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Paula M. Pevato

International Environmental Law Volume I

Edited by

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Series Preface

Open a newspaper, listen to the radio or watch television any day of the week and you will read or hear of some matter concerning international law. The range of matters include the extent to which issues of trade and human rights should be linked, concerns about refugees and labour conditions, negotiations of treaties and the settlement of disputes, and decisions by the United Nations Security Council concerning actions to ensure compliance with international law. International legal issues have impact on governments, corporations, organisations and people around the world and the process of globalisation has increased this impact. In the global legal environment, knowledge of international law is an indispensable tool for all scholars, legal practitioners, decision-makers and citizens of the 21st century.

The Library of Essays in International Law is designed to provide the essential elements for the development of this knowledge. Each volume contains essays of central importance in the development of international law in a subject area. The proliferation of legal and other specialist journals, the increase in international materials and the use of the internet, has meant that it is increasingly difficult for legal scholars to have access to all the relevant articles on international law and many valuable older articles are now unable to be obtained readily. These problems are addressed by this series, which makes available an extensive range of materials in a manner that is of immeasurable value for both teaching and research at all levels.

Each volume is written by a leading authority in the subject area who selects the articles and provides an informative introduction, which analyses the context of the articles and comments on their significance within the developments in that area. The volumes complement each other to give a clear view of the burgeoning area of international law. It is not an easy task to select, order and place in context essays from the enormous quantity of academic legal writing published in journals – in many languages – throughout the world. This task requires professional scholarly judgment and difficult choices. The editors in this series have done an excellent job, for which I thank and congratulate them. It has been a pleasure working with them.

ROBERT MCCORQUODALE
General Series Editor
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Preface

I went to the woods because I wished to live deliberately, to front only the essential facts of life, and see if I could not learn what it had to teach, and not, when I came to die, discover that I had not lived.

Excerpt from chapter entitled 'Where I Lived, and What I Lived For',
in Henry David Thoreau, *Walden; or, Life in the Woods* (1854)

During a speech to the General Assembly gathered in New Delhi for the 1968 meeting of the Swiss-based International Union for the Conservation of Nature and Natural Resources, Senegalese forestry engineer and ecologist Baba Dioum could not have said it any better when he declared:

In the end we will conserve only what we love. We will love only what we understand. We will understand only what we are taught.

How true it is that without instruction, we might never comprehend the fragile state of our global environment. Once the global community was made aware of that state, and the potential irreversible losses of habitat, species and entire ecosystems, an international conservation agenda ensued. But was it out of love or necessity? Whatever basis for that reaction, it is indeed a fact that the global community needs to be reminded constantly of the following: why we must preserve the earth's fragile ecosystems; how nature is inextricably linked with and affected by humankind's activities; where damage has already occurred to the global environment, what we can do to halt or even reverse that damage; that ongoing destruction of habitats and entire ecosystems endangers some of the world's most unique species inhabiting them, such as the elusive cloud leopard of Russia or the lion-tailed macaque in India's Western Ghats living in closed-canopy forests; and, what we do to the environment today determines the state of the environment we will pass on to future generations. It is only after we contemplate these questions seriously that we might begin to understand how utterly delicate our natural world is and the complicated environmental structure it supports. Thus the study of international protection of the environment is so critical today given that it contributes to understanding the international community's legal and policy responses to resolving global environment concerns and achieving some measure of ecological security. Those measures taken at the international level then have a trickle-down effect, with the ultimate obligation to implement international norms and standards into domestic law and policy.

It is my most sincere desire that this collection of essays assembled within these two volumes contributes to the study of international environmental law. Whether the reader is a newcomer to a field that operates within the normative system comprising public international law, or seasoned academic, or practitioner facing daily challenges on behalf of clients, or undergraduate and graduate student alike, whether reading law or environmental science and other related topics, this collection of essays offers something for everyone. This collection reflects upon past ecological crises – both underlying and immediate – triggering the progressive development of international environmental norms and standards, assesses critically international legal and policy norms and standards, and their effectiveness in achieving global environmental security, in addition to pondering whether or how environmentally responsible are those decisions that our political leaders take to achieve such security, and ultimately to hold those in decision-making authority accountable for the state of the world we intend to pass on to future generations.

