

The Importance of Information and Participation Principles in Environmental Law in Brazil, the United States and Beyond

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This article explores the two different kinds of uncertainty, 'hard' uncertainty (unknown unknowns) and 'soft' uncertainty (known unknowns), in the context of environmental law decision making. First, it is argued that these different categories should not be treated the same when facing decisions under uncertainty. To deal with these different uncertainties, a tiered risk analysis process is called for, wherein participatory techniques are used both to turn hard uncertainty into (more manageable) soft uncertainty as well as to increase the legitimacy of environmental decision making, even in cases of hard uncertainty. This methodology can and should apply to all instances of domestic, transnational and international environmental law making. This article applies this conceptual platform to analyze how participatory techniques can be factored in to manage uncertainty by reference to two domestic systems – American and Brazilian environmental law – as well as to international (environmental) law. The article concludes that managing uncertainty in the environmental decision-making process is a procedural justice tool to promote more balanced and equitable outcomes.

INTRODUCTION

This article argues that participation is a key consideration in managing uncertainty in environmental policy making. The main point is that participation – understood as access to environmental information, participation in environmental decision making and access to justice – should be an important component of regulatory policies based on precaution. Indeed, whether considered as a principle or as an approach, the essence of precaution is to deal with uncertainty. We divide uncertainty into two distinct stages: 'hard' (unknown unknowns) and 'soft' (known unknowns or 'risks') uncertainty.¹ The term 'hard uncertainty' refers to cases where the triggering event may be known but the probabilities of possible outcomes or even the outcomes themselves cannot be predicted. The term 'soft uncer-

tainty' refers to circumstances where potentially negative outcomes and their probabilities can be predicted and, therefore, measured. In such cases, risks can be assessed. Consequently, soft uncertainty scenarios are subject to cost-benefit analysis and can be addressed through more rational and efficient policy-making processes, whereas instances of hard uncertainty cannot. The impact of participation, in this context, is twofold. First, participation is useful for gathering and disseminating information on a given issue (for purposes of risk analysis, including 'risk assessment', 'risk management' and 'risk communication'), which, in turn, can help to move from 'hard uncertainty' to 'soft uncertainty'. Second, even when hard uncertainty cannot be dissipated, participation remains an important procedural justice tool to make decisions taken under uncertainty more legitimate. Thus, participation is an important component of the development and implementation of environmental policies. Let us discuss this argument in more detail.

The prevalence of uncertainty renders environmental decision making – already a multifaceted and intricate endeavour – even more complex. Uncertainty involves both scientific and socioeconomic dimensions. From a scientific perspective, environmental policy making aims to rely on the best available information and the best available technology – both of which vary widely depending on region and circumstances. However, the complexity of environmental decision making also stems from the need to account for different social and economic policies, interests and needs. These, too, vary significantly across regions, countries and continents, and are conditioned upon constitutions, treaties and statutes that establish various priorities and levels of risk aversion. It also bears emphasizing that risk assessment is inherently subjective and region-specific. Policy decisions that have an impact on the environment can never equally benefit all affected groups. They involve tradeoffs or, in other words, they necessarily generate social costs that must be allocated somewhere. Different groups and regions absorb different impacts; outcomes preferable to some will be anathema to others. Environmental policy thus must accommodate human choices that vary across communities and societies even as it seeks to minimize global risk. Those two goals can

¹ D.N. Cassuto and R.S.R. Sampaio, 'Keeping it Legal: Transboundary Management Challenges Facing Brazil and the Guarani', 36:5 *Water International* (2011), 661.

sometimes be at variance. For example, while some nations might be willing to accept the risks of genetically modified organisms (GMOs) in light of the boost it will provide to their agricultural sectors, others reject such risks because they believe that the potential dangers of GMOs outweigh any potential gains.² Because of the many diverse views and perceptions receiving input from many different variables, risk communication – understood as the interactive exchange of information from different stakeholders before a risky decision³ – is a crucial instrument in any regulatory attempt to transition from hard to soft uncertainty.

In order to assess the environmental and social costs (and concomitant sustainability) of a particular policy, the uncertainty it generates must be identified and measured as accurately as possible. Environmental law provides a variety of tools to do this, such as environmental impact assessments, regular monitoring, training and capacity building and, last but not least, participation. These tools stem from an array of international declarations, conventions and treaties, as well as from domestic constitutions, statutes, regulations, and regional and local policies. Their primary objective is to reduce ‘asymmetric information’ (i.e., to ensure that relevant information is evenly diffused among different stakeholders, thus serving as an active and effective ‘risk communication’ strategy), and thereby facilitate rational and efficient policy making.

However, equal access to relevant information does not mean equal allocation of risk. Risk management does not necessarily facilitate equitable outcomes; rather it enables procedural fairness. Procedural fairness, in turn, is useful both in influencing decisions on the allocation of costs and benefits (risk management) and in facilitating equitable outcomes (risk communication), even when facing ‘hard uncertainty’. Environmental choices that acknowledge and allow for risks and that weigh the impact of negative externalities may be described as ‘sustainable development’.⁴

Complex policy decisions involving development aspirations, social needs and environmental objectives are made amidst a conflicting set of asserted rights. For example, the rights to development, a better quality of life, and the preservation and conservation of ecosystems are often at loggerheads.⁵ However, when affected parties are well informed and the degree of asymmetric information is low, risks are better managed and outcomes gain legitimacy. Even when a decision disfavors some individuals, the chance to participate in the decision-making process increases the opportunities to influence the design of the policy. This leads to a more legitimate and just outcome. Opportunities for participation encompass more than formal legal requirements. They serve also as risk analysis tools encompassing the three prongs of risk assessment, risk management and risk communication in contexts where outcomes cannot be predicted with precision.⁶

