION FOR ALL 2, 5, 17 (2016), <http://unstats.un.org/sdgs/files/metadata-compilation/Metadata-Goal-6.pdf> [<https://perma.cc/337G-H4G2>]. This right is alternatively described as the human right to water and sanitation, the human right to safe drinking water and sanitation or the human rights to water and sanitation. These semantics are symbolically important as I discuss in a prior work, Sharmila Murthy, *The Human Right(s) to Water and Sanitation: History, Meaning and the Controversy over Privatization*, 31 BERKELEY J. INT’L L. 89 (2013). In this Article, I use the term “human right to safe drinking water and sanitation” when referring to official documents and “rights to water and sanitation” when discussing the concepts generally.

⁴³ See, e.g., U.N. OFFICE OF THE HIGH COMM’R ON HUMAN RIGHTS, HUMAN RIGHTS INDICATORS: A GUIDE TO MEASUREMENT AND IMPLEMENTATION, at III (2012), http://www.ohchr.org/Documents/Publications/Human_rights_indicators_en.pdf [<https://perma.cc/X7FK-T769>].

⁴⁴ See, e.g., WHO/UNICEF JMP 2015 UPDATE, *supra* note 11.

rights to water and sanitation under international law. However, because not all aspects of human rights can easily be quantified, I urge caution in understanding the potential knowledge effects that could alter the meaning of the rights. This analysis offers insights to human rights advocates who want to understand how to translate their ideas into numeric terms that policymakers can understand. It also suggests that the quantitative indicators being developed to measure the global water targets may have greater influence on policymaking and norm development than the politically negotiated text of the U.N. General Assembly declarations that gave rise to them.

Through a comparative and interdisciplinary analysis, this Article provides a new approach for analyzing how quantitative indicators can promote legal compliance, even with soft law norms. The analysis underscores the importance of studying how quantitative indicators are created to ensure that the knowledge they impart reflects the original legal goals.

I. CONCEPTUAL FRAMEWORK FOR ANALYZING THE PROMISES AND PERILS OF USING QUANTITATIVE INDICATORS TO PROMOTE LEGAL COMPLIANCE

A. *Governance Effects*

By creating standards that benchmark performance, quantitative indicators have the potential to influence behavior, even absent legal penalties.⁴⁵ With seeming objectivity, numbers provide a basis for accountability and comparability.⁴⁶ Indicators have enormous communicative power because they can simplify a complex idea into a number.⁴⁷ Quantification has been described as a powerful “social technology” due to its potential to shape law and public policy.⁴⁸ In our information age,⁴⁹ the interest in indicators has coincided with a more general “audit explosion”⁵⁰ and a desire for “evidence-based governance.”⁵¹

⁴⁵ Fukuda-Parr et al., *supra* note 27, at 2; MERRY, *supra* note 3, at 11.

⁴⁶ FUKUDA-PARR & YAMIN, *supra* note 32.

⁴⁷ Fukuda-Parr et al., *supra* note 27, at 2, 7.

⁴⁸ PORTER, *supra* note 37, at 58. A growing body of literature explores “indicators as a technology of global governance.” See, e.g., Davis et al., *supra* note 1, at 28.

⁴⁹ Esty, *supra* note 25.

⁵⁰ Rosga & Satterthwaite, *supra* note 32, at 256 (quoting economic analyst Michael Power).

⁵¹ MERRY, *supra* note 3, at 10 (defining “evidence-based governance” as “a broad range of regulatory strategies that rely on empiricism, quantitative knowledge as the basis for decision making and problem solving through benchmarking”).

The TRI is a well-studied example from the environmental literature that showcases how quantitative indicators can shape behavior and thereby promote compliance with new legal norms.⁵² After the devastating releases of chemicals at the Union Carbide plants in Bhopal, India and in Institute, Virginia in the 1980s, the American public demanded greater access to information about environmental hazards.⁵³ As a result, Congress created the TRI to require that certain U.S. facilities publicly report releases of listed toxic chemicals above a threshold amount.⁵⁴

By simply requiring the disclosure of information about pollution discharges, the TRI has had a governance effect and spurred corrective action by industry.⁵⁵ Between 1988 and 1998, TRI was credited with a forty-six percent decrease in the releases of toxic chemicals.⁵⁶ Declines have continued but at a more moderate pace, with an overall decrease of twenty-four percent between 2005 and 2015.⁵⁷ As a result, TRI has been

⁵² 42 U.S.C. §§ 11001–11050 (1994 & Supp. III 1997). The provisions regarding the Toxics Release Inventory are found in § 313 of the Emergency Planning and Community Right to Know Act, 42 U.S.C. § 11023 (1994 & Supp. III 1997).

⁵³ See Bradley C. Karkkainen et al., *After Backyard Environmentalism: Toward a Performance-Based Regime of Environmental Regulation*, 44 AM. BEHAV. SCI. 690, 695–96 (2000); KRAFT ET AL., *supra* note 28, at 56–61.

⁵⁴ See Esty, *supra* note 4, at 28; Karkkainen, *supra* note 25, at 286; Karkkainen et al., *supra* note 53, at 695–96; William F. Pedersen, *Regulation and Information Disclosure: Parallel Universes and Beyond*, 25 HARV. ENVTL. L. REV. 151, 163 (2001); JAMES T. HAMILTON, REGULATION THROUGH REVELATION: THE ORIGIN, POLITICS, AND IMPACTS OF THE TOXICS RELEASE INVENTORY PROGRAM (2005); KRAFT ET AL., *supra* note 28, at 56–60; David W. Case, *The Role of Information in Environmental Justice American Bar Association Section of Environment, Energy, and Resources Symposium*, 81 MISS. L. J. 701, 732 (2011); Kim Fortun, *From Bhopal to the Informing of Environmentalism: Risk Communication in Historical Perspective*, 19 LANDSCAPES EXPOSURE KNOWLEDGE ILLNESS MOD. ENV'T 283, 288 (2004).

⁵⁵ Some corporations even took preemptive actions because they were concerned about the detrimental publicity that would likely result from the disclosure of information through TRI. For instance, in 1998 Monsanto pledged to cut toxic air emissions by over ninety percent within five years, and achieved this goal ahead of schedule after spending \$100 million. KRAFT ET AL., *supra* note 28, at 53; Mary Graham & Catherine Miller, *Disclosure of Toxic Releases in the United States*, in INDUSTRIAL TRANSFORMATION: ENVIRONMENTAL POLICY INNOVATION IN THE UNITED STATES AND EUROPE 307 Theo J. N. M. de Bruijn & Vicki Norberg-Bohm eds., 2005); Cynthia Giles, *Next Generation Compliance*, in NEXT GENERATION ENVIRONMENTAL COMPLIANCE AND ENFORCEMENT 6 (LeRoy Paddock & Jessica Wentz eds., 2014).

⁵⁶ Graham & Miller, *supra* note 55, at 307. See also KRAFT ET AL., *supra* note 28, at 54 (“For example, Invista, a facility in New Hanover County, North Carolina, reduced its toxic releases from 25.6 million pounds in 1988 to 3.6 million in 1989—a drop of roughly 85 percent in only one year’s time.”).

⁵⁷ EPA, 2015 TRI NATIONAL ANALYSIS: EXECUTIVE SUMMARY, at ii (2015), https://www.epa.gov/sites/production/files/2017-01/documents/tri_na_2015_executive_summary.pdf [<https://perma.cc/HC37-56RM>].

hailed as a new model of environmental regulation by policymakers, scholars, and environmental groups for its overall impact.⁵⁸ Closer inspection, however, reveals that TRI has actually had inconsistent results.⁵⁹ For example, between 2009 and 2010, there was a sixteen percent increase in total disposal and other releases.⁶⁰ Moreover, when the TRI data is disaggregated, it becomes clear that not all facilities have actually reduced their toxic releases. Some facilities have made huge progress in reducing their chemical releases while others actually have increased the amount of toxics they generate and release into the environment.⁶¹

TRI's disclosure-based approach addresses some of the inherent challenges of environmental regulation, such as the need for greater information,⁶² but it may not necessarily be the best way to reduce environmental hazards and incentivize corporate action in a domestic context where other enforcement options exist.⁶³ However, it is beyond the scope of this Article to engage in a debate over the merits of traditional versus alternative forms of regulation, such as market-based or new governance options.⁶⁴ Rather, I suggest that the lessons that can be learned from TRI

⁵⁸ Pedersen, *supra* note 54, at 163; KRAFT ET AL., *supra* note 28, at 54; Karkkainen et al., *supra* note 53, at 696.

⁵⁹ KRAFT ET AL., *supra* note 28, at 153; Graham & Miller, *supra* note 55, at 313.

⁶⁰ EPA, 2010 TRI NATIONAL ANALYSIS OVERVIEW 6–7 (2010), https://www.epa.gov/sites/production/files/documents/2010_national_analysis_overview_document.pdf [<https://perma.cc/5BW5-LCM4>]; EPA, 2012 TRI NATIONAL ANALYSIS OVERVIEW 7–8 (2014), https://www.epa.gov/sites/production/files/2014-01/documents/complete_2012_tri_na_overview_document.pdf [<https://perma.cc/8C29-77UZ>] (showing an increase in toxic chemical releases).

⁶¹ KRAFT ET AL., *supra* note 28, at 154. *But see* Graham & Miller, *supra* note 55, at 315 (noting that some of the increases in the mid-1990s were due to a rapidly growing economy and that toxic waste generation increased at a slower rate than manufacturing production).

⁶² Karkkainen, *supra* note 25, at 263–68 (“Conventional approaches to environmental regulation are . . . limited by the capacity of regulators to acquire the information necessary to set regulatory standards and keep pace with rapid changes in knowledge, technology, and environmental conditions. . . . Given these daunting information barriers, it is not surprising that so few pollutants have actually come under regulatory control, despite the proliferation of regulatory statutes and offices to administer them, and despite the investment of millions of dollars and thousands of person-years in the effort to set and justify standards.”); Wendy E. Wagner, *Commons Ignorance: The Failure of Environmental Law to Produce Needed Information on Health and the Environment*, 53 DUKE L.J. 1619, 1619 (2003) (arguing that “one of the most significant problems facing environmental law is the dearth of scientific information available to assess the impact of industrial activities on public health and the environment”).

⁶³ David W. Case, *Corporate Environmental Reporting as Informational Regulation: A Law and Economics Perspective*, 76 U. COLO. L. REV. 379, 387 (2005) (noting “that disclosure strategies are imperfect substitutes for direct legal controls on environmental conduct”).

⁶⁴ *See, e.g.*, Lobel, *supra* note 22; Sidney A. Shapiro & Rena Steinzor, *Capture, Accountability, and Regulatory Metrics*, 86 TEX. L. REV. 1741, 1741 (2008); Ronan Kennedy,

are valuable for the international environmental law context, where it is rare for even binding treaties to penalize parties for non-compliance and where compliance is often incentivized through the transparent disclosure of information.⁶⁵

The Paris Agreement on climate change is a case in point.⁶⁶ All parties committed to establishing emissions targets in the form of “nationally determined contributions” and to adopting “domestic mitigation measures, with the aim of achieving the objectives of such contributions.”⁶⁷ The Paris Agreement does not have economic or military penalties for non-compliance. Instead, participating nations agree to report on their own progress and to be subject to a form of external review, with the expectation that the transparent disclosure of information will foster adherence to the treaty terms.⁶⁸ Although the global commitments to expanding access to water, sanitation, and hygiene are soft law and not treaty-based obligations, the global monitoring schemes that monitor their progress have the same goal of incentivizing compliance through information disclosure.

With the goal of extrapolating lessons for the global water sector, I studied the literature on the TRI to understand why it was effective in some instances at changing corporate behavior and enhancing public

Rethinking Reflexive Law for the Information Age: Hybrid and Flexible Regulation by Disclosure, 7 GEO. WASH. J. ENERGY & ENVTL. L. 124, 124 (2016); Sarah E. Light & Eric W. Orts, *Parallels in Public and Private Environmental Governance*, 5 MICH. J. ENVTL. & ADMIN. L. 1, 7–10 (2015).

⁶⁵ For example, neither the U.N. Convention on the Law of the Seas, nor the U.N. Framework Convention on Climate Change, nor the U.N. Convention on Non-Navigational Uses of International Watercourses contain provisions that would allow economic or military sanctions to be imposed on a country for non-compliance with the treaty terms. However, all emphasize the importance of cooperation in exchanging information. The Montreal Protocol on Substances that Deplete the Ozone Layer is a notable exception because it does permit the imposition of trade related penalties. See HUNTER ET AL., *supra* note 18; see generally United Nations Convention on the Law of the Sea art. 200, May 21, 1997, U.N.T.S. 3, 6; U.N. GENERAL ASSEMBLY, United Nations Framework Convention on Climate Change, May 9, 1992, S. Treaty Doc No. 102-38, 1771 U.N.T.S. 1, *2, *6, *9; United Nations Convention on Non Navigational Uses of International Watercourses art. 9, April 11, 1997, S. Treaty Doc. No. A/51/869, 6. The Montreal Protocol on Substances that Deplete the Ozone Layer is a notable exception because it does permit the imposition of trade related penalties. *But see* 26 I.L.M. 1522, 34 (1987).

⁶⁶ Paris Agreement art. 13, Apr. 22, 2016, T.I.A.S. 16-1104, http://unfccc.int/files/essential_background/convention/application/pdf/english_pari_agreement.pdf [<https://perma.cc/HJG6-SKNV>]. See also Daniel Bodansky, *The Legal Character of the Paris Agreement*, 25 REV. EUR. COMP. INT'L ENVTL. L. 142, 142 (2016); Daniel Bodansky, *The Paris Climate Change Agreement: A New Hope?*, 110 AM. J. INT'L L. 288, 288 (2016).

⁶⁷ Paris Agreement, *supra* note 66, art. 4(2).

⁶⁸ *Id.* art. 13.

knowledge of environmental risks. Drawing on the work of Karkkainen, Kraft et al., and others,⁶⁹ I synthesized this body of scholarship and distilled out three key factors that appear to mediate the governance effect of TRI's disclosure scheme.

The first important factor that I identified from the TRI literature is that disclosed information has stronger communicative power when it is framed as a simple quantitative indicator that promotes comparison. The concept of "equivalence," which I borrow from Boyd, helps to explain why.⁷⁰ Equivalence refers to those technical practices that allow seemingly different activities to be standardized into one system and thus be treated equivalently for comparative purposes.⁷¹ The TRI metric promotes equivalence by enabling facilities of different sizes, working in different industries, and located in different parts of the country, to be measured and ranked across one indicator.⁷² By translating complex goals on environmental risk and performance into a simple quantitative metric, TRI generates information that is more accessible to the public, media, regulators, and the facilities themselves.⁷³

The second influential factor is the ability and willingness of the target actor to change its behavior. The TRI has a stronger governance effect when reporting facilities have the capacity and desire to improve and adapt.⁷⁴ Prior to the implementation of TRI, many facilities were not even aware of their own toxic releases.⁷⁵ They then discovered that the information they had to report to TRI enabled them to manage their operations better, consistent with the adage "you manage what you measure."⁷⁶ For these facilities, TRI promoted a continuous-learning, continuous-improvement dynamic that propelled them to voluntarily enhance their

⁶⁹ See Karkkainen et al., *supra* note 53; KRAFT ET AL., *supra* note 28; Case, *supra* note 54; Fortun, *supra* note 54.

⁷⁰ Boyd, *supra* note 33, at 856.

⁷¹ For example, in a case study on how deforestation became an object of international climate governance, Boyd uses equivalence to explain how the concept of "global warming potential" allowed different gases in diverse sectors to be tracked in one system, which in turn facilitated the integration of tropical forests into the carbon compliance system. See *id.* at 912.

⁷² See generally *id.* at 856 (applying the principle of equivalence to TRI).

⁷³ 42 U.S.C. § 11023; KRAFT ET AL., *supra* note 28, at 60–61; Karkkainen, *supra* note 25, at 285 (noting that much of the information that EPA normally gathers is not easily comprehensible, leading to the agency to describe itself as "data-rich but information-poor").

⁷⁴ KRAFT ET AL., *supra* note 28, at 42–47; Karkkainen, *supra* note 25, at 289–90, 295.

⁷⁵ Karkkainen, *supra* note 25, at 297.

⁷⁶ *Id.* at 298–99 (noting that one "firm had never set internal pollution prevention goals because '[w]e never had the information we needed to know if progress was being made.'").

own environmental self-monitoring.⁷⁷ However, the selective impact of TRI on changing behavior aligned with other corporate goals.⁷⁸ It also suggests that certain facilities have the capacity to use the information more productively.⁷⁹

The third factor that influences the governance effect of disclosed information is the ability of external stakeholders to influence the target actor, which is impacted by the power dynamics between the groups. TRI has been more effective at spurring corporate change when markets, regulators, and the public have been able to use the disclosed information to alter the reporting facility's actions.⁸⁰ In some instances, TRI data has influenced the perceptions of corporate boards, institutional investors, the stock market,⁸¹ as well as the firm's own employees and customers.⁸² Regulators at the national, state, and local levels have used the data generated on toxic releases to identify regulatory gaps and priorities⁸³ and, in some instances, to enact additional laws to regulate the facilities.⁸⁴ Civil society groups have been able to transform the TRI information into more user-friendly data.⁸⁵ This in turn has helped communities bring

⁷⁷ *Id.* at 302, 305–09, 330 (discussing how TRI has fostered some additional peer-based benchmarking and monitoring efforts, such as the Responsible Care program launched by the organization now known as the American Chemistry Council); KRAFT ET AL., *supra* note 28, at 55.

⁷⁸ KRAFT ET AL., *supra* note 28, at 170.

⁷⁹ *Id.* at 153–76; Graham & Miller, *supra* note 55, at 313.

⁸⁰ Graham & Miller, *supra* note 55, at 311.

⁸¹ Karkkainen, *supra* note 25, at 299; *id.* at 323–24; KRAFT ET AL., *supra* note 28, at 42.