But the ongoing struggle to realise ecological security does not stop at the international level. For 'when one tugs at a single thing in nature', wrote John Muir, 'he finds it attached to the rest of the

world'. It is hard to imagine that our present actions, their effect upon our surroundings, and what we do each day to preserve our own little corner of the universe, our personal space, our tiny environment, every single action contributes to broader international environmental goals. So it is not only our political leaders who are accountable for decision-making that may contribute positively (or, regrettably, negatively) to international environmental security, but also ourselves as individuals, each and every day, from multinational corporate decision-makers in the private sector to the small and medium sized businesses operating at the grass roots level, to public sector entities, and to individual households participating in community recycling and energy saving programmes. Published just in time for the 1992 Rio Earth Summit, Al Gore reminded us in *Earth in the Balance: Ecology and the Human Spirit* that,

[t]he world's ecological balance depends on more than just our ability to restore a balance between civilisation's ravenous appetite for resources and the fragile equilibrium of the earth's environment . . . Each of us must take a greater personal responsibility for this deteriorating global environment.

Help save the environment, not only through participation in democratic processes, namely, in choosing to vote for political leaders with platforms that have an ecologically sound vision, but in your actions each and every day: reduce waste, recycle, if possible bike to work, car pool or take public transit, go for a long walk through a public park, choose environmentally friendly products, volunteer to plant trees in your local community, teach your children about preserving the environment. Education matters. Every action counts. 'The creation of a thousand forests', according to Ralph Waldo Emerson, 'is in one acorn'. Likewise, the creation of a global environmental consciousness begins in one person. Volumes I and II contain twenty-five distinct visions represented by twenty-four authors who critically analyse and interpret international environmental problems and the proposed solutions to those global issues. Every written contribution matters to the teaching and study of international environmental law. These essays in turn expand our understanding of the subject from an international legal perspective. Our passion for protecting and preserving the global environment may be escalated, thereby helping us to appreciate our natural world. Hopefully, in the end, the reader is encouraged now more than ever to conserve what is appreciated, even loved: the earth's fragile, unique and glorious environment.

Now for a few housekeeping notes. The ratification status of treaties referred to in the Introduction was reviewed on an ongoing basis, particularly near final drafting and editing stages from August to October 2001. However, it may seem odd that many of the ratification status dates cited do not reflect those periods. This is simply because the actual dates cited reflected that particular treaty Secretariat's own latest updates according to the most up-to-date information presented on each respective website. In other words, a treaty's status checked in September 2001 may record the status updated last by the Secretariat in January 2000. Hence, the apparent discrepancy. I hope this clears up any potential confusion. Additionally, with exceptions, research reflects most developments as at October 2001.

In the 1980s, developers planned to build residential and commercial units at the infamous sight considered the birthplace of the American environmental movement: Walden Woods. Fortunately, the pristine sight of Henry David Thoreau's infamous retreat, where the author and philosopher wrote his literary masterpiece *Walden*, was saved by developers thanks to Don Henley, who in 1990 founded The Walden Woods Project, a not-for-profit land conservation organisation. Through its mission – to protect land of ecological and historic significance at Walden Pond's environs, and to support educational initiatives pertaining to the study of the environment and the humanities via the Thoreau Institute at Walden Woods – collectively the Project, Institute and Thoreau Society (the latter founded in 1941) are exemplary of locally organised, donor-funded and grass roots driven initiatives that contribute to the preservation of a particular local environment's ecological heritage and historical integrity for present and future generations. Additionally, the Project contributes to broader international environmental goals: conservation, education, preservation, protection, and ultimately, ecological security. It is thus with profound respect that I express my affable appreciation to Don Henley, his

publishing administrator Lisa Thomas, music companies and collaborating colleagues on the song for having given their kind and generous permission to excerpt lyrics from a most humbling and prescient 'Goodbye To A River'.