In what follows, we explore the implications of participation as a tool to deal with uncertainty in environmental policy making. Uncertainty is an inherent component of environmental regulation. Its effects on the policy-making process are significant. In some cases, a genuine environmental problem is denied or insufficiently tackled to the detriment of affected parties and the natural environment. In other cases, uncertainty adversely affects the efficiency and rationality of the process, particularly where unknown unknowns are over-emphasized and ‘crowd out’ areas where sufficient information is actually available and where proper risk analysis could take place. In this article, we argue for a tiered risk analysis process wherein participatory techniques are used both to turn hard uncertainty into (more manageable) soft uncertainty as well as to increase the legitimacy of environmental decision making, even in cases of hard uncertainty. This methodology can and should apply to all instances of domestic, transnational and international environmental law making.

To illustrate the proposed approach, we look at some examples derived from Brazilian and United States law. The selection of these two countries is based both on the authors’ familiarity with them and on their contrasting approaches to environmental decision making. We first provide an overview of the role of uncertainty in envi-

² K. Anderson and L.A. Jackson, ‘Why are US and EU Policies toward GMOs so Different?’, 6:3 *AgBioForum* (2003), 95.

³ R. O’Rourke, ‘EU Measures on the Safety of Food Imports from Japan Following the Nuclear Accident at Fukushima’, 3:1 *European Journal of Risk Regulation* (2012), 81, referring to European Commission Regulation 178/2002 which defines risk communication as: ‘[T]he interactive exchange of information and opinions throughout the risk analysis process as regards hazards and risks, risk-related factors and risk perceptions, among risk assessors, risk managers, consumers, feed and food businesses, the academic community and other interested parties, including the explanation of risk assessment findings and the basis of risk management findings.’ Regulation 178/2002 of 28 January 2002 Laying Down the General Principles and Requirements of Food Law, Establishing the European Food Safety Authority and Laying Down Procedures in Matters of Food Safety, [2002] OJ L31/1, Article 3.13.

⁴ This definition differs from the widely accepted version, which defines ‘sustainable development’ as: ‘[A] process of change in which the exploitation of resources, the direction of investments, the orien-

tation of technological development; and institutional change are all in harmony and enhance both current and future potential to meet human needs and aspirations.’ Our Common Future, Report of the World Commission on Environment and Development: Our Common Future (UN Doc. A/42/427, 4 August 1987), Annex, at 54. However, we believe that our version is more accurate and descriptive and in no way contradicts the general understanding of the term.

⁵ R. De Giorgi, *Direito, Democracia e Risco: Vinculos Com O Futuro* (Safe, 1998), at 191–192.

⁶ See R. O’Rourke, n. 3 above, at 81 (‘[R]isk communication within the risk analysis structure often plays second fiddle to risk assessments and risk management decisions’).

ronmental law making. We discuss the role of hard and soft uncertainty in the risk analysis process and what it portends for public policy.⁷ This conceptual platform is then used to analyze how participatory techniques can be factored in to manage uncertainty by reference to two domestic systems – American and Brazilian law – as well as to international (environmental) law.

RISK AND ENVIRONMENTAL LAW

Environmental law imposes regulatory demands that create opportunities through restraint. As already noted, the nature of ‘hard uncertainty’ requires policy makers to act in the face of unknown unknowns (i.e., when the probability of the outcomes, or even the outcomes themselves, are not known). This would render rational and efficient policy making particularly challenging. It is, however, in this context that resorting to participatory techniques may help to reduce the level of uncertainty. Diffusing information among stakeholders (i.e., reducing the asymmetry of information) would enhance the level of awareness of the local stakeholders with respect to a given problem. As they learn or become more acutely aware, these stakeholders may be led to share specific information that they may have on the issue at hand and, thereby, contribute to the management of the problem. The key is to prompt the sharing of such information and, as a regulator, to be capable of taking it into account. Thus, making local stakeholders aware of a problem may be a useful step towards reducing the scientific uncertainty surrounding the problem. Even in those cases where local knowledge has limited impact on the scientific understanding of the problem, it is, in all events, important in connection with the management of the socioeconomic implications (risk management) and with the legitimacy of regulatory action.

In the light of these observations, one can more easily understand why participation is an important component of precaution. Precaution is about decision making in a context of uncertainty.⁸ If participation can guide such a process, either by reducing uncertainty (its scientific and/or socioeconomic dimensions) or by legitimizing the allocation of yet unknown costs and benefits, then precaution is also about participation. Significantly, precaution must not be equated with risk aversion. Rather, precaution would mean the ability to handle uncertainty better and more confidently.⁹ The

dissemination of information entailed by this precautionary approach can, as a matter of fact, lead to greater tolerance of risk. As uncertainty is dissipated through the reduction of asymmetric information and the risks are better understood, the latter may also be better tolerated on the basis of a more complete and shared understanding of costs and benefits. By contrast, secretive treatment of information may lead to heightened fear and intransigence, deter innovation and even amplify potential harms.¹⁰ As discussed below, however, the precautionary approach can also be (mis)applied in ways that impede flexibility and heighten risk. Thus, depending on its application, the precautionary approach can translate into more or less risk aversion.