⁸² Karkkainen, *supra* note 25, at 325–28 (suggesting that workers might demand wage premiums for risking exposure to perceived workplace hazards and that a facility may use its “superior” performance on the TRI to build its public image).

⁸³ For example, Congress amended the Clean Air Act in 1990 to strengthen provisions on hazardous air pollutants after early rounds of data from the TRI revealed that much larger volumes of these pollutants were being released into the air. *Id.* at 310–12; KRAFT ET AL., *supra* note 28, at 45, 55.

⁸⁴ KRAFT ET AL., *supra* note 28, at 65 (discussing New Jersey's Worker and Community Right to Known Act and Massachusetts' Toxic Use Reduction Act).

⁸⁵ The EPA's National Analysis on TRI data explicitly invites users to conduct their own analysis of the publicly available TRI data. EPA, *supra* note 57, at 3. For example, the Scorecard, which was originally created by Environmental Defense Fund and is now run by Green Media Toolshed, combines data from the TRI with other information on the potential health hazards of toxic chemicals. *Pollution Locator*, SCORECARD (last visited Jan. 21, 2018), <http://scorecard.goodguide.com/env-releases/us-map.tcl> [<https://perma.cc/66UR-8DY6>]; Fortun, *supra* note 54, at 292 (noting that when the Scorecard was first launched, *Chemical Week* described it as the “Internet Bomb” because of its potential impact on the reputation of chemical companies, while Greenpeace lauded it as the “gold standard” of environmental information systems).

pressure on polluters, such as through boycotts, adverse publicity, and lawsuits.⁸⁶ The data has also revealed inequities in exposure that raise environmental justice concerns.⁸⁷ However, the fact that these disparities continue to exist highlights the unequal power dynamics that limit the potential for a strong governance effect.⁸⁸ Although the impact of any particular stakeholder depends on the given situation, Karkkainen argues that the “underlying genius” of the TRI is that it allows monitoring and benchmarking by multiple actors.⁸⁹

The three factors identified through this synthesis of the TRI literature—the simplicity of the metric, the capacity and desire of the disclosing actor to change its behavior, and the ability of external stakeholders to influence the target actor—provide a useful framework for analyzing the governance effect of other disclosure schemes, such as the global water, sanitation, and hygiene monitoring efforts that are the focus of this Article’s case study. However, TRI also illustrates the potential distorting impact of relying solely on numeric indicators to achieve a complex goal like reducing environmental risk. The next section on knowledge effects explains why and identifies factors that influence the ability of a legal norm to be accurately translated into a quantitative indicator.

B. *Knowledge Effects*

Quantitative indicators may take on a life of their own and represent more (or less) than originally intended, and thereby have a knowledge effect that inadvertently redefines the original normative goal and distorts the subsequent policy options.⁹⁰ For example, TRI data is often

⁸⁶ Karkkainen, *supra* note 25, at 316–23; KRAFT ET AL., *supra* note 28, at 44; Kim Fortun et al., *Pushback: Critical data designers and pollution politics*, *BIG DATA & SOCIETY* 1 (2016).

⁸⁷ KRAFT ET AL., *supra* note 28, at 10; Case, *supra* note 54, at 733–34; RUBIN PATTERSON, *GREENING AFRICANA STUDIES: LINKING ENVIRONMENTAL STUDIES WITH TRANSFORMING BLACK EXPERIENCES* 128 (2015), <http://web.a.ebscohost.com/ehost/detail/detail?vid=2&sid=ffaf9521-0dd0-4c8e-9fdf-f226e30b2311%40sessionmgr4008&bdata=JkF1dGhUeXBIPWNvb2tpZSxpcCx1cmwsc2hpYiZzaXRIPWVob3N0LWxpdmUmc2NvcGU9c2l0ZQ%3d%3d#AN=910206&db=nlebk> [<https://perma.cc/J93B-VAP4>] (last visited Jan. 21, 2018).

⁸⁸ Kraft et al. underscore this point when they note that “somewhat contrary to the expectations that policymakers had for the TRI program, relatively few people and community groups have made much direct use of the TRI data; this is particularly the case in later years of the program’s operation.” KRAFT ET AL., *supra* note 28, at 55.

⁸⁹ Karkkainen, *supra* note 25, at 329.

⁹⁰ Fukuda-Parr et al., *supra* note 27. SAKIKO FUKUDA-PARR, *GLOBAL DEVELOPMENT GOAL SETTING AS A POLICY TOOL FOR GLOBAL GOVERNANCE: INTENDED AND UNINTENDED CONSEQUENCES* 2, 6 (2013), <http://www.ipc-undp.org/pub/IPCWorkingPaper108.pdf> [<https://perma.cc/6UVH-ELTM>].

used as a proxy for community environmental health⁹¹ and for corporate environmental performance⁹²—but the metric is in fact a poor predictor of both normative goals. TRI simply requires facilities to disclose pounds of toxins released, not the actual risk associated with these toxins.⁹³ Although the chosen metric of pounds of toxics released is theoretically calculable, facilities are only required to report estimates and most do not even have reliable ways to conduct the measurements.⁹⁴ In other words, the indicator was chosen in part because of what was technically feasible and what data was readily available.⁹⁵

The list of chemicals covered by the TRI is only a fraction of the chemicals currently used.⁹⁶ We know very little about the vast majority of chemicals and the EPA does not have the needed expertise or staff power to conduct appropriate tests.⁹⁷ Not all chemicals are equally toxic⁹⁸ and the health risk depends on the medium through which the toxin is released, i.e., through air, water, or land.⁹⁹ Because the reporting requirements only apply to certain industry sectors and businesses of a certain

⁹¹ For example, when President Bill Clinton signed into law updates to the Emergency Planning and Community Right-to-Know Act, he explained that the act provides “an innovative approach to protecting public health and the environment by ensuring that communities are informed about the toxic chemicals being released into the air, land, and water by manufacturing facilities.” 60 FED. REG. 41791 (Aug. 8, 1995), *available at* <https://www.gpo.gov/fdsys/pkg/USCODE-2010-title42/html/USCODE-2010-title42-chap116.htm> [<https://perma.cc/6TVL-KWQC>]. Similarly, the EPA asserts that “Since the creation of the TRI Program, the information collected and presented has provided a way for citizens to better understand possible sources of pollution in their communities.” U.S. EPA, LEARN ABOUT THE TOXICS RELEASE INVENTORY US EPA (2013), <https://www.epa.gov/toxics-release-inventory-tri-program/learn-about-toxics-release-inventory> [<https://perma.cc/92VL-D8MM>] (last visited Jan. 21, 2018).

⁹² See, e.g., Karkkainen, *supra* note 25, at 305–06.

⁹³ KRAFT ET AL., *supra* note 28, at 63, 66–67; Pedersen, *supra* note 54, at 173.

⁹⁴ KRAFT ET AL., *supra* note 28, at 61.

⁹⁵ *Id.* at 61.

⁹⁶ *Id.* at 61, 68 (noting that the TRI list has grown from about 300 to about 650 chemicals, but industrial facilities use tens of thousands of chemicals and new ones are constantly being developed; even those that are deemed to be “safe” have not necessarily been thoroughly tested for toxicity).

⁹⁷ Karkkainen, *supra* note 25, at 263–65; Pedersen, *supra* note 54, at 179–81.

⁹⁸ Karkkainen, *supra* note 25, at 264–65; *Pollution Locator*, *supra* note 85; Pedersen, *supra* note 54, at 171–72; KRAFT ET AL., *supra* note 28, at 63.

⁹⁹ Pedersen, *supra* note 54, at 170–71; Graham & Miller, *supra* note 55, at 318–19; KRAFT ET AL., *supra* note 28, at 67 (noting that air pollution dissipates more rapidly than other mediums, but many people are nonetheless exposed via inhalation; that certain toxins remain in water, enabling exposure through ingestion or dermal contact; and that although less people tend to be exposed through land pollution, contaminants can remain in the ground for a long time).

size,¹⁰⁰ a huge amount of toxins continue to be used¹⁰¹ and released into the environment.¹⁰² The information disclosed may not even reflect true improvements due to “paper changes”¹⁰³ and inaccurate estimations.¹⁰⁴ Moreover, the TRI metric is focused on pounds of toxins released, so the data is necessarily skewed towards larger facilities; percentage reductions would in fact be a more accurate assessment of performance.¹⁰⁵

Given that a metric like the TRI is a poor proxy for normative goals on environmental risk exposure and corporate environmental performance, is the quantitative indicator useful at all? I agree with most scholars who have studied the issue and concluded that the answer is yes.¹⁰⁶ Although TRI is not perfect, it has created positive governance effects, at least in certain circumstances as discussed in the prior section. Moreover, as long as the inherent limitations are understood, then the disclosed information can be taken with the appropriate grain of salt. In other words, we should not throw out the proverbial baby with the bath water. However, we need to understand why it is difficult to translate complicated legal norms into numbers so that we can address these barriers, improve the statistics, and, where appropriate, develop other more descriptive sources of information.

The development of statistical indicators necessarily prioritizes those factors that can easily be quantified and demotes more complicated, harder to quantify aspects.¹⁰⁷ The reliance on statistics can turn an exercise of judgment and subjectivity into a technical exercise, devoid of political context.¹⁰⁸ As Ackerman et al. observes, a quantitative indicator “seems

¹⁰⁰ 42 U.S. Code § 11023; 40 CFR § 372.65; Case, *supra* note 54, at 736; Pedersen, *supra* note 54, at 165–70.

¹⁰¹ Pedersen, *supra* note 54, at 173; Graham & Miller, *supra* note 55, at 326.

¹⁰² KRAFT ET AL., *supra* note 28, at 56; Graham & Miller, *supra* note 55, at 308.

¹⁰³ These “paper changes” are due to changes in estimations or because a facility may decide to start reporting the on-site recycling of a chemical as “in-process recovery,” which is not reportable to TRI. Graham & Miller, *supra* note 55, at 317; KRAFT ET AL., *supra* note 28, at 63, 69.

¹⁰⁴ KRAFT ET AL., *supra* note 28, at 61.

¹⁰⁵ *Id.* at 89.

¹⁰⁶ For example, Karkkainen argues that despite TRI's limitations, it is nevertheless effective because it shifts the burden of producing information to the polluting facilities, which helps to overcome the “information bottleneck” that EPA faces in all its environmental regulatory efforts. Karkkainen, *supra* note 25, at 263. *See also* Graham & Miller, *supra* note 55; KRAFT ET AL., *supra* note 28; Archon Fung & Dara O'Rourke, *Reinventing Environmental Regulation from the Grassroots Up: Explaining and Expanding the Success of the Toxics Release Inventory*, 25 ENVTL.MANAGE. 115, 116 (2000); Pedersen, *supra* note 54, at 207–08.

¹⁰⁷ Bartram et al., *supra* note 14, at 8157.

¹⁰⁸ Rosga & Satterthwaite, *supra* note 32, at 258.

to promise to the lay decision maker a comprehensive assay of the problem to be confronted,” when in fact, it represents only one dimension of a much more complex issue.¹⁰⁹ The veil of objectivism that surrounds statistical indicators camouflages political assumptions that go into the process.¹¹⁰ “Quantification is seductive,” Merry argues, because “numbers convey an aura of objective truth and scientific authority despite the extensive interpretive work that goes into their construction.”¹¹¹

Examples abound with respect to this kind of knowledge effect distortion, even outside the environmental field.¹¹² Consider the pervasive use of unemployment figures. According to the U.S. Department of Labor, “people are classified as unemployed if they do not have a job, have actively looked for work in the prior 4 weeks, and are currently available for work.”¹¹³ Unemployment is often used as a proxy for the overall health of the economy because it is simple to report and understand. But, in fact, it is a very limited indicator. If people stop looking for work, they are not captured in unemployment statistics.¹¹⁴ People who drive for Uber or work at McDonald’s might have highly variable incomes, depending on the amount of work they are able to get in a given week; such income volatility is not captured in unemployment. Moreover, unemployment is an aggregate figure, representing an average. If the data was disaggregated, it would reveal high variability among communities based on geography, race, and social class.

Similarly, the long-standing debate over the value of cost-benefit analyses in regulatory decision-making has underscored that issues that are difficult to measure can easily be ignored. As Justice Stevens has observed, the application of cost-benefit analysis “is particularly controversial in the environmental context in which a regulation’s financial costs are often more obvious and easier to quantify than its environmental benefits.”¹¹⁵ Heinzerling and Ackerman have argued that cost-benefit

¹⁰⁹ ACKERMAN ET AL., *supra* note 8, at 28, 30.

¹¹⁰ MERRY, *supra* note 3, at 19–20.

¹¹¹ *Id.* at 1.

¹¹² SETH STEPHENS-DAVIDOWITZ, *EVERYBODY LIES: BIG DATA, NEW DATA, AND WHAT THE INTERNET CAN TELL US ABOUT WHO WE REALLY ARE* 252–56 (2017) (discussing a variety of examples where we overemphasize things that are measurable, such as educational test scores and the results of pedometers, that are really proxies for other things that are less measurable, such as the development of critical thinking and overall fitness).

¹¹³ Bureau of Labor Statistics, U.S. Department of Labor, *HOW THE GOVERNMENT MEASURES UNEMPLOYMENT*, https://www.bls.gov/cps/cps_htgm.htm#unemployed [<https://perma.cc/N7ES-ASUK>] (last visited Jan. 21, 2018).

¹¹⁴ *Id.*

¹¹⁵ *Entergy Corporation v. Riverkeeper, Inc.*, 556 U.S. 208 (2009) (Stevens, dissenting)

analysis is fundamentally flawed because it requires the creation of artificial prices for all relevant health and environmental impacts, which cannot readily be reduced to numbers.¹¹⁶ They discuss absurd examples of such economic reductionism, such as a study showing that states would save money by encouraging their citizens to smoke more because they would not have to pay for long-term nursing care and related costs.¹¹⁷ They further note that prior successful environmental protection actions, such as the removal of lead from gasoline, would never have been undertaken had cost-benefit analysis been applied because the benefits would not have been appropriately quantified.¹¹⁸

Livermore and Revesz, however, challenge this conventional wisdom by suggesting that in certain circumstances, cost-benefit analysis can in fact lead to more environmentally stringent outcomes than more seemingly protective criteria, such as health-based standards.¹¹⁹ Because environmentalists initially absented themselves from the development of cost-benefit analyses, the methodologies became biased against regulation and “environmentalist opposition to cost-benefit analysis became a self-fulfilling prophecy.”¹²⁰ More recently, environmentalists are engaging in the development of cost-benefit methodologies because they recognize that the approach can enhance environmental protection.¹²¹

(noting that the EPA’s cost-benefit calculation for water intake regulations only included the value of commercially or recreationally harvested fish, which meant that 98.2% of the aquatic life was excluded from the analysis because the value of those species could not easily be monetized). *See also* Lisa Heinzerling, *Statutory Interpretation in the Era of OIRA*, 33 *FORDHAM URB. L. J.* 1097, 1105 (2006) (critiquing EPA’s rule on cooling water intake structures at existing power plants for its failure to monetize benefits of all impacted species); Heinzerling, *supra* note 34, at 113 (noting that even when an agency recognizes that unquantifiable benefits exist, they are often ignored when the focus is on a “numerical bottom line,” such as when “a federal court overturned the EPA’s ban on asbestos partly because it concluded that the agency could not rely in any significant way on unquantified benefits in justifying the ban.”).

¹¹⁶ Ackerman & Heinzerling, *supra* note 34, at 1563–64.

¹¹⁷ *Id.* at 1553–54. Interestingly, they also laud the Toxics Release Inventory as an effective “right to know” alternative that does not rely on cost-benefit analysis—even though this disclosure scheme also suffers from some of the same flaws. *Id.* at 1582–83.

¹¹⁸ Frank Ackerman et al., *Applying Cost-Benefit to Past Decisions: Was Environmental Protection Ever a Good Idea?*, 57 *ADMIN. L. REV.* 155, 156 (2005).

¹¹⁹ Livermore & Revesz, *supra* note 35 (arguing that “contrary to the commonly accepted view, [National Ambient Air Quality Standards under the Clean Air Act] have generally been set at levels that are less stringent than those that would result from the application of cost-benefit analysis”).

¹²⁰ Livermore & Revesz, *supra* note 35, at 6.

¹²¹ *Id.* at 5.

While I recognize the inherent challenges in translating a complex legal norm into a number, I suggest that it is important to understand how quantitative indicators are constructed and deployed so that the methodologies can be improved and the resulting statistics can be placed in their proper context. Several terms of art drawn from the environmental law and social science literature provide a helpful vocabulary for describing the process and limitations of translating legal norms into quantitative indicators. I draw again on Boyd's work, adopting the term "calculability," which he uses to describe techniques that facilitate the quantification, simplification and comparison of that problem.¹²²

I also build on the social science literature examining the role of indicators in global governance.¹²³ In particular, Merry highlights two related phenomenon that underscore the limitations of calculability.¹²⁴ Because information can be difficult to gather, quantitative indicators may be structured around data that already exists instead of measuring the intended goal, and thus suffer from "data inertia."¹²⁵ Quantitative indicators purport to convey the objective truth, but because the data is never complete and may not measure exactly what is intended, the result can be misleading.¹²⁶ In addition, "expertise inertia" refers to the fact that statistical indicators are inherently limited by the experiences and skills of those charged with developing them.¹²⁷ These terms—calculability, data inertia and expertise inertia—create a language that helps explain the challenges of translating legal norms into numeric indicators.

Problems of calculability, data inertia, and expertise inertia should also be understood as social justice issues.¹²⁸ As Merry observes, technocratic processes often mask the political and normative nature of decision-making, allowing statistical knowledge to fly "under the radar of social and political analysis as a form of power."¹²⁹ For instance, as noted earlier, civil society groups have been able to use data from the TRI to highlight environmental justice concerns because counties that have a higher percentage of black and other minority residents are more likely to live in

¹²² Boyd, *supra* note 33, at 856, 916.