Similarly, I support and reiterate recognition towards all authors and/or publishing houses referred to in the Acknowledgements pages of Volumes I and II. Their collective permission to reprint articles contained herein means much more to me than giving *carte blanche* authority to reproduce a previously published essay. It is much more than that: their permission is symbolic of what might perhaps be characterised as an unwritten solidarity when it comes to presenting issues pertaining to international protection of the environment. Taken at face value, some of the essays may seem dated (as elaborated upon later within the Introduction to these volumes). Yet, open-minded authors (whether scientist, international legal scholar or international law practitioner) and their publishers undoubtedly recognise that each essay has had something important to say – notwithstanding the date when it was conceived, written, and published – and certainly every individual author was influenced by current challenges, debates and developments surrounding the international community during those times when she or he were immersed in writing their respective essay. For instance, less recent articles are still relevant today because they contribute to a better understanding of various historical dimensions and subsequent evolution of more contemporary issues, theories and achievements. Some authors were, and still are to a great extent, considered mavericks during their times, having recorded provocative, even *avant garde* doctrines. Since their publication, great strides have been gained within international environmental law, thanks in part to those challenging, dare we say even radical, contributions made for their time. The past should never be dismissed. Rather, it should be embraced, celebrated and recognised so that one understands current legal and policy issues pertaining to international environmental protection. Therefore, all essays contained herein have stood the test of time, are in no way outdated, each having contributed intelligent opinions and commentaries on the progressive development of international environmental law and policy. Authors' and publishers' kind reprinting permission is illustrative of a mature confidence in granting said rights. Thus, it is a privilege and honour to commend all authors and/or their publishing representatives who have had the grace and enthusiasm to participate in these exciting volumes. My thanks are courteously extended to all of you.

On a more personal note, I am grateful to Professor Robert McCorquodale for having invited me to participate in this most ambitious project. His guidance and helpful suggestions throughout the drafting processes were invaluable. My sister, Linda Pevato, BEd, BA, reviewed many drafts (without a single complaint I might add!) and provided expert guidance on presentation, content and technique. I am lucky to have both Robert and Linda as friends and mentors. Any omissions and oversights are my responsibility alone.

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Finally, according to Song Hun, 'a clear breeze has no price, the bright moon no owner'. I am indebted to my family for their enduring encouragement and for having given me the priceless gift of respecting and loving our natural world. I embrace wholeheartedly their love and friendship. *Con mille auguri, abbracci e baci.*

Dr. Paula M. Pevato
Toronto, Canada
October 2001 and May 2003

Introduction

Great indeed are the things which in this brief treatise I propose for observation and consideration by all students of nature. I say great, because of the excellence of the subject itself, the entirely unexpected and novel character of these things, and finally because of the instrument by means of which they have been revealed to our senses.

The Starry Messenger (Galileo Galilei, 1610)

The evolving framework of international environmental law and the development of national law provide a sound basis for addressing the major environmental threats of the day. It must be underpinned by a more coherent and coordinated approach among international environmental instruments.

Malmö Ministerial Declaration (UNEP, 2000)

International Law and Environmental Protection: Casual Musings

The natural environment when viewed as a resource is a finite one. That might be a paradoxical reality difficult to reconcile with popular attitudes represented within many economically developed societies where a 'disposable mentality' prevails. In other words, if something is broken, replace it! This is a maxim that is not so easily applied to the protection and preservation of the environment: thus there are no spare unpenetrated ozone layers, no back-up uncontaminated oceans, no surplus of 'closed canopy' ecosystems to be purchased at local shopping malls. If exploitation of the earth's fragile ecosystems and the resources they accommodate continues along unsustainable depletion patterns fully taking into account what has happened to the natural environment during the past two centuries without the intervention, development and implementation of new environmental protection norms and standards in international law and policy (along with regional and municipal environmental management plans or other legal and policy initiatives expressing those standards), grave consequences are predicted. The global environment is irreplaceable. Following decades of prolonged, substantial, and often irreversible, environmental harm, it became a matter of grave urgency that the restoration, preservation and protection of the environment was necessary – especially for damaged fragile ecosystems, over-exploited non-renewable resources, and over-harvested renewable natural resources – once the global community accepted that pervasive harm to the natural world had to be redressed by legal and other means. Numerous technological achievements marked significant turning points in history. Those achievements were attained via developments within specific scientific and engineering disciplines which, at the same time, also contributed to ecological degradation in many cases (for example, the automobile). Consequently, new paradigms and innovative fields needed to be developed within traditional disciplines, particularly law and environmental sciences, to respond to the adverse effects of persistent environmental abuse. In reaction to many pressing issues facing the international community in relation to global environmental degradation, international law evolved to provide an assortment of legal and policy frameworks offering solutions to those environmental