The degree of risk tolerance may be expressed in terms of the ratio of soft to hard uncertainty. When soft uncertainties (known unknowns) predominate, cost-benefit analyses gain coherence and risk analysis becomes a tool for mitigating harm and alleviating concern. Although uncertainty remains, the probability of potentially negative outcomes is measurable. On the other hand, in hard uncertainty scenarios, policy makers cannot know what they ignore and must act without virtually any guidance other than social perceptions. In turn, this situation may result in a feedback loop that diverts resources away from risk analysis and toward rearguard measures aimed at safeguarding the status quo. In other words, precaution becomes severe risk aversion. Instead of examining the implications of a situation, stakeholders try and think of comparable examples. If an example comes readily, it will form the basis for the social response even if statistically rare. Thus, for instance, enormous resources are devoted to passenger inspections at airports although the risk of terrorist infiltration is low and likely not substantially affected by such measures. Meanwhile, little attention or money goes toward securing maritime ports, where security is low and the comparative threat level much higher. It is fear and not reason that guides action. This tendency to focus on sources of low risk but heightened fear leads to what Kuran and Sunstein call an ‘availability cascade’, wherein the ensuing abundance of information about the perceived risk makes it increasingly difficult to obtain information about other, more serious threats.¹¹ Those who doubt the perceived risk

scholars such as Daniel Farber have recommended the ‘a-precautionary principle’, which considers ‘both the worst case and best case scenarios, rather than focusing merely on uncertainty and harmful outcomes’. D.A. Farber, ‘Uncertainty’, 99:4 *Georgetown Law Journal* (2011), 901, at 905.

¹⁰ See generally C.R. Sunstein, *Risk and Reason: Safety, Law and the Environment* (Cambridge University Press, 2004).

¹¹ T. Kuran and C.R. Sunstein, ‘Availability Cascades and Risk Regulation’, 51:4 *Stanford Law Review* (1999), 683. Gillette and Krier present a contrasting vision of the lay public’s conception of risk, arguing that for lay people, the model of risk is much richer because they are concerned with risks that ‘have catastrophic potential, that are unfamiliar, uncontrollable, or involuntary, that threaten future generations . . . that are distinctively threatening as opposed to

⁷ B.M.J. van der Meulen *et al.*, ‘Structural Precaution: The Application of Pre-market Approval Schemes in EU Food Legislation’, 67:4 *Food and Drug Law Journal* (2012), 453, at 454 (asserting that ‘[r]isk analysis is a science-based methodology consisting of risk assessment, risk communication and risk management’).

⁸ J.S. Applegate, ‘The Taming of the Precautionary Principle’, 27:1 *William and Mary Environmental Law and Policy Review* (2002), 13.

⁹ There are instances where risk cannot be quantified and the precautionary approach does not function effectively. In these instances,

begin doubting themselves, thereby silencing an important constituency whose opinions might lead to more rational behaviour.¹² The result of these linked phenomena is 'probability neglect' wherein powerful feelings of fear lead people to ignore probability and focus instead on the worst case, irrespective of the greater danger from other causes.¹³ For example, we fear the highly improbable plane crash more than the much more likely possibility of a car accident. Probability neglect diverts resources away from the most serious dangers and concentrates them instead on palliating social unease.¹⁴ The result is increased hard uncertainty, generated by inefficient investment of resources that could better be used to tackle existing soft uncertainty. This, in turn, feeds into greater probability neglect. This bowdlerized precautionary approach underlies much societal dysfunction and mismanagement of resources. Much of the problem relies on the little attention paid by policy makers to risk communication strategies. That is due in part to the fact that regulators, in general, 'are poor communicators'.¹⁵

Not all approaches to hard uncertainty are irrational, however. Postponing projects or regulatory action until

widespread and shared by the general population, that are manmade as opposed to natural'. C.P. Gillette and J.E. Krier, 'Risk, Courts and Agencies', 138:4 *University of Pennsylvania Law Review* (1990), 1027, at 1073. By this logic, the lay conception of risk is far more complex and reflective of human nature. People tend to most fear those risks that arise from human behaviour and yet lie beyond their control. This presents a paradox wherein the actions of the government to regulate behaviour and thereby control risk actually create the types of risk that the public most fears. See also D.M. Kahan, 'Two Conceptions of Emotion in Risk Regulation', 156:3 *University of Pennsylvania Law Review* (2008), 741, at 743, which argues that emotional response to risk is a necessary and beneficial part of risk assessment and that attempting to 'shield law from the distorting influence of emotion' is a serious policy error arising from a serious error of perception. Kahan maintains that risk assessment is, or should be, a values-driven enterprise and that omitting it from the calculus ignores a key component of human reasoning and the human condition.

¹² See C.R. Sunstein, n. 10 above, at 33–35, 93–98.

¹³ *Ibid.*, at x–xi.

¹⁴ *Ibid.*, at 51.

¹⁵ R.E. Lofstedt, 'Risk versus Hazard: How to Regulate in the 21st Century', 2:2 *European Journal of Risk Regulation* (2011), 149, at 153, which notes that: '[A]part from anything else, [regulators] are often too slow to communicate, because in many cases held back by the vast bureaucratic machinery that makes up most government departments. By being slow in their communication strategies officials spend more time firefighting and engaging in reactive communications. The problem with this strategy is that reactive risk communication destroys public trust whereas proactive risk communication gains public trust. This is complicated by the fact that many regulatory bodies do not understand the importance of risk perception and staff has not been trained in risk communication. They therefore often find it difficult to convey clear and concise messages needed for the modern media. To address this problem, regulators could either be encouraged to participate in existing continuing education risk communication courses for professionals such as those developed by Harvard University, or by developing customised risk-communication and risk-analysis guidelines, something that the EFSA is presently doing.'