¹²³ See also MERRY, *supra* note 3, at 14–15; Davis et al., *supra* note 1, at 79–80; FUKUDA-PARR & YAMIN, *supra* note 32, at 1, 4; Rosga & Satterthwaite, *supra* note 32, at 255.

¹²⁴ MERRY, *supra* note 3, at 6–7 (explaining the limitations of "data inertia" and "expertise inertia" on calculability).

¹²⁵ *Id.* at 7.

¹²⁶ *Id.* at 5.

¹²⁷ *Id.* at 6.

¹²⁸ I return to this theme in Section II.D, when I discuss how human rights have influenced the development of global water indicators.

¹²⁹ MERRY, *supra* note 3, at 5.

communities exposed to higher numbers of acute and chronic toxic releases.¹³⁰ However, the information would be more accurate at predicting environmental risk if the TRI metric included all chemicals used by the facilities and provided information on actual toxic exposure. Given that industry has already pushed back on efforts to expand the list of chemicals that must be reported to the TRI,¹³¹ attempts to improve the TRI indicator would no doubt face stiff resistance. The failure to change the metric reflects, directly or indirectly, power dynamics in society and the political prioritization of issues.¹³²

I am not suggesting that all complex issues can—or should—be translated into numeric terms because not all topics can be adequately measured. Rather, I am making a more subtle argument: when a quantitative indicator is developed, it is critical to examine why the metric was constructed in a particular way and why certain data gaps exist. It is also important to engage in meaningful efforts to improve a statistical indicator so that it better captures the complexity of a problem. However, because numbers can never portray the full story, it is equally important that other complementary forms of research and knowledge are generated so that a complete picture can emerge.

By identifying the factors that influence both the governance effects and knowledge effects of quantitative indicators, this interdisciplinary conceptual framework provides a novel way to examine when information disclosure is likely to promote legal compliance. This approach is particularly useful to the study of international environmental law because a large monitoring scheme has developed to quantitatively measure progress on global commitments to expanding access to water, sanitation, and hygiene. The next section describes the relevant international legal declarations and then uses the conceptual framework to examine the governance and knowledge effects of these global indicators.

II. CASE STUDY ON GLOBAL WATER, SANITATION, AND HYGIENE

A. *Brief History of Global Water Goals*

Over the last half century, access to *intrastate* water has become an object of global environmental governance. The start of the international

¹³⁰ PATTERSON, *supra* note 87, at 128.

¹³¹ Pedersen, *supra* note 54, at 165; KRAFT ET AL., *supra* note 28.

¹³² See also Ackerman & Heinzerling, *supra* note 34, at 1573–74 (noting that because cost-benefit analysis focuses on aggregate benefits and costs, “it tends to ignore, and therefore has the effect of reinforcing, patterns of economic and social inequality”).

environmental movement is often traced to the 1972 Stockholm Conference on the Human Environment, whose declaration briefly mentioned water as among the natural resources of the earth that must be safeguarded.¹³³ However, it was the 1977 Action Plan of the U.N. Water Conference in Mar Del Plata that galvanized attention on a variety of water issues. With respect to community water supply, the U.N. conference declared that “[a]ll peoples, whatever their stage of development and their social and economic conditions, have the right to have access to drinking water in quantities and of a quality equal to their basic needs.”¹³⁴ The 1980s were declared the International Drinking Water Supply and Sanitation Decade and concrete targets were established: 100% access for urban water, 80% access for urban sanitation, and 50% access for rural water and sanitation.¹³⁵ Any achievement towards these targets was negated by population growth, so when states met at the 1990 Global Consultation on Safe Water and Sanitation in New Delhi, they declared that universal access for water and sanitation should be achieved by 2000.¹³⁶ This commitment to universal access to safe water and sanitation services was reaffirmed in Agenda 21, the comprehensive action plan that accompanied the 1992 Rio Declaration on Environment and Development.¹³⁷

The turn of the century heralded a new approach to international development, one that prioritized measurable goals that could be monitored through quantitative indicators.¹³⁸ In 2000, U.N. member states adopted the Millennium Declaration, which did not commit to universal water access but instead resolved “to halve the proportion of people who

¹³³ See generally G.A. *Report of the United Nations Conference on the Human Environment*, U.N. Doc. A/Conf.48.14.Rev.1.

¹³⁴ U.N. WATER CONFERENCE—RESOLUTIONS, at 1, U.N. Sales No. E.77.II.A.12 (March 1977), <http://ielrc.org/content/e7701.pdf> [<https://perma.cc/D2WD-TWG3>].

¹³⁵ G.A. Res. 35/18, at ¶ 4 (Nov. 10, 1980), <http://www.un.org/documents/ga/res/35/a35r18e.pdf> [<https://perma.cc/9WPP-2J2B>]; B.Z. Diamant, *Assessment and Evaluation of the International Water Decade*, 112 J. R. SOC. HEALTH 183, 183–84 (1992).

¹³⁶ *New Delhi Statement, Global Consultation on Safe Water and Sanitation*, 2–3, U.N. Doc A/C.2/45/3 (Oct. 11, 1990), <http://ielrc.org/content/e9005.pdf> [<https://perma.cc/4DUT-4WW9>].

¹³⁷ *United Nations Conference on Env't & Dev., Agenda 21*, art. 6.12 (June 14, 1992), <http://www.un.org/esa/sustdev/documents/agenda21/english/Agenda21.pdf> [<https://perma.cc/MMC6-C288>].

¹³⁸ Statement by Mark Suzman, Managing Director, International Policy, Programs & Advocacy, Bill & Melinda Gates Foundation, to High Level Dialogue on Health in the Post-2015 Development Agenda (Mar. 5, 2013), <https://www.gatesfoundation.org/Media-Center/Speeches/2013/03/High-Level-Dialogue-on-Health-in-the-Post-2015-Development-Agenda> [<https://perma.cc/5BKP-R6AM>] [hereinafter Suzman Statement Mar. 2013].

are unable to reach or to afford safe drinking water” by 2015.¹³⁹ This shift away from universal water access reflected the international community’s embrace of more realistic time-bound goals that could be measured.

The goals in the Millennium Declaration were ultimately translated into the MDGs,¹⁴⁰ through a technical process that was criticized by civil society for being non-transparent and non-participatory.¹⁴¹ The resulting goals committed states to “halv[ing] by 2015, the proportion of the population without sustainable access to safe drinking water and basic sanitation.”¹⁴² This target differed from the original wording of the Millennium Declaration in several ways. The Millennium Declaration only addressed water, but sanitation was added to the MDG target in 2002.¹⁴³ After much debate, the reference to “affordability” in the Declaration was deleted, the phrase “sustainable access” was added to the MDG target, and the description of water as “safe” in the Declaration was maintained.¹⁴⁴ However, as will be discussed in Section II.C, the actual indicators used to measure progress with this MDG target did not consider sustainability, safety, or affordability. The Joint Monitoring Program for Water Supply and Sanitation (“JMP”), which the World Health Organization and UNICEF created in 1990, was tasked with developing indicators to monitor progress towards the MDGs.¹⁴⁵

¹³⁹ G.A. Res. 55/22, at 4 (Sept. 18, 2000); Langford & Winkler, *supra* note 41, at 145 (describing this as a “normative regression”).

¹⁴⁰ The targets identified in the Millennium Declaration were merged with the International Development Goals that had been developed by the Development Assistance Committee of the OECD to prioritize funding for overseas development. David Hulme, *The Millennium Development Goals (MDGs): A Short History of the World’s Biggest Promise* 12–16 (Brooks World Poverty Inst., Working Paper No. 100, Sept. 2009), <http://papers.ssrn.com/abstract=1544271> [<https://perma.cc/F83W-CTPV>] (last visited Jan. 21, 2018); John W. McArthur, *The Origins of the Millennium Development Goals*, XXXIV SAIS REV. 5, 6 (2014) (“The lack of transparency in the formulation of the MDGs was one of their shortcomings, for a group of staff members from the U.N., International Monetary Fund, World Bank, and OECD were responsible for the drafting process without any broader participation, especially from civil society.”).

¹⁴¹ See, e.g., Ved Nanda, *The Journey from the Millennium Development Goals to the Sustainable Development Goals*, 44 DENV. J. INT’L POL’Y 389, 398 (2016).

¹⁴² U.N. DEP’T OF ECON. AFFAIRS, OFFICIAL LIST OF MDG INDICATORS, <http://mdgs.un.org/unsd/mdg/Host.aspx?Content=Indicators/OfficialList.htm> [<https://perma.cc/GC77-G2CP>] (last visited Oct. 24, 2017).

¹⁴³ Bartram et al., *supra* note 14, at 8142.

¹⁴⁴ *Id.*

¹⁴⁵ *Id.* at 8138, 8142 (noting that international monitoring of drinking water and sanitation began in the 1930s under the League of Nations but became more robust under the JMP).

In 2010, the MDG target for water was met five years ahead of schedule, but there was less cause for celebration than might appear at first glance.¹⁴⁶ At that point in time, there were still approximately 780 million individuals without access to improved drinking water.¹⁴⁷ As discussed below, however, these figures were underestimates because the statistical methodology did not capture whether the water was safe, available when needed, easily accessible, or affordable.¹⁴⁸ In addition, by the time the MDGs expired in 2015, sanitation remained one of the most off-track MDGs, with the target having been missed by almost 700 million people.¹⁴⁹

The year 2010 was also when the U.N. General Assembly and Human Rights Council adopted resolutions recognizing a human right to safe drinking water and sanitation.¹⁵⁰ The right, which derives principally from the International Covenant on Economic, Social and Cultural Rights, “entitles everyone to sufficient, safe, acceptable, physically accessible and affordable water for personal and domestic uses.”¹⁵¹ As discussed in Section II.D, this recognition fueled greater attention to the MDG water targets by the human rights community and provided another language for describing the shortcomings of the indicators.¹⁵²

The MDGs expired in 2015 and there was significant debate over what would define the so-called post-2015 development agenda.¹⁵³ At the 2012 Rio+20 Conference on Sustainable Development, states adopted an outcome document that included a call to develop SDGs.¹⁵⁴ Ultimately,

¹⁴⁶ WHO/UNICEF JOINT MONITORING PROGRAMME FOR WATER SUPPLY AND SANITATION, JMP REPORT: PROGRESS ON DRINKING WATER AND SANITATION: 2012 UPDATE Looking Forward Looking Back, Foreword (2012), <https://washdata.org/reports?reports%5B0%5D=date%3A2012> [<https://perma.cc/Y3QG-2ZZW>] [hereinafter WHO/UNICEF JMP 2012 UPDATE].

¹⁴⁷ *Id.*

¹⁴⁸ WHO/UNICEF JMP 2015 UPDATE, *supra* note 11, at 5.

¹⁴⁹ *Id.* at 4.

¹⁵⁰ G.A. Res 64/292, U.N. Doc. A/RES/64/PV.108, at 2 (July 28, 2010); Human Rights Council Res. 15/9, U.N. Doc. A/HRC/RES/15/9, at 1 (Oct. 6, 2010).

¹⁵¹ *Gen. Comment No. 14: Substantive Issues Arising in the Implementation of the International Covenant on Economic, Social and Cultural Rights*, ESCOR, Comm. on Economic, Social and Cultural Rights on Its 22nd Session, E/C.12/2000/4 (Aug. 11, 2000) [hereinafter *Gen. Comment No. 14*]; *Gen. Comment No. 15: The Right to Water*, Comm. on Economic, Social, and Cultural Rights on Its 29th Session, E/C.12/2002/22, ¶ 2 (Jan. 20, 2003) [hereinafter *Gen. Comment No. 15*].

¹⁵² *Gen. Comment No. 15*, *supra* note 151.

¹⁵³ G.A. Res. 66/288, ¶ 249 (July 27, 2012), http://www.un.org/en/ga/search/view_doc.asp?symbol=%20A/RES/66/238 [<https://perma.cc/6H9M-UXF3>].

¹⁵⁴ *Id.* ¶ 81.

in 2015, the U.N. General Assembly adopted a resolution entitled “Transforming our world: the 2030 Agenda for Sustainable Development,” which set forth the 17 goals and 169 targets that now comprise the SDGs.¹⁵⁵ The declaration also reaffirms state “commitments regarding the human right to safe drinking water and sanitation.”¹⁵⁶

Goal 6 of the SDGs seeks to “ensure availability and sustainable management of water and sanitation for all.”¹⁵⁷ In Targets 6.1 and 6.2 of the SDGs, states commit to achieving by 2030 “universal and equitable access to safe and affordable drinking water for all” and “access to adequate and equitable sanitation and hygiene for all and end[ing] open defecation, paying special attention to the needs of women and girls and those in vulnerable situations.”¹⁵⁸ As discussed more in Section II.D, although the actual goal and targets are not framed in human rights terms, the JMP, which is responsible for developing the statistical indicators for the water, sanitation and hygiene targets, has explicitly embraced a human rights interpretation of these targets.¹⁵⁹ In addition, SDG 6 also encompasses process-oriented “means of implementation” targets, with states pledging in Target 6.b to “support and strengthen the participation of local communities in improving water and sanitation management.”¹⁶⁰ Several other SDGs are also relevant to the water targets, including the commitment to “reduce inequality within and among countries”¹⁶¹ and to “ensure all men and women, in particular the poor and vulnerable, have equal rights to economic resources, as well as access to basic services. . . .”¹⁶²

To measure and compare country progress, enhance accountability, and inform policy, several U.N. agencies¹⁶³ are developing quantitative

¹⁵⁵ G.A. Res. 70/1, *supra* note 15, ¶ 7.

¹⁵⁶ *Id.* ¶ 7.

¹⁵⁷ *Id.* at 14.

¹⁵⁸ *Id.* at 18.

¹⁵⁹ IAEG-SDGs, *supra* note 42; WHO/UNICEF: METHODOLOGICAL NOTE, *supra* note 40, at 29, 81. As discussed in Section II.D, the current U.N. Special Rapporteur on the human rights to water and sanitation has criticized the JMP for not including a human rights perspective even more explicitly in their 2017 progress report. Open Letter from Léo Heller, U.N. Special Rapporteur on the human rights to safe drinking water and sanitation, to the WHO-UNICEF Joint Monitoring Programme for WASH, ¶3 (July 28, 2017), http://www.ohchr.org/Documents/Issues/Water/OpenLetter_WHO_UNICEF_WASH.pdf [<https://perma.cc/VSP5-8ZVH>].

¹⁶⁰ G.A. Res. 70/1, *supra* note 15, ¶ 3.

¹⁶¹ *Id.* at 21.

¹⁶² *Id.* at 15.

¹⁶³ All of these targets under Goal 6 are being managed under the umbrella of U.N. Water. The drinking water and sanitation access targets will continue to be monitored by the Joint Monitoring Program on UNICEF and the World Health Organization, which

indicators through a complex bureaucratic process that is being coordinated by the Inter-Agency Expert Group on SDG Indicators, a new initiative under the auspices of the U.N. Statistical Commission.¹⁶⁴

B. *Governance Effects of Global Water Goals*

In this Article, I argue that current efforts to achieve global water, sanitation, and hygiene goals will have a governance effect because the elaborate monitoring apparatus that has been developed to measure progress with the SDGs will result in the disclosure of information. I am not suggesting that the SDGs will actually be effective in achieving their lofty ambitions, but rather that the very process of compiling statistics about each country's progress and creating comparative rankings will shape state behavior.¹⁶⁵ Just as the disclosure of information through the TRI has had a governance effect, I argue that the data generated from the quantitative indicators developed for the precursor MDGs, and now the SDGs, have had and will continue to have a governance effect.

The MDGs focused international efforts on a handful of time-bound targets that could be measured and thereby provide accountability.¹⁶⁶ The eight poverty alleviation and environmental sustainability goals¹⁶⁷

was created in 1991. The process-oriented “means of implementation” targets relating to assistance and participation will be monitored by U.N. Water Global Analysis and Assessment for Sanitation and Drinking Water (“GLAAS”), in collaboration with OECD and U.N. Environment. The other targets relating to water quality, wastewater management, water resource management, etc. are being coordinated by a new initiative known as GEMI under the U.N. Water umbrella. See U.N. WATER, MONITORING WATER AND SANITATION IN THE 2030 AGENDA FOR SUSTAINABLE DEVELOPMENT: AN INTRODUCTORY GUIDE 7 (2016), <http://www.indiaenvironmentportal.org.in/files/file/Monitoring%20Water%20and%20Sanitation%20in%20the%202030%20Agenda.pdf> [<https://perma.cc/32HC-XS6S>].

¹⁶⁴ U.N. Dep't of Econ. and Soc. Affairs, IAEG-SDGs—SDG Indicators, <https://unstats.un.org/sdgs/iaeg-sdgs/metadata-compilation/> [<https://perma.cc/5S6W-2HCY>] (last visited Jan. 21, 2018).

¹⁶⁵ See, e.g., MERRY, *supra* note 3, at 5 (“Quantitative information influences aid to developing countries, investment decisions, choices of tourist destinations, and many other decisions. A country with poor indicators for the rule of law, human rights compliance, and trafficking invites international intervention and management.”).

¹⁶⁶ John Gerard Ruggie, *The United Nations and Globalization: Patterns and Limits of Institutional Adaptation*, 9 GLOB. GOV. 301, 307 (2003); Philip Alston, *Ships Passing in the Night: The Current State of the Human Rights and Development Debate seen through the Lens of the Millennium Development Goals*, 27 HUM. RIGHTS Q. 755, 756 (2005).