challenges. Thus, when ecological changes were classified as physical limits to the global environment's non-renewable natural resources within singular and interdependent ecosystems, some international lawyers concluded that global environmental degradation had reached a 'precrisis stage' by the 1990s (Timoshenko, 1990, 127ff, quoted in Chapter 1, p. 3, Volume I). Others such as Handl determined that the global environment was experiencing an 'unavoidable global environmental change that threatens possibly catastrophic economic, social and political consequences': in short, the protection and preservation of the environment became a matter of 'global security' (see further Chapter 1, p. 3, Volume I).

Contemporary ecological concerns may be succinctly characterised as environmental issues. According to Caldwell, an 'environmental issue' is an issue formulated as 'a result of an emergent change in the environment, caused or influenced by human activity, with consequences arousing social concern or creating problems leading to political action'. Furthermore, he suggests that environmental issues 'interact with and interrelate with other seemingly mutually exclusive developments . . . air quality issues interlink with health, energy, and economic problems; and endangered species issues entail questions of habitat, land use, recreation, commerce, and ethics' (Caldwell, 1990, p. 11). This view is reminiscent of renowned British astrophysicist Sir Arthur Eddington's rather dire predictions in relation to the natural world, given that he observed an earlier period farther back in time when the earth was less disorganised or, as Sir Arthur put it, 'less shuffled'. Certainly, an incontrovertible amount of unnatural 'disorder' now exists within a more advanced, or 'shuffled', world today. Eddington further observed that entropy,¹ as time's arrow, points forward only: thus the world was in a constant state of evolution, so had to be less disorderly, less shuffled in the past. He also surmised that the amount of energy for use in the universe was finite (Eddington, 1928). As such, just as there is a finite component to energy, so too is there a calculable component to the natural environment.

It is within the context of the environment that this particular disorder is relevant, a category of disorder that cannot be attributed solely to an inevitable, evolutionary process. Rather, it is disorder marked, and marred, by human intervention and activities aptly categorised by Caldwell into twelve broad groupings, many of which are examined throughout the various chapters in these two volumes. The first six were deemed critical and required immediate action: genetic loss; ecosystem disruption and destruction; devegetation; desertification; contamination of the environment (air, water, soil and biota); and degradation and depletion of fresh water. The remaining six were at various stages of proceeding to critical levels (for example, 'precrisis stage'): overpopulation by humans; deterioration and erosion of topsoil; climate change and deterioration of atmospheric quality and resultant adverse effects including sea-level rise (Chapter 18, Volume II); ozone depletion and acid rain (Chapter 7, Volume I); progressive reduction in existing sources of energy and the adverse environmental effects of such use; disruption of biogeochemical cycles; and maintenance of mankind's built environment and loss of cultural heritage in arts and architecture, including large-scale public works such as dams, canals and highways (Caldwell, 1990, pp. 17–18). Furthermore, it is disorder identified by patterns of unsustainable development, irresponsible use of finite resources, neglect, abuse, greed and ignorance or lack of respect for and understanding of the earth's variegated patchwork of fragile ecosystems, inextricably linked, interdependent and indivisible. It is disorder capable of taking on assorted identities: endangered or extinct species, depleted forests, land or ship based sources of marine pollution, threats to and loss of biological diversity (Chapter 19,

Volume II), nuclear testing carried out amidst highly sensitive environments (Sands, 1996), careless transfers of hazardous wastes (Chapters 21 and 22, Volume II), oil fields set afire during armed conflicts thereby creating environmental disasters (Schmitt, 1997),² industrial factories spewing toxic effluents into air and water and dispersing them beyond state borders, threats to local river ecosystems, to rain forest watersheds, to species inhabiting those environments, and adverse health and social consequences from unsustainable development, all resulting from development projects such as the construction of hydro dams that damage water quality and ecosystems,³ these are just some scenarios that would have tragic consequences for the planet, its environment and inhabitants.