information can be gathered and analyzed is in itself a form of cost-benefit analysis. It posits that the benefits of immediate action or regulation are outweighed by those gained through information gathering. The delays created by such decisions can involve significant social costs. Indeed, critics of precaution point to the inertia that arises from unchecked information gathering as evidence of the unsoundness of the precautionary approach and its susceptibility to misuse both by the overly fearful and by those who intentionally fear-monger.¹⁶ In such circumstances, an abundance of caution – even in the absence of an availability cascade – can lead to decisions that defy sound management strategies and foster ignorance.¹⁷

Choosing one strategy or another (precaution as management versus precaution as fear) presupposes some level of participation. But the role of participation in the two cases is different. In the context of precaution as management, participation intervenes in connection with risk assessment, risk management and risk communication, whereas in the context of precaution as fear, participation may in fact crowd out risk analysis and, at best, contribute an additional measure of legitimacy to the measures taken (or the lack thereof). However, the boundaries between the two contexts are sometimes blurred. Through analyzing examples taken from the Brazilian and American domestic systems, we endeavour to shed light on how to calibrate participation as a tool to manage uncertainty.

PARTICIPATION AS AN UNCERTAINTY MANAGEMENT TOOL: DOMESTIC AND INTERNATIONAL ILLUSTRATIONS

As noted in the introduction, this section illustrates the foregoing considerations by reference to the Brazilian and American legal systems. Broadly speaking, the latter is unjustifiably confident in the face of uncertainty, whereas the former tends to be over-cautious. While this generalization is overly broad and not universally accurate, it is nevertheless useful as it highlights the differences in the historical development of American and Brazilian environmental law.

¹⁶ N. Oreskes and E.M. Conway, 'Challenging Knowledge: How Climate Science Became a Victim of the Cold War', in: R.N. Proctor and L. Schiebinger (eds.), *Agnology: The Making and Unmaking of Ignorance* (Stanford University Press, 2008), 78 (discussing what Hofstadter termed the 'paranoid style' in American politics).

¹⁷ This is particularly true for what Farber terms 'fat tail risks'. See D.A. Farber, n. 9 above, at 956. See generally C.R. Sunstein, n. 10 above.

Historically, the American system has employed a reactive approach, operating on the assumption that risk can be successfully identified and quantified. This approach displays a high degree of confidence in conventional risk analysis and a willingness to ignore unquantifiable uncertainty. By contrast, Brazilian environmental law, which developed at the same time as the nation developed, evolved to face different challenges. These differences underpin the divergent approaches to uncertainty and participation taken by each system.

INFORMATION AND PARTICIPATION IN US LAW

Environmental law in the United States looked to mitigate a lack of proper environmental risk analysis in the past. Unlike Brazil, whose environmental legal regime emerged as part of the nation's rapid development, the United States was already industrialized and its population's basic needs already met when environmental laws came to the fore.

As noted above, most environmental laws in the United States do not acknowledge unknowable risks. For example, although the National Environmental Policy Act ('US NEPA')¹⁸ calls for potential harms stemming from agency actions to be assessed and disclosed,¹⁹ and although the threat of terrorism for nuclear facilities is both obvious and potentially catastrophic, the Nuclear Regulatory Commission does not acknowledge the threat of terrorism in its Environmental Impact Statements because such risks cannot be quantified.²⁰ Similarly, agencies also need not discuss worst case scenarios in their Environmental Impact Statements. Instead, they must disclose potential information deficits that are relevant to 'reasonably foreseeable significant adverse impacts'.²¹ Perhaps an even starker example is *Industrial Union Department, AFL-CIO v. American Petroleum Institute (Benzene Case)*, in which the Supreme Court held that an agency could not regulate a known carcinogen unless it could conclusively show through existing data that the health risk surpassed a quantifiable level.²²

Despite these limitations, the US NEPA has a strong participatory component. The first law of its kind in the world, it not only introduced the importance of

examining potential environmental impacts of proposed governmental activities, but also the ideas of public participation and investigation of alternative courses of action that could prevent or mitigate negative impacts *before* they occurred. In addition to mandating the use of Environmental Impact Statements, it was also the first environmental law to explicitly incorporate the direct involvement of non-elected citizens into the decision-making process. It infused anticipatory and precautionary planning into the earliest stages of project development. The power of the information thereby gleaned to galvanize public participation and influence policy making has proven quite formidable.²³

Despite this predisposition toward data-driven risk assessment, the precautionary approach is not entirely absent from American environmental law. Courts have consistently held that the Clean Air Act (CAA)²⁴ requires the Environmental Protection Agency (EPA) to regulate pollutants even in the face of uncertainty as to their potential harm. In *Ethyl Corp. v. Environmental Protection Agency*, the petitioner challenged the EPA's decision to regulate lead emissions from motor vehicles in the absence of hard proof that they posed a threat. The court rejected this challenge, noting that 'awaiting certainty will often allow for only reactive, not preventative regulation',²⁵ and that 'where existing methodology or research in a new area of regulation is deficient, the agency necessarily enjoys broad discretion to formulate solutions on the basis of available information'.²⁶ This deference to a precautionary approach to air quality was confirmed in subsequent cases. In *Whitman v. American Trucking Association*,²⁷ the Supreme Court confirmed that the language of the CAA gives the EPA administrator broad discretion to safeguard public health. The law instructs the EPA to set air quality standards 'the attainment and maintenance of which . . . are requisite to protect the public health'.²⁸ It further states that such standards must incorporate 'an adequate margin of safety'.²⁹ The respondent challenged the EPA's methodology, arguing that cost concerns should play a role in the setting of emission standards. The court rejected this argument, holding that the clear language of the statute requires the administrator to focus solely on protecting the public from hazardous emissions. The statute's directive, including building in an 'adequate margin of safety' was found to be an intelligible principle through which to

¹⁸ 42 USC §§4321–4347 (2012).