¹⁶⁷ The eight goals were: (1) eradicate extreme poverty and hunger; (2) achieve universal primary education; (3) promote gender equality and empower women; (4) reduce child mortality; (5) improve maternal health; (6) combat HIV/AIDS, malaria, and other diseases; (7) ensure environmental sustainability; and (8) develop a global partnership for development. UNITED NATIONS, *About the MDGs*, *supra* note 13.

were supplemented by twenty-one targets, which in turn were measured by sixty quantitative indicators.¹⁶⁸ Experts within the U.N. system created the goals, targets and indicators.¹⁶⁹ As time-bound targets, they commanded stronger political attention to poverty,¹⁷⁰ influenced national development strategies,¹⁷¹ and galvanized international aid efforts.¹⁷² Many developing countries integrated MDG priorities into their budgets and adopted schemes to accelerate progress towards the goals.¹⁷³ The MDGs aligned efforts across member states, U.N. agencies, international financial institutions, NGOs, and foundations,¹⁷⁴ and also fostered coordination of global partnerships, such as the Global Fund.¹⁷⁵ At the same time, the

¹⁶⁸ OFFICIAL LIST OF MDG INDICATORS, *supra* note 142.

¹⁶⁹ The targets identified in the Millennium Declaration were merged with the International Development Goals that had been developed by the Development Assistance Committee of the OECD to prioritize funding for overseas development. See Hulme, *supra* note 140, at 12–16; McArthur, *supra* note 140, at 6.

¹⁷⁰ U.N. Secretary-General, *The Report of the High-Level Panel of Eminent Persons on the Post-2015 Development Agenda, Letters from the Co-Chairs* (May 30, 2013), https://www.un.org/sg/sites/www.un.org.sg/files/files/HLP_P2015_Report.pdf [<https://perma.cc/R2TQ-QAKK>] (last visited Jan. 21, 2018).

¹⁷¹ U.N. DEV. PROGRAM, *MDG Report 2015: Lessons Learned in Implementing the MDGs. Assessing Progress in Africa Toward the Millennium Development Goals*, 62 (2015), <http://www.undp.org/content/undp/en/home/librarypage/mdg/mdg-reports/africa-collection.html> [<https://perma.cc/WWR3-DFZE>].

¹⁷² Olav Kjørven, *The unlikely journey to the 2030 Agenda for Sustainable Development*, DELIVER 2030 (Feb. 15, 2016), <http://deliver2030.org/?p=6767> [<https://perma.cc/F9HU-9XCM>] (last visited Jan. 21, 2018); Bill Gates, *Dream with a Deadline: The Millennium Development Goals*, THE BLOG OF BILL GATES (Sept. 18, 2013), <https://www.gatesnotes.com/Development/MDGs-Dream-with-a-Deadline> [<https://perma.cc/BP86-9H5B>]; Tom Murphy, *How Bill Gates stopped worrying and learned to love the MDGs*, HUMANOSPHERE (2013), <http://www.humanosphere.org/basics/2013/09/how-bill-gates-stopped-worrying-and-learned-to-love-the-mdgs/> [<https://perma.cc/GV4X-F8ZQ>] (last visited Jan. 21, 2018); U.N. System Task Team on the Post-2015 U.N. Development Agenda, *Realizing the Future We Want for All: Report to the Secretary-General* 5 (June 2012), http://www.un.org/en/development/desa/policy/untaskteam_undf/untt_report.pdf [<https://perma.cc/YND4-LCSE>]; Jeffrey D. Sachs, *High stakes at the UN on the Sustainable Development Goals*, 382 THE LANCET 1001–02 (2013); Ruggie, *supra* note 166, at 306.

¹⁷³ Suzman Statement Mar. 2013, *supra* note 138; Clare Melamed, *Post-2015: The Road Ahead* 4 (2012), <https://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/7873.pdf> [<https://perma.cc/9Q8Q-KD6J>].

¹⁷⁴ Ruggie, *supra* note 166, at 305; McArthur, *supra* note 140, at 22; Hulme, *supra* note 140, at 38–39; Fukuda-Parr et al., *supra* note 27, at 1.

¹⁷⁵ Statement by Mark Suzman, President, Global Policy and Advocacy, Bill & Melinda Gates Foundation to Sixth Session of the Open Working Group on Sustainable Development Goals in New York, NY (Dec. 10, 2013), <https://www.gatesfoundation.org/Media-Center/Press-Releases/2013/12/Statement-by-Mark-Suzman-to-Sixth-Session-of-the-Open-Work>

very strength of the MDGs—their narrow scope and focus on measurable outcomes—was also cause for severe criticism, as discussed in greater detail in Section II.C on Knowledge Effects.¹⁷⁶

The MDGs have generally been seen as a very successful endeavor, which is why the international community decided to build on this prior effort when adopting the SDGs.¹⁷⁷ However, upon closer inspection, the actual impact of the MDGs was mixed and uneven.¹⁷⁸ According to economist and U.N. advisor Jeffrey Sachs, “[t]he MDGs have been the most successful global undertaking in history to coordinate action to fight extreme poverty in all its forms: income, hunger, disease, lack of schooling, and deficient basic infrastructure.”¹⁷⁹ Sachs’s claims largely hold true in certain areas, but not in others. The World Bank, for example, observes that the MDGs helped to reduce income poverty, but the global goals did not lead to improvements in other areas, such as access to quality education or basic health services.¹⁸⁰ In some respects, the dramatic decline in poverty rates can be attributed to the rapid economic growth in Asia, especially in China and India.¹⁸¹ Empirical studies have attempted to assess whether the MDGs actually made a difference or whether the improvements would have occurred regardless.¹⁸² The studies found mixed results, with positive improvements in only some categories, such as under-five mortality, maternal mortality, primary school enrollment, and some diseases like tuberculosis.¹⁸³ In some instances, the data suggested that the positive impacts commenced with MDG efforts, while in others, the efforts began prior to 2000 but progress accelerated after the MDGs were adopted.¹⁸⁴

The three factors identified in the first half of the conceptual framework from a review of the TRI literature—simplicity of the indicator, capacity of the target actor, and influence of external stakeholders—provide a useful way to analyze the governance impact of the MDGs.¹⁸⁵

ing-Group-on-Sustainable-Development-Goals [<https://perma.cc/AQ9K-ZU6C>] [hereinafter Suzman Statement Dec. 2013].

¹⁷⁶ See, e.g., FUKUDA-PARR & YAMIN, *supra* note 32 (providing case studies from many different sectors critiquing the MDG’s approach).

¹⁷⁷ Suzman Statement Mar. 2013, *supra* note 138.

¹⁷⁸ See generally *id.*

¹⁷⁹ Sachs, *supra* note 172, at 1

¹⁸⁰ WORLD BANK GRP., *supra* note 12, at 1.

¹⁸¹ *Id.* at 2, 94.

¹⁸² *Id.* at 97.

¹⁸³ *Id.*; FUKUDA-PARR & YAMIN, *supra* note 32, at 1.

¹⁸⁴ WORLD BANK GRP., *supra* note 12, at 97.

¹⁸⁵ *Id.*

First, the information disclosed was in the form of quantitative indicators that could be easily understood and compared.¹⁸⁶ The MDGs were not the first goals to be articulated by the U.N. but they were different from prior efforts because they were concise, easy to communicate, measurable, and focused on outcomes.¹⁸⁷ In the international development arena, the MDGs underscored the importance of data for promoting accountability, making wise investment decisions, and enhancing research.¹⁸⁸ The business adage, “you manage what you measure,” also began to drive the international development agenda.¹⁸⁹

The concept of equivalence was also at the core of these efforts. The same statistics were gathered regardless of whether a person lived in a rural village or a modern city, or whether she had to walk five miles to gather water from a well or had a tap inside her home. The quantitative indicators presented a “way of seeing” that allowed seemingly different things to be compared on the same spectrum.¹⁹⁰ This comparison, in turn, facilitated the kind of information-sharing that could shape state behavior, even absent binding international law.¹⁹¹ As a result of the monitoring, countries were ranked according to individual indicators and then the indicators were merged together to create composite indicators. The governance effect resulted in part because no country wanted to be listed at the bottom of the rankings.¹⁹² Standardized reporting across regions enabled comparisons and peer-learning among countries, which “unwittingly encouraged weaker performers to improve their performance by generating a spirit of positive competition.”¹⁹³ In this respect, the MDGs exercised the “power of numbers” because they relied upon numerical indicators to measure progress and incentivize behavior.¹⁹⁴

In the water sector, countries and regions were scored according to whether they had achieved progress on expanding access to water and

¹⁸⁶ See Suzman Statement Dec. 2013, *supra* note 175.

¹⁸⁷ Fukuda-Parr et al., *supra* note 27, at 9. In contrast, more comprehensive efforts, such as Agenda 21, which resulted from the 2002 Rio Conference on Sustainable Development and which led to the creation of the Commission on Sustainable Development, failed largely because it was difficult to track and measure progress. See U.N. Secretary-General, Lessons learned from the Commission on Sustainable Development: Report of the Secretary-General, U.N. Doc. A/67-757, 2–3 (February 26, 2013).

¹⁸⁸ U.N. DEV. PROGRAM, *supra* note 171, at xi.

¹⁸⁹ WHO/UNICEF JMP 2017 UPDATE, *supra* note 11, at 13.

¹⁹⁰ Boyd, *supra* note 33, at 856.

¹⁹¹ U.N. DEV. PROGRAM, *supra* note 171, at 62.

¹⁹² See FUKUDA-PARR, *supra* note 90.

¹⁹³ U.N. DEV. PROGRAM, *supra* note 171, at 62.

¹⁹⁴ Fukuda-Parr et al., *supra* note 27, at 2; Suzman Statement Dec. 2013, *supra* note 175.

sanitation, with percentages assigned to the proportion of each country's urban and rural populations that had access to these basic services.¹⁹⁵ These quantitative metrics then allowed the countries and regions to be classified into one of four categories: "met target," "good progress," "moderate progress," and "limited or no progress."¹⁹⁶ Detailed reports also provided more nuanced ranking information, which motivated governments and attracted international attention.¹⁹⁷ For example, India met the water target and made "moderate progress" on the sanitation target.¹⁹⁸ However, home to more than half of world's population who defecate in the open,¹⁹⁹ India also earned an ignominious reputation as the "global capital of open defecation."²⁰⁰ As a result, the country launched a "Clean India Movement," including an effort to construct more toilets and end open defecation.²⁰¹ In fact, sanitation has now gained significantly more attention due to the abysmal global progress on the MDG sanitation targets.²⁰²

The second factor that mediated the potential governance effect was the ability and capacity of the target actors. The MDG targets were more easily attained when the targets aligned with existing efforts within the country to address an issue, which reflected the willingness and ability of that country to address a problem.²⁰³ Significant regional variation in progress existed, with targets more easily met by countries that were already benefitting from economic progress, such as China and India.²⁰⁴ In contrast, countries with high fertility rates and rapid population growth that were predominantly natural resource-based economies or struggling with conflict had less capacity to meet the MDG targets.²⁰⁵

¹⁹⁵ WHO/UNICEF JMP 2015 UPDATE, *supra* note 11, at 56.

¹⁹⁶ *Id.*

¹⁹⁷ U.N. DEV. PROGRAM, *supra* note 171, at 62.

¹⁹⁸ WHO/UNICEF JMP 2015 UPDATE, *supra* note 11, at 64.

¹⁹⁹ *Id.* at 32–33.

²⁰⁰ *India global capital of open defecation: NGO*, DECCAN HERALD (Nov. 18, 2013), <http://www.deccanherald.com/content/369696/india-global-capital-open-defecation.html> [<https://perma.cc/DS5R-P6R4>] (last visited Jan. 21, 2018).

²⁰¹ *Govt sets up clean India fund to receive contributions for building toilets*, BUSINESS STANDARD (Nov. 26, 2014), http://www.business-standard.com/article/current-affairs/govt-sets-up-clean-india-fund-to-receive-contributions-for-building-toilets-114112501458_1.html [<https://perma.cc/9SNF-XKN2>] (last visited Jan. 21, 2018); Avishek D. Dastidar & Liz Mathew, *PM plans social media challenge to clean India*, THE INDIAN EXPRESS (Oct. 2, 2014), <http://indianexpress.com/article/india/india-others/pm-plans-social-media-challenge-to-clean-india/> [<https://perma.cc/CL9F-TQXY>].

²⁰² Langford & Winkler, *supra* note 41.

²⁰³ Fukuda-Parr et al., *supra* note 27, at 4.

²⁰⁴ U.N. DEV. PROGRAM, *supra* note 171, at 2.

²⁰⁵ WORLD BANK GRP., *supra* note 12, at 96.

The architects of the MDGs intended the goals to be global targets. However, they were almost immediately translated into national targets, which mean that they did not take into account the existing capacity of states.²⁰⁶ Because the baseline year was set in the year 1990, some countries had already made significant progress towards the goals by the time they were officially adopted in the 2000s.²⁰⁷ As a result, countries that had in fact made significant progress in relative terms were described as “off-track.”

For example, rather than laud Africa for its successes,²⁰⁸ the region was instead described as the most “off-track” region because barely three of the eight MDGs had been achieved.²⁰⁹ Countries in sub-Saharan African, in particular, are comparatively poorer, suffer from more extreme poverty, have more difficulty translating economic growth into improved per capita incomes, and have larger amounts of sovereign debt.²¹⁰ The region is also more susceptible to shocks, such as declines in commodity prices, public health crises like Ebola, natural disasters like droughts and floods, violent conflicts, non-tariff trade barriers imposed by other countries, and reductions in overseas development assistance prompted by the 2008 financial crisis.²¹¹ As a result, even though many sub-Saharan African countries made substantial progress in absolute terms,²¹² the global MDG benchmarks that were based on percentages created an even greater onus on a region that had less capacity to respond.²¹³ This was also true for the water and sanitation MDGs. Countries with low baselines and with rapid population growth, such as in sub-Saharan Africa,

²⁰⁶ EDWARD ANDERSON & MALCOLM LANGFORD, A DISTORTED METRIC: THE MDGS AND STATE CAPACITY 2 (2013), <https://papers.ssrn.com/abstract=2217772> [<https://perma.cc/QP7M-N7SJ>] (last visited Jan. 21, 2018); Jan Vandemoortele, *MDGs: Misunderstood Targets?*, IDEAS WORK. PAP. SER. REPEC (2007).

²⁰⁷ See ANDERSON & LANGFORD, *supra* note 206, at 2 (“It led to the rather odd situation where upon the adoption of the MDGs, China [announced] that it had already met the MDG income poverty target, in 1999.”).

²⁰⁸ *Id.*; William Easterly, *How the Millennium Development Goals are Unfair to Africa*, Brookings Global Econ. and Dev., Working Paper No. 14 (Nov. 2007).

²⁰⁹ See U.N. DEV. PROGRAM, *supra* note 171, at 79 (noting in 2015, Africa was only on track to attaining MDG 2 (achieve universal primary education), MDG 3 (promote gender equality and empower women) and the targets related to MDG 6 (combat HIV/AIDS, malaria and other diseases)).

²¹⁰ See WORLD BANK GRP., *supra* note 12, at 94; U.N. DEV. PROGRAM, *supra* note 171, at xiv–xvii, 1–4.

²¹¹ U.N. DEVELOPMENT PROGRAM, *supra* note 171, at xiv–xvii, 1–4.

²¹² Suzman Statement Dec. 2013, *supra* note 175.

²¹³ WORLD BANK GRP., *supra* note 12, at 94; Melamed, *supra* note 173, at 5.

faced more difficulty in meeting the targets.²¹⁴ The key lesson learned from a 2015 review of progress on the MDGs in Africa by the U.N. Development Program was that initial conditions mattered in a country's ability to achieve progress in the MDG goals.²¹⁵ At the same time, it would be a mistake to assume that countries with less ability to meet global development targets were less sensitive to information disclosed as a result of MDG monitoring.²¹⁶ In fact, just the opposite might be true due to the next factor.

The third factor that mediated the governance effect of the MDGs was the influence of external actors, which in the field of international development includes financial institutions, international agencies, donors, and NGOs. Different factors motivated each of these organizations, which used the information for their own distinct purposes. Regardless, the compilation and disclosure of information about progress towards the MDGs influenced the agendas of these external actors, who, in turn, had the capacity to impact the priorities of developing nations, especially those dependent on foreign assistance. Indeed, the strong influence of these external actors speaks to their power relative to poor countries.

International financial institutions and development banks, such as the World Bank and International Monetary Fund, sought to help countries achieve progress on the MDGs.²¹⁷ The World Bank proclaimed that it was "committed to helping achieve the MDGs because, simply put, these goals are our goals."²¹⁸ For example, to support the MDGs, the World Bank focused on improving incomes for the bottom 40% in each country, increasing agriculture financing to \$8–10 billion per year,²¹⁹ expanding funding for education²²⁰ and gender equality,²²¹ and enhancing

²¹⁴ WHO/UNICEF JMP 2015 UPDATE, *supra* note 11, at 7.

²¹⁵ U.N. DEV. PROGRAM, *supra* note 171, at 62.

²¹⁶ The MDGs have been criticized for their one-size-fits-all approach to development. See FUKUDA-PARR & YAMIN, *supra* note 32; ANDERSON & LANGFORD, *supra* note 206.

²¹⁷ See generally WORLD BANK GRP., *supra* note 12.

²¹⁸ See generally THE WORLD BANK, MILLENNIUM DEVELOPMENT GOALS, <http://www5.worldbank.org/mdgs/> [<https://perma.cc/5UWZ-HPEQ>] (last visited Jan. 21, 2018).

²¹⁹ THE WORLD BANK, MILLENNIUM DEVELOPMENT GOALS, ERADICATE EXTREME POVERTY AND HUNGER BY 2015, http://www5.worldbank.org/mdgs/poverty_hunger.html [<https://perma.cc/5ZCQ-GYGU>] (last visited Jan. 21, 2018).

²²⁰ THE WORLD BANK, MILLENNIUM DEVELOPMENT GOALS, ACHIEVE UNIVERSAL PRIMARY EDUCATION BY 2015, <http://www5.worldbank.org/mdgs/education.html> [<https://perma.cc/H6QJ-XG9T>] (last visited Jan. 21, 2018).