Applied metaphorically to an international legal inquiry, the views of Sir Arthur Eddington – a celebrated mathematician, astronomer and physicist – would have one imagine that many centuries or even decades ago, when the entropy arrow had not yet pierced forward to the extent one sees today, global pollution was of little concern to humankind. Before the 1970s, very few international legal textbooks referred to the environment. It was perhaps discussed more in fiction than fact, for instance in Tolkien's *Lord of the Rings* trilogy and its prequel *The Hobbit*, wherein the fire-breathing dragon 'Smaug' was created as a metaphor for the author's own personal dismay over environmental pollution, starkly evident in a post-industrial revolution society.⁴ Similarly, very few global treaties expressing environmental protection regimes had been ratified, or declarations adopted, prior to 1972. Most of the early treaties concentrated on regional or bilateral concerns, such as the conservation of wildlife (birds, fisheries, seals) as expressed in the 1902 Convention for the Protection of Birds Useful to Agriculture,⁵ or the protection from pollution of jointly managed boundary waters, exemplified by the 1909 Boundary Waters Treaty⁶ between the United States (US) and the United Kingdom, on behalf of Canada (Sands, 1995, pp. 26–9). In contrast, hundreds of treaties and declarations were ratified or adopted at global, regional, sub-regional and bilateral levels by the end of the twentieth century.⁷ Scenarios described in the previous paragraph illustrate just a few of many urgent conditions triggering development of international norms and standards. In direct contravention of entropy laws, if one could peer backwards in time using Galileo's 'instrument', known today simply as a telescope, the metaphysical eye would reveal a less 'shuffled' natural environment, unlike today's natural world with its critical pollution levels.

Assembled against an elaborate backdrop scattered with images of what Aldo Leopold characterised as a 'world of wounds', (Leopold, 1978, p. 197) the collection of essays presented within Volumes I and II expands upon those images and the international legal solutions that have been formulated to resolve global environmental problems. The essays chosen convey pivotal breakthroughs in 'international environmental law', delineated by the following broad categories:

- historical developments and milestones achieved in standard-setting;
- traditional and modern sources of international law;
- a myriad of governance issues pertaining to international institutions, inter-governmental organisations (IGOs) and non-governmental organisations (NGOs);
- the progressive development of international environmental law, featuring a selection of global treaties;
- two essays comparing and contrasting approaches to controlling the hazardous wastes trade to and from developed and developing states; and

- challenges to be addressed concurrent with the progressive development of international environmental law, including tensions, cross-cutting issues, international financing dilemmas, and general deficiencies within the international normative system for environmental protection.

Despite the broad array of topics covered by these essays, this anthology does not seek to replace comprehensive texts on the subject.⁸ Nor does it attempt to cover issues of international environmental politics and policy,⁹ and national, sub-regional or regional developments,¹⁰ such as those within economic or politically integrated zones, for example, the European Union (EU),¹¹ UN Economic Commission for Europe (UNECE), Organisation of American States (OAS), African Union (AU) replacing the Organisation of African Unity (OAU) in 2002, Organisation for Economic Cooperation and Development (OECD), and Asia Pacific Economic Cooperation (APEC),¹² to name but a few.

Hence, this particular compilation must be viewed as a prelude to a broader spectrum of perspectives and approaches captured within many studies on international protection of the environment, and an invitation to further exploration. Given that international environmental law is anything but static, it is logical to observe that more recent essays will represent up-to-date developments. Others in the collection should be read within an historical context, especially where certain treaties or protocols either were not in force or did not exist when that specific essay was written. However, the essence of less recent essays is not diminished by the passage of time, for many of them are just as insightful and original now as they were when published decades ago. For example, Hardin's metaphoric thesis on the tragedy of the commons (Chapter 2, Volume I) has only gained momentum over time, having become entrenched within the symbolic pathos of international environmental law and policy. Others, such as Springer's 1977 essay on the meaning of pollution (Chapter 3, Volume I), Stone's chapter pleading the case for assigning rights to natural objects (Chapter 4, Volume I), or Brown Weiss's theory on a planetary trust for the environment (Chapter 5, Volume I), may be viewed comparatively when measuring current developments and progress achieved. Certain essays might also serve as significant benchmarks to determine how far the international community has come since those individual theories were introduced, observations proposed, and what obstacles remain on the path to achieve Handl's state of international environmental security.