¹⁹ *Ibid.*, at §4332.

²⁰ The Ninth Circuit rejected this reasoning in *San Luis Obispo Mothers for Peace v. Nuclear Regulatory Comm'n*, 449 F.3d 1016, 1032 (9th Cir. 2006). However, the Nuclear Regulatory Commission has refused to change its policy. See D.A. Farber, n. 9 above, at 909–910.

²¹ See D.A. Farber, n. 9 above, at 916 (citing 40 CFR §1502.22 (2009)).

²² *Indus. Union Dep't, AFL-CIO v. API*, 448 US 607, 614–615 (1980) (plurality opinion).

²³ D.N. Cassuto and J.A. Edgar, 'The Basics of NEPA and Its Role in Combating Climate Change', in: R. Sampaio, G. Leal and A. Reis (eds.), *Temas de Direito Ambiental: 30 Anos da Política do Meio Ambiente* (Editora Lumen Press, 2012), 629.

²⁴ 42 USC §§7401–7671q (2012).

²⁵ *Ethyl Corp. v. EPA*, 541 F.2d 1 (DC Cir. 1976), at 25.

²⁶ *Ibid.*, at 27, n. 18.

²⁷ *Whitman v. Am. Trucking Ass'n*, 531 US 457 (2001).

²⁸ 42 USC §7409(b)(1) (2012).

²⁹ *Ibid.*

guide the agency's rule making.³⁰ Consequently, the EPA must incorporate a degree of caution into its emission standards. This type of precautionary approach is to some extent present in other statutes as well.³¹

Public participation can serve as either a boon or impediment to the process of managing uncertainty in the United States. For example, in the recent controversy over ground-level ozone regulation, public outcry (and citizen lawsuits) brought the Bush-era ozone standards under public scrutiny for failing to incorporate the latest scientific knowledge. When President Obama took office in January 2009, his EPA administrator declared the regulations 'not legally defensible' under the CAA.³² The Administration then persuaded the plaintiffs to suspend their lawsuits pending the EPA's issuance of new regulations. The next several years saw unrelenting pressure both from citizens' groups and from industry. The citizen groups demanded the standards be strengthened due to increasing evidence of public health threats posed by ozone. Regulatory groups, on the other hand, argued that stricter standards were unnecessary in the face of the uncertain nature of the public health threats and that increased regulation would undermine the economy. In September 2011, President Obama rejected the advice of his EPA and kept the Bush-era standards in place, arguing that his action would decrease regulatory uncertainty.³³ The outcry was immediate and vociferous and the litigation continues.

Ironically, public pressure brought the issue of ozone regulation into focus but also created years of uncertainty and litigation as two presidential administrations sought to address both public health and industry pressures. The CAA requires the Administration to issue new standards in 2013.³⁴ It remains to be seen how the newly re-elected President will attempt to meet his statutory obligations while also negotiating the seemingly conflicting goals of protecting public health and satisfying industry's demand for regulatory predictability.

In sum, environmental law in the United States lacks a clear, defining principle with respect to risk analysis. It tends toward a data-driven, reactive approach but also

incorporates the precautionary approach in various instances. Like the Brazilian system discussed below, the American legal regime is constrained by an inability to adjust to information deficits. It also often utilizes a rigid risk assessment mechanism that is vulnerable to hard uncertainty. That vulnerability stems in part from poor application of both the precautionary and data-driven approaches and in part from weaknesses in the approaches themselves. While increased stakeholder participation, access to information and effective risk communication strategies will not resolve all these systemic flaws, they would significantly decrease avoidable instances of hard uncertainty. For example, in the aforementioned controversy over ozone standards, public participation led to a re-examination of the scientific viability of the Administration's proposed standards. Forcing the EPA to defend its position also brought considerable new information to light and led to increased scrutiny of the agency's role as watchdog of environmental and public health threats.

INFORMATION AND PARTICIPATION IN THE BRAZILIAN LEGAL REGIME

Brazil presents an example of an emerging economic power with an advanced environmental law regime that continues to face significant structural challenges. Like the United States, Brazil is geographically vast and ecologically diverse. During the past two decades, Brazilian law makers have struggled to decrease inequality by promoting development policies more evenly throughout rich and poor areas of the country. To date, this goal has been primarily accomplished through policies such as the '*Bolsa Família*',³⁵ as well as by incentivizing the agricultural and industrial sectors. During this same period, Brazil also significantly revised its environmental laws and policies.³⁶

Against this backdrop, one can more easily understand how different interests, perspectives and even constitutional rights can collide. On the one hand, Brazil has an enormous number of people who lack access to proper education, sanitation and other basic needs. On the other hand, groups of conservationists empowered by the country's modern environmental laws are advocating strongly for a stricter interpretation and enforcement of those laws. In this context, one may expect participation to play a very important role in connection with the allocation of the costs and benefits of

³⁰ Whitman, n. 27 above, at 474.

³¹ The 1996 Food Quality Protection Act, for example, requires that for food to which infants and children are exposed, the EPA must set pesticide levels at ten times the established margin of safety. See Food Quality Protection Act of 1996, 7 USC § 136. See also the Federal Insecticide, Fungicide and Rodenticide Act, 7 USC§136ff, and the Toxic Substances Control Act, 15 USC §2601ff.