²²¹ THE WORLD BANK, MILLENNIUM DEVELOPMENT GOALS, PROMOTE GENDER EQUALITY AND EMPOWER WOMEN BY 2015, <http://www5.worldbank.org/mdgs/gender.html> [<https://perma.cc/RL8E-RUUP>] (last visited Jan. 21, 2018).

debt relief initiatives for poor countries.²²² The data disclosed through the MDG process was a powerful motivator. In response to data showing that the child mortality MDG was lagging behind other goals, the World Bank “redoubl[ed]” its efforts in this area.²²³ The Bank’s support provided a powerful validation of the MDG (and now SDG) effort because such institutions directly and indirectly influence financial aid and capacity-building assistance to developing countries.²²⁴ Improved progress on MDG indicators also sent positive signals to the private capital markets that invest in developing countries.

The disclosure of information that was made possible through the MDG monitoring effort also helped the donor community make informed decisions, which in turn, influenced the development priorities of countries dependent on such assistance.²²⁵ As a result of the MDG efforts, overseas development assistance increased, with an estimated \$134.7 billion provided in 2013, as compared to \$80 billion in the mid-1990s.²²⁶ The global financial crisis of 2008–2009 had threatened to derail development efforts,²²⁷ but the 2010 MDG Summit²²⁸ encouraged states to renew their commitments to the MDGs. It also prompted the U.N. Development Program to oversee a major acceleration program to try to attain more targets by the 2015 deadline.²²⁹ In addition, international donors, such as the Bill and Melinda Gates Foundation, embraced the MDGs, finding that their focus on simple and measurable targets created a powerful impact.²³⁰ The Gates Foundation has also funded numerous projects that

²²² THE WORLD BANK, MILLENNIUM DEVELOPMENT GOALS, DEVELOP A GLOBAL PARTNERSHIP FOR DEVELOPMENT BY 2015, http://www5.worldbank.org/mdgs/global_partnership.html [<https://perma.cc/FW96-T5NF>] (last visited Jan. 21, 2018).

²²³ THE WORLD BANK, MILLENNIUM DEVELOPMENT GOALS, REDUCE CHILD MORTALITY BY 2015, http://www5.worldbank.org/mdgs/child_mortality.html [<https://perma.cc/KJN5-NGM5>] (last visited Jan. 21, 2018).

²²⁴ WORLD BANK GRP., *supra* note 12, at 107.

²²⁵ Fukuda-Parr et al., *supra* note 27.

²²⁶ WORLD BANK GRP., *supra* note 12, at 91.

²²⁷ Kjørven, *supra* note 172, at 2; *see also* G.A. Res. 65/1, Keeping the promise: united to achieve the Millennium Development Goals, U.N. Doc. A/RES/65/1, ¶ 22 (October 19, 2010), <http://research.un.org/en/docs/ga/quick/regular/65> [<https://perma.cc/DDV2-JVPH>].

²²⁸ G.A. Res. 65/1, *supra* note 227.

²²⁹ U.N. DEVELOPMENT PROGRAMME, MDG ACCELERATION FRAMEWORK, <http://www.undp.org/content/dam/undp/library/Poverty%20Reduction/MDG%20Strategies/MAF%20Report%20Dec%202011.pdf> [<https://perma.cc/ELS6-BKNS>] (last visited Jan. 21, 2018); Kjørven, *supra* note 172, at 2.

²³⁰ Suzman Statement Dec. 2013, *supra* note 175; Suzman Statement Mar. 2013, *supra* note 138; Melinda French Gates, *Melinda French Gates—United Nations General Assembly 2010, Remarks on Progress Against the MDGs* (Sep. 22, 2010), <https://www.gatesfounda>

specifically focus on supporting MDG efforts within particular countries and across the globe.²³¹

Civil society organizations and international organizations also recognized the power of the MDGs to drive development priorities and used information disclosed in country reports to pressure governments to enhance their efforts and commit more resources towards the MDGs.²³² For example, the international NGO WaterAid worked with countries to achieve their MDG water and sanitation targets, and also leveraged the disclosed data to advocate for policy change and highlight continued barriers to access.²³³ Similarly, the human rights community became increasingly interested in how the MDGs could be harnessed to promote a human development and human rights-based conception of development, as is discussed in greater detail in Section II.D.²³⁴ Interestingly, not all

tion.org/Media-Center/Speeches/2010/09/Melinda-French-Gates-UN-General-Assembly-Address [https://perma.cc/56L8-GNQR].

²³¹ For example, a search of the term “MDGs” on the Gates Foundation website in July 2017 returned many results, such as a grant to Graça Machel Trust in the amount of \$2,000,457 “to support the transition of the MDGs to the SDGs . . .” (Sept. 2015), BILL & MELINDA GATES FOUNDATION, <https://www.gatesfoundation.org/How-We-Work/Quick-Links/Grants-Database/Grants/2015/09/OPP1126356> [https://perma.cc/WE2B-B7S4].

²³² Fukuda-Parr et al., *supra* note 27, at 4–5; U.N. DEV. PROGRAM, *supra* note 171, at 80.

²³³ WATERAID, BEHIND ETHIOPIA’S MDG SUCCESS ON WATER SUPPLY, <http://www.wateraid.org/news/news/behind-ethiopia-s-mdg-success-on-water-supply> [https://perma.cc/JV9K-5RL2] (last visited Jan. 21, 2018); WATERAID, LOCAL MILLENNIUM DEVELOPMENT GOALS INITIATIVE: LOCAL GOVERNMENT AND WATER AND SANITATION DELIVERY (2008), <http://www.wateraid.org/~media/Publications/local-millennium-development-goals-initiative.pdf> [https://perma.cc/397W-5NMR]; WATERAID, MEETING THE MDG OF WATER SUPPLY AND SANITATION TARGET IN NIGERIA: CAN LOCAL GOVERNMENTS ACHIEVE IT?, <http://www.wateraid.org/~media/Publications/water-sanitation-millennium-development-goal-nigeria.pdf> [https://perma.cc/SH5M-6RD5].

²³⁴ *See, e.g.*, U.N. OFFICE OF THE HIGH COMM’R FOR HUMAN RIGHTS & CENTER FOR ECON. AND SOC. RIGHTS, WHO WILL BE ACCOUNTABLE? HUMAN RIGHTS AND THE POST-2015 DEVELOPMENT AGENDA (2013), <http://www.ohchr.org/Documents/Publications/WhoWillBeAccountable.pdf> [https://perma.cc/C2ZN-AZDZ]; HUMAN RIGHTS WATCH, *U.N.: Put Human Rights at Heart of New Development Agenda* Human Rights Watch (Sept. 22, 2013, 11:45 P.M.), <https://www.hrw.org/news/2013/09/22/un-put-human-rights-heart-new-development-agenda> [https://perma.cc/6SRV-AL8E] (last visited Jan. 21, 2018); AMNESTY INT’L, *The Millennium Development Goals and Human Rights* (2012), <https://www.amnesty.ca/our-work/issues/economic-and-social-rights/the-millennium-development-goals-and-human-rights> [https://perma.cc/2XQJ-G7G4] (last visited Jan. 21, 2018); Human Rights in Sustainable Development, CESR, CTR. FOR ECON. AND SOC. RIGHTS, <http://www.cesr.org/human-rights-sustainable-development> [https://perma.cc/VFG5-U58D] (last visited Jan. 21, 2018); Mac Darrow, *The Millennium Development Goals: Milestones or Millstones? Human Rights Priorities for the Post-2015 Development Agenda*, 15 YALE HUM. RTS. DEV. L. J. 55 (2012).

U.N. agencies were initially invested in the MDGs because they saw these selective goals as disrupting their existing agendas.²³⁵ However, this reticence has since disappeared, as illustrated by the dominance of the MDGs/SDGs within the agendas of many U.N. agencies.²³⁶

In sum, although the MDGs were not legally binding international law, the disclosure of information that resulted from the extensive data collection and monitoring efforts enabled the creation of quantitative indicators, which in turn had a governance effect in many countries. The same three factors that mediated the governance effect of the TRI—the communicative power of a simple quantitative indicator; the capacity and willingness of the target actor to change its behavior; and the ability of external stakeholders to influence the target actor—also influenced the impact of the MDGs. Because the SDGs build directly on the MDGs' monitoring and disclosure efforts, especially in the water sector, a similar governance effect can be expected.²³⁷

The next section applies the second half of the conceptual framework to the global water sector by examining the potential knowledge

²³⁵ Fukuda-Parr et al., *supra* note 27, at 8.

²³⁶ See, e.g., U.N. DEV. PROGRAM, *Millennium Development Goals*, http://www.undp.org/content/undp/en/home/sdgooverview/mdg_goals.html [<https://perma.cc/9ZP8-YRBH>] (last visited Jan. 21, 2018); WHO, *Millennium Development Goals (MDGs)*, WHO, http://www.who.int/topics/millennium_development_goals/en/ [<https://perma.cc/NJ4R-55JY>] (last visited Jan. 21, 2018); FOOD AND AGRIC. ORG. OF THE U.N., *Millennium Development Goals*, <http://www.fao.org/sustainable-development-goals/mdg/en/> [<https://perma.cc/R4WH-ZT2J>] (last visited Jan. 21, 2018).

²³⁷ However, the SDGs are broader than the MDGs, encompassing more aspects of sustainable development and more process-oriented goals. Their vast and complex nature could potentially dilute the overall focus and impact, despite the reliance on numerical indicators. For example, many at the Gates Foundation have been more skeptical of the SDGs due to their expansive scope and inclusion of targets that are less measurable than the MDGs. See Tom Paulson, *Gates Foundation says it does support the UN development agenda*, HUMANOSPHERE, May 11, 2015, <http://www.humanosphere.org/world-politics/2015/05/gates-foundation-says-it-does-support-the-un-development-agenda/> [<https://perma.cc/53LA-CG2E>] (last visited Jan. 21, 2018); Tom Paulson, *Gates Foundation rallies the troops to attack UN development goals*, HUMANOSPHERE, May 6, 2015, <http://www.humanosphere.org/world-politics/2015/05/gates-foundation-rallies-the-troops-to-attack-un-development-goals/> [<https://perma.cc/K4X4-LKK9>] (last visited Jan. 21, 2018). As a result, a large debate raged over how many goals the SDGs should encompass. See, e.g., David Griggs et al., *Sustainable development goals for people and planet*, 495 NATURE 305, 307 (2013) (suggesting six goals); SUSTAINABLE DEVELOPMENT SOLUTIONS NETWORK, AN ACTION AGENDA FOR SUSTAINABLE DEVELOPMENT, at x–xi (2013), <http://unsdsn.org/wp-content/uploads/2013/06/140505-An-Action-Agenda-for-Sustainable-Development.pdf> [<https://perma.cc/YZG8-MSJU>] (suggesting ten goals); *The 169 commandments*, THE ECONOMIST (March 26, 2015) (suggesting that the SDGs were “a mess” due to their large number).

effects that can result from translating legal norms into quantitative indicators.

C. *Knowledge Effects of Global Water Indicators*

1. Millennium Development Goals (“MDGs”)

If statistical rankings are likely to incentivize compliance with the water, sanitation and hygiene targets of the SDGs, at least under certain conditions, then it is critical that the quantitative indicators used to measure progress in fact reflect the intended normative goals. The concepts of calculability, data inertia, and expertise inertia help explain why certain knowledge effects have resulted from the translation of global water goals into technical indicators. The lessons from the MDGs are once again instructive because the SDG water monitoring efforts build directly on this earlier initiative.

The MDGs were largely designed to be calculable, which means that they were generally framed around certain “outcome” indicators.²³⁸ It was difficult to generate relevant monitoring indicators for targets that were not easily quantifiable.²³⁹ This was also true of the water goals. Target 7.C of the MDGs committed to “halv[ing] by 2015, the proportion of the population without sustainable access to safe drinking water and basic sanitation.”²⁴⁰ This is a goal that was calculable, at least in theory, because it could be translated into a number.

The calculability of the water and sanitation targets, however, was limited by data inertia. There was a complete lack of nationally representative data about drinking water and sanitation, especially in developing countries.²⁴¹ Data had previously been collected by distributing questionnaires to national authorities, which led to significant quality control problems.²⁴² Beginning around 2000, the JMP began to rely on nationally representative household surveys conducted periodically by national statistics offices, often in conjunction with international agencies, and on national censuses, which are normally undertaken by countries

²³⁸ Fukuda-Parr et al., *supra* note 27, at 8.

²³⁹ WORLD BANK GRP., *supra* note 12, at 107 (noting that MDG targets such as “achieve full and productive employment and decent work,” or “universal access to reproductive health” were not as easily quantifiable).

²⁴⁰ WHO/UNICEF JMP 2015 UPDATE, *supra* note 11, at 7.

²⁴¹ IAEG-SDGs, *supra* note 42.

²⁴² Bartram et al., *supra* note 14, at 8143.

at ten-year intervals.²⁴³ In general, national level data has been integrated with other available sources of information and adjusted for global comparison.²⁴⁴ Because these different sources of data use terms inconsistently, the JMP spends considerable effort to verify and harmonize the data; ultimately, it estimates coverage using statistical methods.²⁴⁵ Although many data integrity challenges remain,²⁴⁶ the JMP has also sought to improve data collection, such as by recommending changes to core questions across different household surveys.²⁴⁷

Due to the limitations in data availability during the MDG era, the JMP used the indicator of “improved” water sources as a proxy for “safe water,” on the assumption that such sources would likely be protected against fecal contamination.²⁴⁸ Improved sources included: piped water into dwelling, yard or plot; public taps or standpipes; boreholes or tubewells; protected dug wells; protected springs and rainwater.²⁴⁹ However, because this indicator was a proxy for safe water, it assessed whether a tap was available, even if it did not function properly or the water quality was poor. A similar metric was used for sanitation, where an “improved” sanitation facility referred to a variety of technologies (flush or pour flush toilets to sewer systems, septic tanks or pit latrines, ventilated improved pit latrines, pit latrines with a slab, and composting toilets), but did not capture actual effectiveness.²⁵⁰

Definitions matter. According to James Bartram and colleagues, who have first-hand experience with global monitoring of water and sanitation:

If a measure of the quality of the water were incorporated into the definition of an improved drinking water facility, the drinking water component of the MDG target would be

²⁴³ *Id.* at 8141, 8144 (noting that countries will consult with UNICEF, USAID, or the World Bank, respectively, to conduct Multiple Indicator Cluster Surveys (“MICS”), Demographic and Health Surveys (“DHS”), or Living Standards Measurement Studies (“LSMS”).

²⁴⁴ IAEG-SDGs, *supra* note 42, at 2; WORLD BANK GRP., *supra* note 12, at 107.

²⁴⁵ Bartram et al., *supra* note 14, at 8146–49; WHO/UNICEF JMP, Methods, <https://washdata.org/monitoring/methods> [<https://perma.cc/3RDE-2992>] (last visited Jan. 21, 2018).

²⁴⁶ Bartram et al., *supra* note 14, at 8154–57 (discussing challenges such as the fact that there are often large discrepancies between national and international estimates and that censuses may not be accurate if they exclude marginalized groups, such as those living in informal settlements).

²⁴⁷ *Id.* at 8153.

²⁴⁸ IAEG-SDGs, *supra* note 42.

²⁴⁹ WHO/UNICEF JMP 2015 UPDATE, *supra* note 11.

²⁵⁰ *Id.*; WHO/UNICEF JMP 2017 UPDATE, *supra* note 11; Bartram et al., *supra* note 14.

badly off track; and if households sharing sanitation facilities otherwise classified as “improved” were considered to have adequate sanitation, then the sanitation component of the MDG target would be judged to be on track.²⁵¹

The MDG indicators inadvertently created perverse incentives by motivating governments and donors to adopt short-term solutions that may not have been sustainable.²⁵² Even the U.N. Development Program, which had primary responsibility within the U.N. system for the MDGs and is otherwise a champion of the goals, observed that “[t]he MDG focus on outcomes such as poverty reduction without particular attention to the underlying causes has led in some cases to undesirable, unintended and often unsustainable consequences.”²⁵³ The MDGs tended to promote capital investments in infrastructure without attention to recurring costs. For example, approximately one-third of hand pumps in rural sub-Saharan Africa are non-operational at any given time,²⁵⁴ yet only a fraction of funding is allocated to operations and maintenance.²⁵⁵ Similarly, countries with large populations without access to sanitation, like India, made concerted efforts to build toilets, but often without assessing the long-term sustainability of such measures.²⁵⁶

This is not a phenomenon unique to the water and sanitation sector; for example, the U.N. Development Program found that investments were made in schools and medical facilities in Africa to achieve MDG targets without considering the need to pay for staff and equipment.²⁵⁷ Similarly, a narrow focus on achieving particular MDG outcomes

²⁵¹ Bartram et al., *supra* note 14, at 8157.

²⁵² Langford & Winkler, *supra* note 41, at 150; U.N. DEV. PROGRAM, *supra* note 171, at 63.

²⁵³ U.N. DEV. PROGRAM, *supra* note 171, at 63.

²⁵⁴ WHO/UNICEF JOINT MONITORING PROGRAMME FOR WATER SUPPLY AND SANITATION, DRINKING WATER—EQUITY, SAFETY AND SUSTAINABILITY, THEMATIC REPORT 54 (2011), <https://washdata.org> [<https://perma.cc/55Z9-YS92>].

²⁵⁵ WORLD HEALTH ORG. & UN-WATER, UN-WATER GLOBAL ANALYSIS AND ASSESSMENT OF SANITATION AND DRINKING-WATER (GLAAS): THE CHALLENGE OF EXTENDING AND SUSTAINING SERVICES 29 (2012), http://apps.who.int/iris/bitstream/10665/44849/1/9789241503365_eng.pdf [<https://perma.cc/E672-YCEC>].

²⁵⁶ C.A. KUMAR & U. SINGH, THE WORLD BANK, YOU MANAGE WHAT YOU MEASURE: USING MOBILE PHONES TO STRENGTHEN OUTCOME MONITORING IN RURAL SANITATION (2012), <https://www.wsp.org/sites/wsp.org/files/publications/WSP-Management-What-You-Measure-Using-Mobile-Phones-Strengthen-Outcome-Monitoring-Rural-Sanitation.pdf> [<https://perma.cc/4HRS-N2RN>]; see also S. Murthy, D. Shemie, & F. Bichai, *The Role of Adaptation in Mobile Technology Innovation for the Water, Sanitation and Hygiene Sector*, 13(1) WATER PRACTICE & TECHNOLOGY (forthcoming).