In short, these oft-cited essays presenting original ideas and novel perspectives are all worthy of inclusion within these two volumes for many reasons: they challenge conventional ways of thinking about international law through the addition of environmental protection issues and resultant layers of new and emerging norms and standards; they provide richly descriptive commentaries on historical developments, institutional frameworks, and achievements in treaty-making; they navigate through complex dispute resolution and compliance issues; they emphasise South-North tensions conveyed by environmental protection proponents versus economic development supporters; or, they leap outside of the traditional international law box by confronting more controversial topics related to diverse competing interests, emerging concepts, tensions and cross-cutting issues. This carefully chosen assemblage of essays is based upon the premise that to understand the present and future of international environmental law and security, one must first understand and acknowledge the past. The chapters included within both volumes are loyal to that maxim because they do not ignore historical positions in favour of current ones. Contemporary theories often evolved from earlier ones, even if those theories were less

sophisticated than current approaches. Henceforth, the reader is invited to join an academic journey in defiance of entropy and temporal laws through a representative selection of past, present and future international legal responses to global environmental challenges. This introduction seeks to assist the reader upon that journey, commencing with a few philosophical reflections.

Conceptual Issues

The formidable task of situating the environment within an international legal context, thereby transporting the reader into an international environmental law frame of mind, is accomplished with skill in the opening essay by Günther Handl, 'Environmental Security and Global Change: The Challenge to International Law' (Chapter 1, Volume I). Handl's essay, when appreciated for its discerning philosophical viewpoint, is the perfect starting point for introducing other essays in this first section – particularly but not exclusively Brown Weiss' essay on intergenerational equity (Chapter 5, Volume I) – as well as embodying a treasure chest of issues for both volumes in this particular series, given that he familiarises the reader with many themes to follow. In fact, besides introducing thematic issues, Handl sets the tone for the entire series by posing a central question that might be considered the unofficial leitmotif for Volumes I and II: can the international legal system meet the challenges posed by global environmental concerns, thus providing present and future generations with a 'modicum of environmental security in the face of rapid global change'?

Published during the interregnum period between Stockholm and Rio, this essay evaluates the state of international law for environmental protection 'on the eve of the 1992 United Nations Conference on Environment and Development' (UNCED), a significant turning point for international law and environmental protection and an important fact to bear in mind when reading Handl's assessment of various techniques available at that time to achieve international environmental security. In particular, one might consider whether or not Handl's evaluation of international environmental security, conventional techniques, and corresponding problems they might pose when applied to international environmental issues, remains relevant today despite post-UNCED accomplishments. Additionally, it is prudent to ask whether significant progress has been made in the international legal system's ability to respond to global environmental concerns. Techniques assessed consist of the use of framework conventions and implementing protocols (see Chapters 6 and 7, Volume I, and Chapter 18, Volume II), 'soft law' (see Chapter 9, Volume I, as well as Chapter 11, Volume I, and Chapters 16 and 17, Volume II), and the possibility of establishing uniform environmental standards and the harmonisation of local, regional and global standard-setting. Handl familiarises the reader with key areas of implementation, enforcement and compliance with international environmental standards (see Chapters 13 and 14, Volume I), observing that whilst certain disadvantages might be perceived by the 'reluctance of states to submit to third-party decision-making' in this area – particularly the effectiveness of international environmental regimes to monitor compliance – other advantages offset those drawbacks, such as the increasing use of reporting techniques, peer review and other internal controls on states parties' obligations; the difficulty of using solely legal criteria 'to adjudge the merits of a legal dispute' where the precautionary principle is utilised (see Chapter 10, Volume I); and the increasing role of NGOs in assisting with the

'application and enforcement of international environmental standards' (see Chapter 15, Volume I).