³² Letter from Administrator Lisa Jackson (13 July 2011), found at: <http://www.eenews.net/assets/2011/07/14/document_gw_03.pdf>.

³³ White House, Statement by the President on the Ozone National Ambient Air Quality Standards (2 September 2011), found at: <<http://www.whitehouse.gov/the-press-office/2011/09/02/statement-president-ozone-national-ambient-air-quality-standards>>.

³⁴ Ibid. See also <<http://www.epa.gov/glo/actions.html>>.

³⁵ For a description of the *Bolsa Família* programme, see 'How to Get Children Out of Jobs and Into School: The Limits of Brazil's Much Admired and Emulated Anti-Poverty Programme', *The Economist* (29 June 2010), found at: <<http://www.economist.com/node/16690887>>.

³⁶ P.A.L. Machado (ed.), *Direito Ambiental Brasileiro* (Malheiros, 2011) (presenting a historical overview of the Brazilian environmental, constitutional and regulatory history).

environmental (or, conversely, developmental) policies among different stakeholders as well as with the legitimization of such choices.

In theory, information and participation form a large part of the Brazilian environmental legal regime.³⁷ Information and participation in environmental policy making is guaranteed by the 1988 Constitution. Access to information is guaranteed by Article 5 of the Constitution, which lists all fundamental rights, including the right to information.³⁸ The Constitution also devotes a whole chapter to environmental rights. Article 225 requires environmental impact assessments from all projects with the potential to impact the environment.³⁹ It further requires the government to promote environmental education while mandating civil participation in environmental decision making. The 1981 National Environmental Policy Act (Brazil NEPA)⁴⁰ codifies these constitutional guidelines. In Article 9, the Brazil NEPA lists the tools of environmental policy. Among them is the national environmental information system, which aggregates all relevant policy and project-related information with environmental relevance.⁴¹ In addition to the Constitution and the Brazil NEPA, the Brazilian Congress enacted the Access to Environmental Information Act in 2003, which guarantees public access to information and data from environmental authorities and agencies.⁴² More recently, in 2011, the Freedom of Information Law was enacted.⁴³ This law, guaranteeing access to information retained by any public agency or authority, can be seen as the equivalent to the Freedom of Information Act in the United States.

Following the Brazil NEPA, information and participation in the Brazilian legal framework divides into two different and equally important stages: public policy, and project level. Within the list of available tools, the Brazil NEPA employs two structural and fundamental instruments of environmental policy: zoning and environmental quality standards. With regard to development projects, the Brazil NEPA mandates environ-

mental impact statements and environmental permits. Information and participation are embedded in all of these practices.⁴⁴ However, in reality, these tools are mere formalities and do not fulfil their objective. That is to say, they do not serve as fundamental instruments of procedural rights geared toward producing balanced results. In other words, Brazilian policy makers are failing to effectively implement one of the three core pillars of risk analysis: risk communication.⁴⁵

The Belo Monte Dam, a controversial dam project sited in the Amazon, offers a useful example of how these tools get distorted in practice. Lack of strong, active and representative civil organizations,⁴⁶ coupled with too little space for public participation in strategic energy investment decisions at the federal level,⁴⁷ created a regulatory environment that favours big hydroelectric power plants, including Belo Monte.⁴⁸ Once a policy is adopted, changing or tailoring it at the project level becomes impossible despite the statutory opportunities

⁴⁴ Lei No. 6,938, de 31 de Agosto de 1981, found at: <http://www.planalto.gov.br/ccivil_03/Leis/L6938.htm>.

⁴⁵ M.G. Puder, 'The Rise of Regional Integration Law (RIL): Good News to International Environmental Law (IEL)?', 23:2 *Georgetown International Environmental Law Review* (2012), 165, at 189: 'Traditional risk analysis comprises the triad of assessment, management, and communication. Risk assessment offers qualitative or quantitative risk estimation in light of data collected, documented, and evaluated in pursuance of scientific research and analysis. It moves from hazard identification and hazard characterization to exposure appraisal and risk characterization. Risk management then tackles the task of constraining and reducing risk to levels deemed acceptable. In this stage, policy considerations enter the mix. Finally, risk communication disseminates findings and measures to the stakeholders.'

⁴⁶ Comissão Mundial sobre Meio Ambiente e Desenvolvimento, *Nosso Futuro Comum* [Our Common Future] (FGV, 1988), at 46 (noting the insufficient levels of civil society organization in developing countries). See also D. Hunter, J. Salzman and D. Zaelke, *International Environmental Law and Policy* (Foundation Press, 2002), at 167.

⁴⁷ Ministério Minas e Energia, Plano Decenal de Expansão de Energia 2020 (2011), found at: <<http://www.mme.gov.br/mme/galerias/arquivos/noticias/2011/SUMARIO-PDE2020.pdf>>. The introductory note signed by the Minister of Mines and Energy thanks civil society and all interested groups who participated in public hearings concerning the plan, but the plan itself does not describe how participation helped and in which way comments were addressed and incorporated into the final version presented to the public. Being such an important requirement, information and participation should have received a much more thorough treatment by the Brazilian Energy Plan, describing selection process, disclosure of information, detailing comments received and how they were addressed so that those tools can effectively work and reflect their role in such an important policy making process.

⁴⁸ BBC News Latin American and Caribbean, 'Work to Resume on Brazil's Belo Monte Dam' (28 August 2012), found at: <<http://www.bbc.co.uk/news/world-latin-america-19404740>> (providing a summary and overview of the legal battles fought in Brazilian courts, including the Brazilian Supreme Court on different attempts from different stakeholder for information and participation in the decision-making process concerning the Belo Monte Dam).