²⁵⁷ U.N. DEV. PROGRAM, *supra* note 171, at 63.

sometimes obscured the importance of developing stronger national institutions.²⁵⁸ For instance, although global funds enabled Africa to make significant progress in reducing HIV, malaria, and tuberculosis—which were explicit MDG targets—less funding was spent on improving health systems.²⁵⁹ As a result, many countries did not have the ability to respond to other public health crises, like the Ebola outbreak.²⁶⁰ Although the MDGs promoted foreign aid, less attention was paid to the long-term development of capacity, institutions, and technology.²⁶¹ In some instances, some aid-dependent countries became susceptible to the “fortunes of donor countries,” which undermined the long-term sustainability of their own MDG efforts.²⁶²

The MDGs’ focus on achieving comparatively simple goals that could be measured and reported as quantitative indicators sometimes resulted in a focus on meeting basic needs, rather than enhancing the capacity for a human rights–based approach to development.²⁶³ It also tended to create a “silo-effect,” where the international community focused on trying to achieve the stated goals instead of trying to build national capacity across sectors.²⁶⁴ Because the MDGs served as performance standards against which development progress could be benchmarked, those issues that were not explicitly incorporated into the MDGs tended to be sidelined.²⁶⁵ Due to this selective cherry-picking, the MDGs sometimes disrupted then-existing development efforts.²⁶⁶

In addition, the MDG water targets only looked at national averages, obscuring significant disparities between populations.²⁶⁷ Thus, a country could be reported as having “met” its MDG targets, even if certain populations of people continued to be excluded.²⁶⁸ Lack of subnational

²⁵⁸ Cf. Suzman Statement Dec. 2013, *supra* note 175 (“The MDGs succeeded in part because they did not pretend to be the ‘sum total’ of development. . . . They are deliberately ends rather than means, and as such are not the blueprint for development.”).

²⁵⁹ U.N. DEV. PROGRAM, *supra* note 171, at 63.

²⁶⁰ *Id.*

²⁶¹ *Id.* at 64.

²⁶² *Id.*

²⁶³ Fukuda-Parr et al., *supra* note 27, at 5, 7 (noting that a human rights–based approach to development focuses “on people not as the beneficiaries of specific programs but as active agents in changing the social relations and structures that perpetuate rights deprivations.”).

²⁶⁴ *Id.* at 6–7.

²⁶⁵ *Id.* at 6 (arguing, for example, that MDG’s focus on achieving universal primary education overshadowed other key issues, such as quality of education, early childhood education, adult literacy, etc.).

²⁶⁶ *Id.* at 8.

²⁶⁷ *Id.* at 6.

²⁶⁸ Melamed, *supra* note 173, at 4 (suggesting that because the national averages reported

data about vulnerable groups also prevented countries from developing effective targeted programs.²⁶⁹

These examples highlight how a quantitative indicator can take on a life of its own and create unintended knowledge effects that change the policy discourse. It also suggests that the technical indicators may matter more than the text of the internationally negotiated documents that give rise to the legal norms in the first place.²⁷⁰

However, the MDGs also brought greater awareness of the need to overcome data inertia, as suggested by these startling statistics: “In 2003, only four developing countries had two or more data points for at least sixteen of the twenty-two MDG indicators. By 2013, 129 countries met this metric of data availability.”²⁷¹ The MDG monitoring efforts led to more household surveys being conducted around the world and to more coordination between national statistical offices and international experts.²⁷² More work remains on improving data availability, reliability, and quality, and reducing the time lag between data collection and reporting.²⁷³ Mindful of these prior shortcomings, the SDGs include a greater focus on reporting disaggregated data so as to reveal inequities and inequalities between different subpopulations within a country.²⁷⁴

Expertise inertia is often a hidden challenge. While many national statistical offices have had their capacity improved, that has not always been the case. In some instances, the data is collected and reported by international agencies, effectively sidelining national efforts.²⁷⁵ To the extent that global indicators continue to be created primarily by international experts, who tend to be from developed countries in the West, they may inherently suffer from expertise inertia because they do not incorporate a wider variety of experiences.²⁷⁶

by the MDGs masked inequalities, “the MDGs did not incentivise a particular focus on the poorest or the hardest to reach.”).

²⁶⁹ U.N. DEV. PROGRAM, *supra* note 171, at 66–67.

²⁷⁰ This is ironic given the greater “status” that the politically negotiated goals and targets have. See McArthur, *supra* note 140, at 17; David Donoghue, *My Perspective on the SDG Negotiations*, DELIVER 2030 8 (2016), <http://deliver2030.org/?p=6909> [<https://perma.cc/VNU2-YNCM>] (last visited Jan. 21, 2018).

²⁷¹ WORLD BANK GRP., *supra* note 12, at 107. See also U.N. DEV. PROGRAM, *supra* note 171, at 62.

²⁷² IAEG-SDGs, *supra* note 42, at 2; WORLD BANK GRP., *supra* note 12, at 107; U.N. DEV. PROGRAM, *supra* note 171, at xi.

²⁷³ WORLD BANK GRP., *supra* note 12, at 107.

²⁷⁴ See G.A. Res. 70/1, *supra* note 15, ¶¶ 17, 18.

²⁷⁵ WORLD BANK GRP., *supra* note 12, at 107.

²⁷⁶ MERRY, *supra* note 3, at 6.

The expert agency responsible for monitoring the water, sanitation, and hygiene targets—the JMP, a collaborative effort between UNICEF and the World Health Organization that began in 1991—has sought to continually refine its monitoring techniques and be responsive to criticism about the limitations of its proxy indicators. For example, it started to use a “ladder approach” to show access to different service levels.²⁷⁷ This more flexible methodology allowed countries to monitor access at levels corresponding to their national capacity and resources.²⁷⁸ In 2011, as part of a broader “post-2015 development process” intended to identify what would replace the MDGs when the goals expired in 2015, the JMP also began to hold international consultations with different stakeholders to improve its indicators.²⁷⁹ The process of developing the MDG goals, targets, and indicators had been criticized for being non-transparent and non-inclusive.²⁸⁰ In contrast, the process of developing the SDGs was comparatively more open and inclusive, with greater participation by NGOs and other non-state actors.²⁸¹ The human rights community played an active role in helping the JMP to refine its indicators, as discussed in Section II.D. These efforts helped the JMP to overcome inherent expertise inertia

²⁷⁷ The four categories for water were: piped water on premises, other improved water, unimproved sources and surface water. WHO/UNICEF JMP 2017 UPDATE, *supra* note 11, at 5. A similar ladder existed for sanitation: “improved” facility (defined above); “unimproved facility” (i.e., flush/pour flush not going to sewer/septic/pit, pit latrines without a slab, hanging and bucket latrine); and the last rung of the ladder was open defecation. *Id.* at 8, 33.

²⁷⁸ U.N. WATER, *supra* note 163, at 7.

²⁷⁹ IAEG-SDGs, *supra* note 42; WHO/UNICEF JMP 2017 UPDATE, *supra* note 11, at 13–14.

²⁸⁰ See Nanda, *supra* note 141, at 398; U.N. System Task Team on the Post-2015 U.N. Development Agenda, *supra* note 172, at 46–47 (Annex II highlights the key strengths and weaknesses of the MDGs); FUKUDA-PARR & YAMIN, *supra* note 32. *But see* McArthur, *supra* note 140, at 6.

²⁸¹ The High Level Political Forum overseeing the SDG process specifically involved non-state actors through the Major Groups and Other Stakeholders. See, e.g., IAEG-SDG, *Open Consultation with Civil Society, Academia and Private Sector*, SUSTAINABLE DEVELOPMENT GOALS, <https://unstats.un.org/sdgs/iaeg-sdgs/open-consultation-stakeholders> [<https://perma.cc/7PP6-79CH>] (last visited Jan. 21, 2018); Major Groups and Other Stakeholders High Level Political Forum Coordination Mechanism Terms of Reference (2017), <https://sustainabledevelopment.un.org/content/documents/12947HLPFMGoSCM-ToR-Jan2017.pdf> [<https://perma.cc/6FSX-4T8V>]. In May 2015, I had the opportunity to observe this process directly by giving a short speech on behalf of the International Council for Science, which coordinated the Scientific and Technological Community Major Group at the Interactive Dialogue with Major Groups.” See U.N. NGLS, *Ms. Sharmila Murthy—Suffolk & Harvard University—May UN Post-2015 Negotiations*, YOUTUBE (July 16, 2015), <https://www.youtube.com/watch?v=76pYKUlFwU> [<https://perma.cc/4E43-GSYK>].

because by including other perspectives into the discussion, they were necessarily broadening their pool of knowledge.

2. Sustainable Development Goals (“SDGs”)

In developing new water, sanitation, and hygiene indicators for the SDGs, the JMP has sought to address the calculability, data inertia, and expertise inertia challenges it faced with the MDGs.²⁸² The SDG target on water access seeks to achieve by 2030 “universal and equitable access to safe and affordable drinking water for all.”²⁸³ The JMP has improved upon the “proxy” water indicator by adding three key criteria to its MDG definition of an “improved” water source. It is measuring whether an improved source is (1) “located on premises,” which will address concerns about the level of accessibility of the water source, including the amount of time individuals might otherwise spend walking to a water source; (2) “available when needed,” which will help ensure that the water source actually works in the long run; and (3) “free of faecal (and priority chemical) contamination,” which will tackle safety and quality concerns.²⁸⁴ The JMP is also continuing to use a ladder approach to enable countries to show progress in improving service levels.²⁸⁵

The SDGs specifically commit to expanding access to “affordable” water, but affordability remains a difficult issue to measure due to data inertia and expertise inertia.²⁸⁶ There is a certain irony in this because the price of water is in fact a number that could be quantified. The calculability problem is twofold: first, data on water pricing—an inherently

²⁸² WHO/UNICEF, *About the JMP*, WASHDATA, <https://washdata.org/how-we-work/about-jmp> [<https://perma.cc/822N-ZNJG>] (last visited Jan. 21, 2018).

²⁸³ G.A. Res. 70/1, *supra* note 15, at ¶ 6.1.

²⁸⁴ IAEG-SDGs, *supra* note 42, at 2.

²⁸⁵ For household water, the proposed water service ladder for SDG monitoring has four levels: at the top is “safely managed water,” the definition of which is noted above; next is “basic water,” which is the old definition of “improved water” under the MDG monitoring (as noted in the excerpt above) with a total collection time of no more than thirty minutes for a round trip, including waiting time; the third level is “unimproved water,” which is either an “unimproved source” (i.e., unprotected dug well, unprotected spring, cart with small tank/drum, bottled water) or an “improved source” with a total collection time of over thirty minutes; and the last rung of the ladder is surface water. WHO/UNICEF, *supra* note 11, at 6. The JMP has also used a ladder approach to report disparities in service levels, such as between rural, urban and total populations at the subnational, country, regional and global levels. WHO/UNICEF JMP 2015 UPDATE, *supra* note 11, at 42.

²⁸⁶ See WHO/UNICEF JMP 2012 UPDATE, *supra* note 146, at 15; WHO/UNICEF JMP 2017 UPDATE, *supra* note 11, at 20.

local topic—is not readily available at the national or global level; second, the concept of affordability itself is not well-defined. Debates exist as to whether affordability should be calculated as a proportion of income and if so, at what proportion, or as the ability to have sufficient water without compromising other basic needs, such as food or medicine.²⁸⁷ These are all difficult to measure given existing data availability. Moreover, even if there is standardization as to how to measure affordability, context matters: what might be affordable in the United States would not necessarily be affordable in Zambia.²⁸⁸ In addition, calculating water affordability based on the average or median income in a community would necessarily mean that lower income individuals in a community would be paying a disproportionately larger amount of their income.²⁸⁹ The JMP recognizes these data inertia and expertise inertia challenges, and is working with the World Bank, academics, and others to develop and test relevant indicators.²⁹⁰ It has also begun to “use available data on household expenditure, tariffs, income and poverty to start benchmarking affordability across countries and reporting national, regional and global trends.”²⁹¹ For example, it has undertaken a preliminary analysis of household expenditure on water, sanitation, and hygiene as a proportion of total expenditure.²⁹²

A similar story can be told for the SDG sanitation target, which resulted from an international commitment to provide by 2030 “access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations.”²⁹³ The relevant indicator will measure the “proportion of population using safely managed sanitation services, including a hand-washing facility with soap and water.”²⁹⁴ The sanitation component enhances the old MDG definition of “improved” sanitation by

²⁸⁷ NAT'L CONSUMER LAW CTR., REVIEW AND RECOMMENDATIONS FOR IMPLEMENTING WATER AND WASTEWATER AFFORDABILITY PROGRAMS IN THE UNITED STATES 12 (2014); U.S. CONFERENCE OF MAYORS, PUBLIC WATER COST PER HOUSEHOLD: ASSESSING FINANCIAL IMPACTS OF EPA AFFORDABILITY CRITERIA IN CALIFORNIA CITIES 6–7, 10 (2014), <https://www.cacities.org/getattachment/Member-Engagement/Regional-Divisions/Los-Angeles-County/Water-Cost-Per-Household-Report-California-Cities.pdf.aspx> [<https://perma.cc/E4VA-VWFB>]; U.N. Gen. Assembly, Rep. of the Special Rapporteur on the human right to safe drinking water and sanitation [hereinafter Affordability Report], UN Doc A/HRC/30/39, ¶ 32 (July 6, 2015).

²⁸⁸ See Affordability Report, *supra* note 287, ¶ 28.

²⁸⁹ U.S. CONFERENCE OF MAYORS, *supra* note 287, at 3.

²⁹⁰ WHO/UNICEF JMP 2017 UPDATE, *supra* note 11, at 20.

²⁹¹ *Id.*

²⁹² *Id.*

²⁹³ G.A. Res. 70/1, *supra* note 15, at ¶ 6.2.

²⁹⁴ IAEG-SDGs, *supra* note 42, at 5.

incorporating into the indicator whether that facility is (1) “not shared with other households”; and (2) whether the “excreta is safely disposed in situ or treated off-site.”²⁹⁵ Similar to its reporting for water, the JMP is continuing to use a ladder approach for reporting access to sanitation, with the “safely managed sanitation” indicator now at the top.²⁹⁶ The information from this indicator will also inform another SDG target that commits to halving the proportion of untreated wastewater.²⁹⁷

Interestingly, the sanitation target does not address affordability, but this is an oversight of the 2030 Agenda declaration, not the JMP. Even where subsidies exist to help construct toilets, the long-term maintenance costs can be a barrier to usage.²⁹⁸ The homeowner either needs to pay the fees associated with a networked sewer system or assume the costs of building and maintaining a pit latrine, septic tank or other on-site option.²⁹⁹ For example, once a pit latrine becomes full, either the pit needs to be emptied or the latrine needs to be moved to a new site, both of which cost money.³⁰⁰ Additional water may be needed for flushing, which can further increase costs. Similarly, shared facilities, such as public toilets, may have fees associated with them, which may dissuade individuals from using them. Recognizing these issues, the JMP is including costs of sanitation and hygiene in its current calculations of household expenditures.³⁰¹

The MDGs had been criticized for not explicitly including a reference to hygiene, despite the fact that clear links exist between good health and hygiene.³⁰² Thus, its inclusion in the SDGs is significant. Building on the recommendations of a post-2015 working group, the JMP interprets the term hygiene as “the conditions and practices that help maintain health and prevent spread of disease including hand washing, menstrual hygiene management and food hygiene.”³⁰³ However, because data on handwashing is more readily available than data on menstrual hygiene management or food hygiene at home, the JMP only plans to actually measure handwashing with soap at home.³⁰⁴ In other words, as with the

²⁹⁵ WHO/UNICEF JMP 2017 UPDATE, *supra* note 11, at 44–46.

²⁹⁶ *Id.* at 11.

²⁹⁷ This issue is covered by a separate target that is being managed by a different U.N. agency (Target 6.3, which is being assessed by GEMI), but coordination between the agencies is anticipated. IAEG-SDGs, *supra* note 42, at 8–9.

²⁹⁸ Affordability Report, *supra* note 287.

²⁹⁹ WHO/UNICEF JMP 2017 UPDATE, *supra* note 11, at 20.

³⁰⁰ *Id.*

³⁰¹ *Id.*

³⁰² *Id.* at 18.

³⁰³ WHO/UNICEF JMP 2015 UPDATE, *supra* note 11, at 9.

³⁰⁴ *Id.* at 10.

early efforts to measure water and sanitation access under the MDGs, data inertia limits the calculability of this new SDG indicator on hygiene.

Cognizant of the SDG target language regarding the expanding “universal” access to water and paying “special attention to the [sanitation and hygiene] needs of women and girls and those in vulnerable situations,” the JMP is also developing indicators to measure water, sanitation, and hygiene access at other locations besides the home.³⁰⁵ Data availability will dictate these monitoring efforts, with an initial focus on basic access at schools and health care facilities because data is more accessible at these locations.³⁰⁶ However, the JMP’s broad efforts to provide a more holistic interpretation of the SDG targets are largely the result of a lengthy and collaborative effort to improve the MDG indicators by soliciting the feedback of a variety of stakeholders, which reflects the agency’s efforts to overcome expertise inertia.