³⁷ L. McAllister, *Making Law Matter: Environmental Protection and Legal Institutions in Brazil* (Stanford University Press, 2008), at 178–185.

³⁸ Constituição Federal de 1988, Article 5. (For an unofficial English version of the 1988 Brazilian Constitution, see 'Brazil: 1988 Constitution with 1996 Reforms', in Georgetown University Political Database of the Americas (last updated November 2008), found at: <<http://pdba.georgetown.edu/Constitutions/Brazil/english96.html>>.)

³⁹ *Ibid.*, Article 225.

⁴⁰ Lei No. 6,938, de 31 de agosto de 1981, found at: <http://www.planalto.gov.br/ccivil_03/leis/L6938.htm>, Article 9.

⁴¹ For the information principle under the Brazilian NEPA law, see R.S.R. Sampaio, 'A Importância dos Princípios da Informação e da Participação em um Contexto de Decisão sob Incerteza', in: R. Sampaio, G. Leal and A. Reis, n. 23 above, 443.

⁴² *Ibid.*, at 443; Lei No. 10,650, de 16 de abril de 2003, found at: <http://www.planalto.gov.br/ccivil_03/Leis/2003/L10.650.htm>.

⁴³ Lei No. 12,527, de 18 de Novembro de 2011, found at: <www.planalto.gov.br/ccivil_03/_ato2011-2014/2011/lei/l12527.htm>.

for public participation. Multiple interests and agendas come into play and transform information and participation into purposeless rituals that lack any genuine utility.

The dam project serves to illustrate the ongoing unwillingness to make effective use of the information arising from public participation. A more organized and participatory civil society is a prerequisite for more balanced and just projects. The challenge facing Brazilian interest groups is not a lack of opportunity to participate, but rather an entrenched unwillingness to honour the input arising from that participation. As a result, projects like Belo Monte proceed without adequately addressing public concerns. Changing the culture of policy making to better utilize public participation will allow for better and more qualified participation at the project level. This shift could and should lead to a more coherent national environmental policy that implements a virtuous circle of information and participation.

What the Brazilian legal regime 'on the books' indicates and what practice illustrates is that despite the sophistication of laws concerning access to information and the right to participation, bridging the gap between theory and reality is still necessary. Public knowledge and participation are often restricted and, as a result, procedural justice and legitimacy become compromised. Policy makers have yet to realize that information and participation are more than just formal requirements in the law and must effectively include civil society in the decision-making process. The United States example offers a different but equally cautionary tale. The statutory regime is highly reactive even as the opportunity for public participation is significant. If the statutes allowed for greater acknowledgement of the role of uncertainty in environmental policy, the efficacy of public participation would be significantly enhanced. As it is, however, reducing uncertainty remains an elusive goal – one that is often impeded by regulatory inflexibility.

INFORMATION AND PARTICIPATION IN INTERNATIONAL ENVIRONMENTAL LAW

Participation and information principles are as important at the international level as they are at the domestic level. Uncertainty regarding the long-term effects of global environmental issues has allowed producers and consumers of products with potential negative effects to argue against taking corrective action until more information is known.⁴⁹ This has permitted multinational

corporations to maximize profits by basing their business operations in locations with the least stringent environmental laws.⁵⁰ Participation principles at the international level have become increasingly urgent because of the lack of intergovernmental cooperation to improve international environmental standards.⁵¹ As noted in the introductory article to this issue of *RECIEL*, participatory techniques could provide a means of 'outsourcing' the pressure required for States and companies to implement international environmental law.⁵²

Environmental participation was first introduced in Principle 10 of the 1992 Rio Declaration⁵³ and thereafter became widespread in international environmental instruments.⁵⁴ Many multilateral environmental agreements following the Rio Declaration incorporated similar participation principles.⁵⁵ The 1995 UNECE Guidelines on Access to Environmental Decision-making classified public participation as 'one of the seven key elements for the long-term environmental program for Europe'.⁵⁶ These international mechanisms laid the framework for the main instrument on environmental participation – the Aarhus Convention,⁵⁷ which propounded access to environmental information, public participation in decision making and environmental matters, and access to justice in environmental matters.⁵⁸ The public participation provisions have allowed citizens to access 'an international venue where national options have been exhausted'.⁵⁹

⁵⁰ Ibid.

⁵¹ M. Dellinger, 'Ten Years of the Aarhus Convention: How Procedural Democracy is Paving the Way for Substantive Change in National and International Law', 23:2 *Colorado Journal of International Environmental Law and Policy* (2012), 309, at 315.

⁵² See the contribution by Viñuales in this issue.

⁵³ Principle 10 of the Rio Declaration states: 'Environmental issues are best handled with the participation of all concerned citizens, at the relevant level. At the national level, each individual shall have appropriate access to information concerning the environment that is held by public authorities, including information on hazardous materials and activities in their communities, and the opportunity to participate in decision-making processes. States shall facilitate and encourage public awareness and participation by making information widely available. Effective access to judicial and administrative proceedings, including redress and remedy, shall be provided. Rio Declaration on Environment and Development, found in Report of the United Nations Conference on Environment and Development, (UN Doc. A/CONF.151/26 (Vol. I), 12 June 1992), at 10.'

⁵⁴ See M. Dellinger, n. 51 above.

⁵⁵ Ibid., at 318 (citing the United Nations Framework Convention on Climate Change, the Espoo Convention on Environmental Impact Assessment in a Transboundary Context, and the Protocol on Water and Health to the Convention on the Protection and Use of the Transboundary Watercourses and International Lakes).

⁵⁶ Ibid. at 319.

⁵⁷ United Nations Economic Committee for Europe's (UNECE) Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (Aarhus, Denmark, 25 June 1998; in force 8 October, 2009).

⁵⁸ <<http://www.unece.org/env/pp/contentofaarhus.html>>.

⁵⁹ See M. Dellinger, n. 51 above, at 365.

⁴⁹ Z.A. Smith, *The Environmental Policy Paradox: International Environmental Management*, 5th edn (Pearson, 2008), at 275–292.

Additionally, the Aarhus Convention and other similar international agreements demonstrate a growing awareness among countries that effectiveness of environmental principles at the international level must improve.

While international agreements are important, they only reach the countries bound by them. Furthermore, they are only as strong as the most reluctant participant's threshold. International agreements also suffer from a dearth of specific guidelines for providing access to information and enabling public participation. The Aarhus Convention demonstrates how multilateral environmental agreements can efficiently foster procedural rights such as the right to information, public participation and access to justice. It also illustrates that conventions such as these are limited to those countries that choose to be bound by them. As Viñuales and Chuffart note, the Aarhus Convention 'requires State parties to introduce into their domestic legislation three clusters of environmental procedural rights'.⁶⁰ Those rights are: information, public participation and access to justice. Implementation often depends on the enforcement mechanism set up by the Convention under the coordination of a Compliance Committee.⁶¹

The Aarhus Convention illustrates how effective multilateral environmental agreements can be in the promotion of procedural rights while also showing how the scope of international law is often limited to developed societies with greater levels of domestic political stability and a greater degree of civil society organization.⁶² By contrast, less developed countries face challenges in adhering to international environmental agreements. They often lack internal political stability and have development priorities that do not allow for social or environmental obstacles arising from information and public participation mechanisms. Those factors, in turn, have a negative impact on the effectiveness of

international law, particularly in the realm of procedural rights.

The Rio+20 summit exemplifies how an international conference, which initially was expected to propel these issues forward, fell short of providing any genuine guidance or solutions.⁶³ As Morgera and Savaresi note, despite the fact that 'green economy' comprised one of the themes of the conference, the participant countries failed to even agree on a definition of the term, much less a roadmap for its implementation. They did, however, emphasize the need for inclusiveness and participation in the development of an eventual consensus understanding of the term.⁶⁴ And that agreement, while modest, embraces participation and information sharing and, if effectively implemented, could significantly aid in future international negotiations.

CONCLUSION

Information and participation are instrumental to a coherent precautionary approach. If the goal is to transmute hard uncertainty into soft uncertainty and thereby enable competent risk analysis (including risk assessment, risk management and risk communication), eliminating asymmetric information is crucial. Information gathering prior to action or rule making forms the essence of risk analysis and the embodiment of the precautionary principle. It enables just and equitable outcomes by reducing asymmetric information, allowing for social accountability and providing procedural justice. It thus makes the decision-making process more legitimate.

Information gathering and public participation are components of Brazilian and American national laws as well as, more generally, of international conventions. However, for a variety of reasons, such as national development agendas, domestic political instability, lack of binding international conventions promoting procedural rights for developing countries, and reactive legal systems to risks as opposed to prevention policy mechanisms in the American case (e.g., the US NEPA nuclear terrorism example), participatory techniques are not fully effective. This, in turn, impairs effective implementation of proactive risk communication strategies. In Brazil, information and participation are guaranteed by national law, but in practice they serve as mere formal requirements rather than effective components of environmental decision making. In the United States, they are also part of the legal framework, but

⁶⁰ J.E. Vinuales and S. Chuffart, *From the Other Shore: Economic, Social and Cultural Rights from an International Environmental Law Perspective* (Graduate Institute Geneva, Centre for International Environmental Studies, 2011), at 13.

⁶¹ *Ibid.*, stating that: 'The Aarhus Convention is interesting for our analysis in a number of ways. First, the Convention obliges States to implement what could be broadly referred to as 'transparency measures' or 'environmental democracy' measures. Thus States must introduce into their domestic systems three clusters of environmental procedural rights that allow civil society to put pressure on States (and therefore, to some extent, to monitor them) in connection with environmental policies and environment-related activities. Second, where States fail to implement such measures, civil society groups can bring a complaint before a compliance committee specifically established by the Convention for this purpose.'

⁶² For a list of signatory countries of the Aarhus Convention, see United Nations Treaty Collection, Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters, found at: <http://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-13&chapter=27&lang=en>.

⁶³ F. Ullah, *Rio+20: Dig Deep, Prepare to Act and Have Hope* (Outreach, 2012), at 1.

⁶⁴ See the contribution by Morgera and Savaresi in this issue.

often in such a diluted form that uncertainty and risk are ignored in the policy-making process.

In the international realm, information and participation are built into major multilateral environmental agreements. However, the lack of multi-stakeholder participation in international decision making and the lack of progress in turning international procedural laws into national and locally accountable commitments hamper the aforementioned benefits.

In sum, genuine precaution – an acknowledged commitment to reducing hard uncertainty through information gathering and public participation thereby leading to coherent and functional risk analysis – continues to be more of a grail than a genuine policy initiative. The unwillingness of the international community to commit to comprehensive risk analysis is part of the reason why Rio+20 failed to generate any significant international agreement. This is due in large part to the ongoing failure to adopt functional risk analysis policies at the domestic level. The United States and Brazil offer useful examples of why such failures persist. Each nation has its own unique reasons for ineffectively managing risk. The failure, however, is global in scope.

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