Both the water and sanitation/hygiene SDG targets stress the importance of providing *equitable* access, which was not emphasized in the MDGs.³⁰⁷ As a result, significant energy is being invested into reporting data that is disaggregated by subpopulation so that such disparities can be revealed.³⁰⁸ However, these efforts will only be as good as the data gathering process, i.e., data inertia may continue to create a bottleneck. Highly relevant to overcoming the challenges of data inertia, Target 17.18 of the SDGs commits “to increase significantly the availability of high-quality, timely and reliable data disaggregated by income, gender, age, race, ethnicity, migratory status, disability, geographic location and other characteristics relevant in national contexts.” The JMP has taken note of this mandate and plans to “continue to develop its reporting of inequalities and their progressive reduction.”³⁰⁹

The JMP’s current categories for disaggregation are urban/rural; wealth; and affordability; and the others are to be determined.³¹⁰ To truly assess inequalities, states will need to ensure that they identify vulnerable and marginalized groups and gather data specifically on those populations. The JMP has pointed out that it is not possible to measure inequalities within a given household according to sex, age, or disability given the existing questionnaires; however, it can estimate gender equality

³⁰⁵ G.A. Res. 70/1, *supra* note 15, ¶ 6.2.

³⁰⁶ WHO/UNICEF JMP 2012 UPDATE, *supra* note 146, at 5–9 (depicting service ladders for monitoring WASH in schools and in health care facilities).

³⁰⁷ Fukuda-Parr et al., *supra* note 27, at 6.

³⁰⁸ G.A. Res. 70/1, *supra* note 15, ¶ 17.18.

³⁰⁹ WHO/UNICEF JMP 2015 UPDATE, *supra* note 11, at 3.

³¹⁰ *Id.* at 35.

based on time spent for water collection.³¹¹ For example, in 2010, women and girls were responsible for collecting water 71% of the time when they lived in households without running water in sub-Saharan Africa.³¹²

The SDG targets on expanding water, sanitation, and hygiene access build directly on the MDG indicators and leverage the expertise of the JMP, an agency that has taken steps to improve the calculability of its indicators and address concerns about data inertia and expertise inertia. Although some efforts, like addressing affordability and measuring hygiene, are necessarily limited, it is likely that the JMP will continue to enhance these metrics. Moreover, given the SDG's emphasis on improving data collection and disaggregation, the capacity of national statistical offices will likely continue to increase. Yet, part of the JMP's success also lies in the fact that the targets on expanding access to water, sanitation, and hygiene are inherently calculable if the data and expertise exists. In contrast, the process-oriented "means of implementation" SDG targets are more difficult to measure.³¹³

The challenges of developing a satisfactory indicator to measure community participation in improving water and sanitation management highlights how data and expertise inertia can compound inherent calculability challenges. Target 6.b of the SDGs seeks to "support and strengthen the participation of local communities in improving water and sanitation management."³¹⁴ The only indicator currently being developed, however, is "percentage of local administrative units with established and operational policies and procedures for participation of local communities in water and sanitation management."³¹⁵ This is clearly a very narrow view of participation. Even if such policies exist, are they actually being implemented? Even if they are being implemented, are the policies and procedures a meaningful vehicle for local community involvement in decision-making? Who is selected from the community and how? To what degree do the decision-makers actually consider the input of the community? And who exactly is the "community"—i.e., are women and marginalized individuals included?

³¹¹ Although Target 6.1 relating to water access does not mention women and girls, the JMP interprets the phrase "paying special attention to the needs of women and girls" (G.A. Res. 70/1, *supra* note 15, ¶ 6.2) to encompass reducing the burden of collecting water. IAEG-SDGs, *supra* note 42, at 3.

³¹² See, e.g., WHO/UNICEF JMP 2015 UPDATE, *supra* note 11, at 31.

³¹³ G.A. Res. 70/1, *supra* note 15, ¶¶ 6.a–b.

³¹⁴ *Id.* at ¶ 6.b.

³¹⁵ IAEG-SDGs, *supra* note 42, at 34.

Not only is participation not as calculable as something like water quality, but efforts to measure participation also suffer from data inertia because this information has not historically been gathered and was not included in the precursor MDG targets. In addition, a relatively new initiative, the U.N. Water Global Analysis and Assessment for Sanitation and Drinking Water (“GLAAS”), has been tasked with developing a methodology for assessing this indicator.³¹⁶ GLAAS was created in 2008 to gather data on the financial inputs, human resource capacities, and policy frameworks in the sanitation and drinking water sector.³¹⁷ Unlike the JMP, GLAAS has not previously had the same opportunity to engage a wide variety of stakeholders on the development and monitoring of the indicator for participation, but moving forward, it plans to undertake these kinds of consultations.³¹⁸

One way for GLAAS to consider enhancing the indicator for participation despite the existing data and expertise inertia challenges may be to conduct more detailed assessments in a few targeted locations. Although the opportunity for participation and input into policy formulation is important, most people probably do not want to spend their free time attending water and sewer utility board meetings. Rather, participation usually becomes an issue when there is a problem, such as the lead poisoning crisis that afflicted Flint, Michigan. Once the crisis resolves, there tends to be less interest in continuing to participate in the mundane business of operating a water-service. Perhaps through a survey or a review of media coverage, GLAAS could identify a few select geographic locations each year that experienced some sort of crisis with respect to water and sanitation access. In those locations, it could work with national statistics offices, international organizations, and/or academics, to do a more detailed survey of participation. Such an approach could address the existing limitations, at least in a few locations, and build expertise in developing relevant questions.

³¹⁶ Although GLAAS did not develop the indicators for the process-oriented Means of Implementation water SDG targets (6.a and 6.b), it has taken the lead to develop the methodological note and to monitor these indicators because it was thought that GLAAS was best placed to do this in collaboration with partners such as OECD and UNEP. Personal communication with U.N.-Water GLASS team, World Health Organization (Sept. 29, 2017).

³¹⁷ U.N. WATER & WHO, INVESTING IN WATER AND SANITATION: INCREASING ACCESS, REDUCING INEQUALITIES: UN-WATER GLOBAL ANALYSIS AND ASSESSMENT OF SANITATION AND DRINKING-WATER [hereinafter GLAAS 2014 REPORT] 2 (2014), http://apps.who.int/iris/bitstream/10665/139735/1/9789241508087_eng.pdf?ua=1&ua=1 [<https://perma.cc/WK29-CSBN>].

³¹⁸ Personal communication with UN-Water GLAAS team, *supra* note 316.

When the SDG water targets are analyzed from the perspective of calculability, data inertia, and expertise inertia, it becomes clear why certain information is being prioritized in the indicators. The development of statistical indicators necessarily favors those factors that can easily be quantified and demotes more complicated, harder to quantify aspects.³¹⁹ The analysis further suggests that the quantitative indicators being created to measure these targets may have greater influence on policymaking than the politically negotiated text of the actual SDG targets.

D. *A Dialogue Between Human Rights and Statistics*

An important insight also emerges from the analysis of the way in which human rights have been influencing the creation of the SDG water indicators.³²⁰ In the 1990s, water was increasingly becoming a concern of the human rights community, at least in part due to protests that had been erupting around the globe in response to water privatization efforts.³²¹ In 2002, the U.N. committee responsible for interpreting the International Covenant for Economic, Social and Cultural Rights (“ICESCR”) issued General Comment 15 on the Right to Water.³²² It determined that the ICESCR’s articles on the “right to an adequate standard of living,” the “right to health,” and the “right to life” should be interpreted to encompass a right to water.³²³ This recognition also built on relevant language in the Convention on the Rights of the Child³²⁴ and in the Convention on the Elimination of All Forms of Discrimination Against Women,³²⁵ and on soft law declarations, such as the Mar del Plata declaration of 1977 discussed in Section II.A.³²⁶ As defined in General Comment 15, the right

³¹⁹ Rosga & Satterthwaite, *supra* note 32, at 256.

³²⁰ U.N. Dev. Programme, *The Human Rights Based Approach to Development Cooperation Towards a Common Understanding Among UN Agencies*, https://undg.org/wp-content/uploads/2016/09/6959-The_Human_Rights_Based_Approach_to_Development_Cooperation_Towards_a_Common_Understanding_among_UN.pdf [<https://perma.cc/P8FM-JJHS>].

³²¹ See Murthy, *supra* note 42, at 97–100.

³²² *Gen. Comment No. 15*, *supra* note 151.

³²³ *Id.* at ¶ 3.

³²⁴ Convention on the Rights of the Child art. 24.2(c), Nov. 20, 1989, 1577 U.N.T.S. 3 (requiring States to combat disease and malnutrition “through the provision of adequate nutritious foods and clean drinking-water”).

³²⁵ Convention on the Elimination of All Forms of Discrimination Against Women art. 14.2(h), Dec. 18, 1979, 1249 U.N.T.S. 13 (requiring States to ensure that women have the right to “enjoy adequate living conditions, particularly in relation to . . . water supply”).

³²⁶ U.N. WATER CONFERENCE—RESOLUTIONS, *supra* note 134, at 66 (“All peoples . . . have the right to have access to drinking water in quantities and of a quality equal to their basic needs.”).

to water “entitles everyone to sufficient, safe, acceptable, physically accessible and affordable water for personal and domestic uses.”³²⁷ In 2010, the U.N. General Assembly and the U.N. Human Rights Council adopted resolutions recognizing a human right to safe drinking water and sanitation.³²⁸ In 2008, the Human Rights Council also appointed a Special Rapporteur on the human right to safe drinking water and sanitation, who began to engage the water community on a variety of issues, including on the shortcomings of the MDGs.

Although the push to recognize water as a human right largely emerged out of struggles against water privatization, it should be noted that human rights law does not prohibit the use of private actors in the delivery of water services.³²⁹ Although states have the primary obligation to ensure that the human right to safe drinking water and sanitation is progressively realized, private actors can step in and fulfill the need. Moreover, under international human rights law, water and sanitation services must be affordable, not free. As a result, many private companies, such as Nestle,³³⁰ Pepsi,³³¹ and Veolia,³³² have embraced the idea of water as a human right because they see themselves as being able to fill a service gap.

In the 2030 Agenda resolution that gave rise to the SDGs, states reaffirmed in the Declaration their “commitments regarding the human right to safe drinking water and sanitation.”³³³ This inclusion is noteworthy because of what was omitted: food and housing, which are expressly described as human rights under the ICESCR, are framed only as basic needs. The clear recognition of the right to water and sanitation—which has only recently been interpreted as a right—reflects the attention given this issue. This acknowledgment follows several resolutions that had been adopted by the U.N. General Assembly and Human Rights Council,

³²⁷ *Gen. Comment No. 14*, *supra* note 151, ¶ 2.

³²⁸ G.A. Res 64/292, *supra* note 150, ¶ 1 (July 28, 2010); Human Rights Council Res. 15/9, *supra* note 150, ¶ 3.

³²⁹ Murthy, *supra* note 42, at 90–91; SALZMAN, *supra* note 12, at 204–05.

³³⁰ *What about the human right to water?*, NESTLE WATERS, <http://www.nestle-waters.com/question-and-answers/what-about-the-human-right-to-water> [<https://perma.cc/3KAH-YNUX>] (last visited Jan. 21, 2018).

³³¹ PEPSICO, PepsiCo Guidelines in Support of the Human Right to Water (Oct. 30, 2015), <https://www.pepsico.com/docs/album/default-document-library/pepsicohumanrightto water.pdf?sfvrsn=0> [<https://perma.cc/YTD2-9X7U>].

³³² VEOLIA WATER, Right to Water—From Concept to Reality (2010), <http://www.ohchr.org/Documents/Issues/Water/ContributionsPSP/Veolia.pdf> [<https://perma.cc/R9H2-CMS6>].

³³³ G.A. Res. 70/1, *supra* note 15, ¶ 7.

which highlighted the importance of including the human right to safe drinking water and sanitation in the post-2015 development agenda.³³⁴

In December 2015, the U.N. General Assembly adopted a resolution on “[t]he human rights to safe drinking water and sanitation” that specifically welcomed the reaffirmation of the human right to safe drinking water and sanitation as part of the 2030 Agenda for Sustainable Development.³³⁵ The title of this resolution is notable because it reflects the evolving consensus that water and sanitation are related but distinct human rights; this is the first time that a General Assembly resolution or Human Rights Council resolution has used the plural form. This resolution followed one adopted in December 2013, in which the General Assembly specifically called upon states “[t]o give due consideration to the human right to safe drinking water and sanitation and the principles of equality and non-discrimination in the elaboration of the post 2015 development agenda.”³³⁶ Moreover, the Human Rights Council has also repeatedly underscored the need to consider the human right to safe drinking water and sanitation in the post-2015 development agenda.³³⁷

Despite the strong advocacy that led to the recognition of the human right to safe drinking water and sanitation in the 2030 Agenda,³³⁸ the actual water, sanitation, and hygiene goals and targets of the SDGs were not framed in human rights terms.³³⁹ Because the 2030 Agenda is not a treaty, it had the freedom to be ambitious.³⁴⁰ Thus, it is perhaps puzzling why it did not incorporate more references to human rights,

³³⁴ G.A. Res. 70/169, at 1 (Feb. 22, 2016); G.A. Res. 68/157, at ¶ 6 (c) (Feb. 12, 2014); Human Rights Council Res. 27/7, UN Doc. A/HRC/RES/27/7, ¶ 4 (Oct. 2, 2014); Human Rights Council Res. 24/18, U.N. Doc. A/HRC/RES/24/18, ¶ 10 (Oct. 8, 2013).

³³⁵ G.A. Res. 70/169, *supra* note 334, at 1.

³³⁶ G.A. Res. 68/157, *supra* note 334, ¶ 6(c).

³³⁷ Human Rights Council Res. 27/7, *supra* note 334, ¶ 4; Human Rights Council Res. 24/18, *supra* note 334, ¶ 10; Human Rights Council Res. 21/2, U.N. Doc. A/HRC/21/2 (Aug. 26, 2013), ¶ 14.

³³⁸ See, e.g., Open Letter from Léo Heller, *supra* note 159, at 2; *The Foundations of SDG 6—The Human Right to Water and Sanitation*, U.N. WEB TV (2016), <http://webtv.un.org/search/the-foundations-of-sdg-6-the-human-right-to-water-and-sanitation/5031101605001?term=human%20right%20to%20water%20and%20sanitation> [https://perma.cc/X6GN-44QN] (last visited Jan. 21, 2018); *News: The Foundations of SDG 6—The Human Right to Water and Sanitation*, NGO MINING WORKING GROUP (2016), <https://miningwg.com/news/> [https://perma.cc/GM8K-X68X] (last visited Jan. 21, 2018).

³³⁹ In fact, none of the goals or targets in any of the sectors used human rights language despite strong advocacy by NGOs and several U.N. agencies. See, e.g., U.N. OFFICE OF THE HIGH COMM’R FOR HUMAN RIGHTS & CENTER FOR ECON. AND SOC. RIGHTS, *supra* note 234.

³⁴⁰ Thomas Pogge & Mitu Sengupta, *The Sustainable Development Goals (SDGs) as Drafted: Nice Idea, Poor Execution*, WASH. INT’L L.J. 571, 572 (2015).

especially considering the natural alignment of the SDG goals with economic and social rights and the strong advocacy efforts to do so.³⁴¹ I suggest that this did not occur because human rights would have led to greater accountability than member states wanted. Indeed, even the softer term “follow-up and review” was used instead of “monitoring and accountability” due to sensitivities of the block of developing countries known as the G-77.³⁴² Nations still have human rights obligations under existing treaties, but grounding the SDGs in human rights would have enhanced their accountability and legal bindingness. Nevertheless, the JMP has purposefully incorporated a human rights perspective into its interpretation of the SDG targets on water, sanitation, and hygiene and this analysis seeks to explain why.³⁴³

The fields of human rights and international development are often like “ships passing in the night”: the ultimate goals may be similar but the strategies and priorities are different.³⁴⁴ The economic and managerial concepts that underpin the MDGs and the SDGs are at odds with the legal and philosophical theory behind human rights.³⁴⁵ Moreover, U.N. statisticians, who pride themselves on developing objective indicators, are not usually keen to embrace human rights language, which they see as advocacy-oriented and difficult to quantify.³⁴⁶

³⁴¹ See, e.g., Human Rights Caucus Reaction to the 2030 Agenda for Sustainable Development (2015) [hereinafter Human Rights Caucus]; Donoghue, *supra* note 270, at 7.

³⁴² Donoghue, *supra* note 270, at 2.

³⁴³ For a more detailed assessment of how the water targets of the SDGs specifically relate to the normative content of the human rights to safe drinking water and sanitation, see ANALYSIS OF THE SUSTAINABLE DEVELOPMENT GOALS FROM THE PERSPECTIVE OF THE HUMAN RIGHTS TO SAFE DRINKING WATER AND SANITATION, REPORT PREPARED FOR THE SISTERS OF MERCY ON BEHALF OF THE NGO MINING WORKING GROUP AT THE UNITED NATIONS, compiled by Sharmila L. Murthy (2016) <https://cdn1.sph.harvard.edu/wp-content/uploads/sites/134/2016/07/Reading-packet-on-HRTWS.pdf> [<https://perma.cc/9S4K-X8N3>].

³⁴⁴ Alston, *supra* note 166. See also U.N. DEV. PROGRAMME, *Integrating human rights with sustainable human development* (1998), http://www.crin.org/docs/resources/publications/hrbap/UNDP_integrating_hr.pdf [<https://perma.cc/J5XX-NSBY>]; PAUL GREARY, HUMAN RIGHTS AND DEVELOPMENT IN THE NEW MILLENNIUM: TOWARDS A THEORY OF CHANGE (1st ed. 2014); TAKHMINA KARIMOVA, HUMAN RIGHTS AND DEVELOPMENT IN INTERNATIONAL LAW (2016); PETER UVIN, HUMAN RIGHTS AND DEVELOPMENT (2004); Peter Uvin, *From the Right to Development to the Rights-Based Approach: How 'Human Rights' Entered Development*, 17 DEV. IN PRACTICE 597–606 (2007); PHILIP ALSTON & MARY ROBINSON, HUMAN RIGHTS AND DEVELOPMENT: TOWARDS MUTUAL REINFORCEMENT (2005); Human Rights Caucus, *supra* note 341; U.N. OFFICE OF THE HIGH COMM'R FOR HUMAN RIGHTS & CENTER FOR ECON. AND SOC. RIGHTS, *supra* note 43, at 2.

³⁴⁵ Alston, *supra* note 166, at 807; Darrow, *supra* note 234, at 68.

³⁴⁶ MERRY, *supra* note 3, at 24.

In light of these distinct epistemologies, the JMP's deliberate incorporation of a human rights perspective into the technical monitoring framework is noteworthy. For example, the JMP explains that "[i]nternational consultations since 2011 have established consensus on the need to build on and address the shortcomings of this [proxy water] indicator, specifically, to address the normative criteria of the human right to water including accessibility, availability, and quality."³⁴⁷ Similarly, the JMP perceives its efforts to disaggregate data as a way of addressing the human rights concepts of universal access and non-discrimination.³⁴⁸ As a result, the JMP has been lauded by much of the human rights community for its efforts to integrate human rights criteria within its framework for global monitoring.³⁴⁹ However, others argue that the JMP has not gone far enough in embracing a human rights approach to its monitoring efforts.³⁵⁰

The conceptual framework developed in this Article helps to explain how and why human rights are being translated into statistical terms. These two distinct approaches have become increasingly fungible or comparable. This equivalence phenomenon can be partly attributed to the rise of human rights indicators, which seek to measure compliance with human rights treaty obligations and thereby transform abstract legal concepts into specific policy prescriptions.³⁵¹ For example, the Social

³⁴⁷ WHO/UNICEF JMP 2012 UPDATE, *supra* note 146.

³⁴⁸ *Id.* at 3; Bartram et al., *supra* note 14, at 8157. The SDGs also contain a broader goal on the need to "reduce inequality within and among countries," which includes targets on the need to "empower and promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status," and "ensure equal opportunity and reduce inequalities of outcome, including by eliminating discriminatory laws, policies and practices and promoting appropriate legislation, policies and action in this regard." G.A. Res. 70/1, *supra* note 15, at Goal 10. However, as of April 2017, the indicators for these Goal 10 targets were classified as "Tier III" by the Inter-agency and Expert Group on SDG Indicators ("IAEG-SDGs"), which means that "[n]o internationally established methodology or standards are yet available for the indicator, but methodology/standards are being (or will be) developed or tested." IAEG-SDGS, TIER CLASSIFICATION FOR GLOBAL SDG INDICATORS 3, 27 (Apr. 20, 2017), https://unstats.un.org/sdgs/files/Tier%20Classification%20of%20SDG%20Indicators_20%20April%202017_web.pdf [<https://perma.cc/VK4S-FXE6>].

³⁴⁹ U.N. OFFICE OF THE HIGH COMM'R FOR HUMAN RIGHTS & CENTER FOR ECON. AND SOC. RIGHTS, *supra* note 234, at 54–56.

³⁵⁰ Open Letter from Léo Heller, *supra* note 159.

³⁵¹ U.N. OFFICE OF THE HIGH COMM'R ON HUMAN RIGHTS, *supra* note 234, at 1–2; Margaret L. Satterthwaite, *Coding Personal Integrity Rights: Assessing Standards-Based Measures Against Human Rights Law and Practice*, 48 NYU J. INT'L POL. 513, 513 (2015); Rosga & Satterthwaite, *supra* note 32, at 254; MERRY, *supra* note 3, at 164.

and Economic Rights Fulfillment Index provides a quantitative measure of a country's fulfillment with social and economic rights.³⁵² Another measure is the Water, Sanitation, and Hygiene Performance Index, which has been developed as a way to measure progress towards the human rights to water and sanitation.³⁵³

Through the lens of equivalence, we see how two different communities (human rights and development) that use two distinct languages (law and statistics) have been able to communicate with each other, thereby providing a pathway for the integration of the rights to water and sanitation into the SDG technical monitoring process. This process was enhanced by channels of communication that were established by the JMP as part of the post-2015 development process.³⁵⁴ The JMP convened working groups not only on the target topics, i.e., water, sanitation, and hygiene, but also on equality and non-discrimination ("END"). Then—U.N. Special Rapporteur on the human right to safe drinking water and sanitation, Catarina de Albuquerque, chaired the END working group.³⁵⁵

The current U.N. Special Rapporteur, Leo Heller, has continued to play an active role, including serving as a member of the Strategic Advisory Group of JMP and GLAAS.³⁵⁶ However, he has also been critical of the process, publishing an open letter "to express [his] disappointment that the JMP's 2017 Progress Report does not incorporate any explicit human rights language."³⁵⁷ Although the emphasis could have been greater, the JMP's 2017 report does in fact state that "[t]he human rights to water and sanitation place obligations on States to ensure that services are affordable," and that "[a]ccessibility, availability and quality are three of the normative criteria of the human right to safe drinking water, and are used by the JMP for global monitoring of drinking water."³⁵⁸ Heller also criticized the JMP's approach for failing to treat affordability

³⁵² Fukuda-Parr et al., *An Index of Economic and Social Rights Fulfillment: Concept and Methodology*, 8 J. HUMAN RIGHTS 195, 197–98 (2009); SAKIKO FUKUDA-PARR, FULFILLING SOCIAL AND ECONOMIC RIGHTS 15–16 (2015), http://nrs.harvard.edu/urn-3:hul.ebookbatch.GEN_batch:EDZ000100263520160623 [<https://perma.cc/FFZ9-N8UA>] (last visited Jan. 21, 2018).

³⁵³ Benjamin Mason Meier et al., *Monitoring the Progressive Realization of the Human Rights to Water and Sanitation: Frontier Analysis as a Basis to Enhance Human Rights Accountability*, in THE OXFORD HANDBOOK OF WATER POLITICS AND POLICY (Ken Conca & E. Weinthal eds., 2017), <https://papers.ssrn.com/abstract=2851032> [<https://perma.cc/CE43-WLXF>] (last visited Jan. 21, 2018).

³⁵⁴ See, e.g., WHO/UNICEF JMP 2017 UPDATE, *supra* note 11, at 1.

³⁵⁵ G.A. Res. 67/270, at 5 (Aug. 8, 2012).

³⁵⁶ Open Letter from Léo Heller, *supra* note 159.

³⁵⁷ *Id.* at 2.

³⁵⁸ WHO/UNICEF JMP 2017 UPDATE, *supra* note 11, at 20, 26.

and equality as an integral part of the definition of “safely managed” water and sanitation.³⁵⁹ Although the extent to which the JMP has embraced human rights language can be debated, this public exchange underscores the open channels of communication between the human rights and technical monitoring communities.

In addition, the former Special Rapporteur, de Albuquerque, helped to promote equivalence by unbundling the rights to water and sanitation into two categories: normative content (quality, accessibility, availability, affordability and acceptability); and cross-cutting criteria (non-discrimination, participation, accountability, impact and sustainability).³⁶⁰ The water community was receptive to this human rights approach because it dovetailed with existing conceptions of “good” water, sanitation, and hygiene access, such as the fact that water should be safe.³⁶¹ In other words, human rights gave the water community a shorthand way of describing “ideal” access. Moreover, in response to demands by the human rights community for a more analytically rigorous way to measure equality and to identify discrimination in service provision, the JMP heightened its efforts to disaggregate data by wealth quintiles and by urban-rural locations even during the MDG monitoring period.³⁶² In addition, the “ladder” approach used by JMP to show progress was seen as responsive to the human rights concept of “progressive realization.”³⁶³

The unbundling of the rights to water and sanitation into their constitutive parts has also facilitated the calculability of the rights to water and sanitation. As noted earlier, the JMP specifically mentioned three constitutive elements of the right to water in its plans for the SDG water access indicator: accessibility, availability, and quality. This corresponds with the efforts to measure whether an improved source is located on premises, available when needed, and free of fecal and certain chemical contamination.³⁶⁴

The human rights to water and sanitation have influenced the SDG indicator development process, but the converse may also be true:

³⁵⁹ Open Letter from Léo Heller, *supra* note 159, at 2.

³⁶⁰ Catarina de Albuquerque, *Progress report on the compilation of good practices*, U.N. Doc. A/HRC/15/31/Add.1, at ¶ 11 (July 1, 2010), http://www2.ohchr.org/english/bodies/hrcouncil/docs/15session/A.HRC.15.31.Add.1_en.pdf [<https://perma.cc/4H96-GSHC>]; Inga T. Winkler, Margaret L. Satterthwaite & Catarina de Albuquerque, *Treasuring What We Measure and Measuring What We Treasure: Post-2015 Monitoring for the Promotion of Equality in the Water, Sanitation, and Hygiene Sector*, 32 WIS. INT'L L.J. 547, 547–48 (2014).

³⁶¹ See Bartram et al., *supra* note 14, at 8142.

³⁶² *Id.*

³⁶³ See *id.*

³⁶⁴ IAEG-SDGs, *supra* note 42, at 2.

the technocratic process associated with SDG monitoring of water, sanitation, and hygiene may influence the evolution and content of these rights. Because the U.N. agencies responsible for developing the water indicators are working directly with countries to implement and measure the SDGs, the inclusion of a human rights perspective into the SDG monitoring apparatus may enhance state recognition and practice, and thereby deepen the status of the rights to water and sanitation under international law.³⁶⁵ Moreover, global data collected through the MDGs revealed the depths of the sanitation problem and also the dearth of information about hygiene, especially menstrual hygiene. The efforts to address these shortcomings in the SDGs have dovetailed with calls to recognize a right to sanitation that is related to, but distinct from, the right to water, and to heighten the status of hygiene as a human rights issue.³⁶⁶

However, the prominent role that the SDG indicator development process has given to the rights to water and sanitation could also result in an unintentional knowledge effect. The scope of the rights to water and sanitation could inadvertently be distorted through the process of developing indicators because certain criteria of the normative content, such as accessibility, availability, and quality, are easier to measure than others, such as participation. As noted earlier, participation has not easily been quantified, even though it is a key human rights concept.³⁶⁷ Similarly, other important process-related values, such as accountability and transparency,³⁶⁸ are not directly measured by the SDG water indicators. Even affordability, which is theoretically calculable, has not been easy to measure.

Some of these human rights concepts are intended to be captured by other goals. Specifically, Goal 16 of the SDGs seeks to “promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels,”³⁶⁹ which includes targets on the need to “[e]nsure responsive, inclusive, participatory and representative decision-making at all levels.”³⁷⁰ The proposed indicators for these targets are more comprehensive

³⁶⁵ See BOYLE & CHINKIN, *supra* note 16, at 215; HUNTER ET AL., *supra* note 18; SALZMAN, *supra* note 12; ZAEKKE ET AL., *supra* note 20.

³⁶⁶ See, e.g., Murthy, *supra* note 42, at 92, 102; Winkler et al., *supra* note 360, at 553, 566–67; Inga Winkler & Virginia Roaf, *Taking the Bloody Linen out of the Closet—Menstrual Hygiene as a Priority for Achieving Gender Equality*, 21 CARDOZO J. L. GENDER 1, 1–2, 20–21 (2015).

³⁶⁷ *Gen. Comment No. 15*, *supra* note 151, at ¶ 48.

³⁶⁸ *Id.* at ¶ 49.

³⁶⁹ G.A. Res. 70/1, *supra* note 15, at 25.

³⁷⁰ *Id.* at Target 16.7. See also *id.* at Target 16.6 (“Develop effective, accountable and transparent institutions at all levels.”).

than the water-specific participation questions because they attempt to capture participation by different subpopulations³⁷¹ and assess public perception of participation processes by subpopulation.³⁷² However, these indicators are still in the early phase of development and do not yet have any internationally established methodologies that would facilitate measurement.³⁷³

By design, the indicator development process necessarily prioritizes those issues that can be measured. Yet, as this analysis illustrates, not all things that matter can easily be reduced to quantifiable measurement. In many instances, sufficient data simply does not exist—which may reflect political priorities and power dynamics because those in positions of authority do not necessarily want to collect information that could reveal weaknesses in the system.³⁷⁴ If the human rights to water and sanitation are simply about ensuring that everyone has access to sufficient amounts of safe water and toilets, then the existing SDG indicators may be sufficient. But if, as I am arguing, recognizing water and sanitation as human rights also means ensuring process-oriented values, like participation and accountability, then the current indicators are somewhat deficient. In other words, the scope of the rights to water and sanitation could be distorted through the indicator development process because the rights will be equated with only those aspects that can be easily measured, like water quality. This knowledge effect risks reducing the meaning of the rights to a few of their constituent elements—a mere shadow of the true meaning. While the statistics obtained through monitoring are important for understanding whether the human rights to water and sanitation are being realized, the two processes are distinct. As a growing literature on human rights indicators suggests, a complete picture may only emerge when statistical data is supplemented by context-specific qualitative data.³⁷⁵

³⁷¹ Indicator 16.7.1 is the “proportions of positions (by sex, age, persons with disabilities and population groups) in public institutions (national and local legislatures, public service, and judiciary) compared to national distributions.” IAEG-SDGs, *supra* note 42, at 27.

³⁷² Indicator 16.7.2 is the “proportion of population who believe decision-making is inclusive and responsive, by sex, age, disability and population group.” *Id.*

³⁷³ *Id.* at 3, 27.

³⁷⁴ See Kate Donald, *The Politics of ‘Progress’: UN report paints a highly partial picture of SDG implementation*, CTR. FOR ECON. & SOCIAL RIGHTS, <http://www.cesr.org/politics-%E2%80%98progress%E2%80%99-un-report-paints-highly-partial-picture-sdg-implementation> [<https://perma.cc/M5B3-PTUN>] (last visited Jan. 21, 2018).

³⁷⁵ Rosga & Satterthwaite, *supra* note 32, at 273; Winkler, Satterthwaite & de Albuquerque, *supra* note 360, at 554.

This analysis not only illustrates how a dialogue is possible between human rights and statistics, but it also provides important lessons for human rights advocates seeking to translate their concerns into a language that can be understood by policymakers. When it comes to developing quantitative indicators, numbers are the *lingua franca*. As the experience from the water sector suggests, human rights often seem nebulous and intimidating until they are broken down into calculable elements that can be understood by those in other fields. Because a human rights perspective often demands more information than is currently available and requires using new data-gathering methodologies, there is a need to overcome data inertia and expertise inertia.

This lack of available data and techniques should be understood as human rights issues because, as I have argued throughout this Article, information is a form of power. Under the right conditions, the disclosure of information through quantitative indicators can have a strong governance effect and shape the behavior of governments, business and individuals, even without binding legal penalties. Many in the human rights community already recognize this because using information to “name and shame” is a well-established advocacy technique. However, what may be less obvious is how the form of information disclosure can mask or obscure the real problem. For instance, if slum-dwellers are not included in census data, then statistics showing progress on urban water access are likely to be inaccurate. These kinds of problems with calculability, data inertia, and expertise inertia that cause indicators to have knowledge effects need to be addressed.

Human rights advocates, who tend to be trained in law and may not be well-versed in math or statistics, should not throw up their hands in despair when confronted with data gaps; rather, they need to partner with the statisticians responsible for developing quantitative indicators to offer constructive input. Quantitative indicators will never be able to convey the complexity of a problem and they are not a substitute for contextual and qualitative information.³⁷⁶ But because quantitative metrics will continue to be used as influential policy tools, human rights discourse can improve their scope and ultimate impact.

³⁷⁶ The literature on cost-benefit analysis and on human rights indicators both underscore that not everything can be measured and translated into a number. See, e.g., Ackerman & Heinzerling, *supra* note 34, at 1556, 1584; Satterthwaite, *supra* note 351; Rosga & Satterthwaite, *supra* note 32, at 273; Winkler et al., *supra* note 360, at 554.

CONCLUSION

In this Article, I proposed a conceptual framework to examine (1) when quantitative measurements are likely to promote legal compliance, which is described as a governance effect, and (2) how the construction of these quantitative indicators can distort the meaning of the original legal norm, which is known as a knowledge effect. Drawing comparative lessons from the U.S. environmental literature on information disclosure and the social science and human rights literature on global indicators, I applied this new approach to a case study on the global water, sanitation, and hygiene sector.

I argued that through an elaborate global monitoring apparatus that discloses quantitative information, the “soft law” targets of the SDGs on water, sanitation, and hygiene have the power to foster legal compliance, shape global norms, and influence national priorities, especially in developing countries dependent on foreign aid. As the comparative case study of the TRI highlighted, this potential governance effect is mediated by three factors—the simplicity of the quantitative indicators, the capacity of the countries to respond to the data, and the influence of external stakeholders, such as development banks, donors, international organizations, and civil society.

I also argued that the simplicity that allows a quantitative indicator to have a powerful governance effect is a double-edged sword because the indicator is necessarily limited in what it can convey. The challenges inherent in translating legal norms into calculable metrics combined with the problems posed by data inertia and expertise inertia can result in inaccurate indicators and create knowledge effects that have perverse policy consequences. As a result, the quantitative indicators being created to measure the SDG targets may have greater influence on policymaking and norm development than the politically negotiated text of the U.N. 2030 Agenda. Great efforts have been made to enhance the calculability of the SDG water targets and address the underlying data inertia and expertise inertia problems that plagued the MDG monitoring period, but challenges remain. This is not to say that quantitative indicators do not provide valuable information, only that their limitations must be recognized so the information disclosed does not stand for more than it should.

Finally, I demonstrated how the human rights to safe drinking water and sanitation are also influencing the development of these technical indicators. The U.N. agencies responsible for monitoring the SDG water targets are interpreting these targets with human rights principles

in mind, which illustrates how expertise inertia is being overcome through a dialogue between two distinct epistemological communities: statisticians and human rights practitioners. A key lesson for advocates is that policymakers can better understand human rights when these sometimes nebulous concepts are made more calculable. The inclusion of a human rights perspective into the SDG monitoring apparatus may enhance state recognition of the rights to water and sanitation under international law. At the same time, because certain dimensions, such as water quality, are more easily measurable than others, such as community participation, a partial integration could inadvertently distort the meaning of the rights.

As this novel conceptual framework for studying the dynamic interaction between legal norms and statistics illustrates, quantitative indicators are like double-edged swords. It is critical to understand exactly how norms are quantified into technical indicators in order to avoid unintended knowledge effects and ensure that the information disclosed reflects the intended goals.