Furthermore, Handl acquaints the reader with the concept of sustainable development (see Chapter 17, Volume II), viewed as a 'cardinal principle of international environmental decision-making', and its 'conceptual or philosophical' counterpart, that of intergenerational equity (see Chapter 5, Volume I). Although his pre-UNCED predictions classify sustainable development as a concept with 'international normative weakness', can the same be true today? Has sustainable development remained a concept that guides policy or has it taken on normative character? That question will be explored further by Sands in Chapter 17 in Part V of Volume II. Finally, in the course of his review of other traditional means of encouraging international environmental cooperation (IEC – the term is clarified in Chapter 11, Volume I) via legal means, Handl emphasises the importance of adopting less conventional methods, such as redefining sovereignty or inviting non-state actors to be participants, most notably transnational corporations (TNCs) and multilateral lending institutions responsible for financing sustainable development, thereby achieving a measure of equity for less developed countries (LDCs), and in turn, assisting in meeting economic and logistical obstacles LDCs inevitably encounter in complying with minimum environmental standards (see Chapters 24 and 25 in Volume II). The 'North–South Issue' is a recurring theme in subsequent essays wherein competing interests between environmental goals and developmental needs are considered (see Chapter 12, Volume I); methods for the transboundary movement of hazardous waste evaluated (see Chapters 21 and 22 in Volume II); and the Global Environmental Facility (GEF), a 'proposal' at the time of Handl's writing, updated and assessed in light of subsequent developments (see generally Chapter 6, Volume I and Chapters 17 and 25, Volume II).

The inherent dangers in embracing unfettered development without consideration of environmental consequences are predicaments for which solutions are not limited exclusively to legal parameters. Thus, it is less idiosyncratic that entropy would factor into a collection of essays on international environmental law than one might assume, since the subject matter itself is multidisciplinary, reaching far beyond the study of international law into the social and natural sciences, philosophy, micro- and macro-economics, politics and diplomacy, and making parallels drawn between 'time's arrow' and the evolution of the global environment harder to repudiate. Just as entropy cannot move in reverse, the natural world cannot evolve backwards into a pristine state tantamount to Elysian Fields. As a corollary to matters within the science of astrophysics, there exist separate but overlapping concerns identified as environmental issues, many of which have been gleaned from the natural and social sciences. It is fitting that this section includes what is considered a classic treatise written by an ecologist.

In Garrett Hardin's essay 'Tragedy of the Commons' (Chapter 2, Volume I), his venerable parable of the herdsman's flock grazing on the commons portrays how seemingly harmless individual pursuits could lead to unavoidable detrimental consequences. His thesis illustrates that in a world where resources such as land are finite, the open, unfettered and unregulated access to commonly owned resources results ultimately in their over-exploitation, with ruinous repercussions. Hardin analyses the pollution problem as a function of population density. Whilst the case of one herdsman seeking to maximise his flock and personal wealth is not so 'tragic', many herdsmen adding to their flocks will generate collective degradation by over-maximising the benefits of commonly owned spaces. If his thesis concerns solely herdsman's flocks grazing on land in the historical sense, utilising Hardin's tragedy of the commons as a metaphor for

modern environmental problems would be obsolete. Yet, when applied to a contemporary framework, his thesis transforms into a practical metaphor facilitating explanations for many global environmental problems that exist in today's common spaces: problems such as acid rain, climate change, ozone depletion, over fishing, polluted oceans, mismanaged forests and desertification.¹³ In short, left unregulated, shared resources became a 'cesspool'. 'Freedom in a commons', wrote Hardin, 'brings ruin to all'. Consequently, external controls were deemed desirable, without which the pursuit of individual interests would lead to tragedy.

Whether viewed as having provided a foundation for 'free-market environmentalism' or as having influenced limited command-and-control models of environmental regulation, Hardin's thesis led to the strong belief for many decades that tight regulatory controls were the only solutions to limit individual freedom of usage within the commons. These limited controls have been criticised for failing to address underlying causes of environmental problems.¹⁴ Contemporary approaches seek to reconcile individual and collective competing interests through various means, such as carrying out environmental impact assessments,¹⁵ taking into account social, economic, environmental and political factors, incorporating better environmental management practices that recognise various values (ancestral, cultural, societal) at each stage of proposed development projects, and providing greater transparency through access to environmental information.

But what does Professor Hardin mean by 'pollution' and is it a term delimited in an international legal context? As Allen Springer illustrates with precision in his essay, 'Towards a Meaningful Concept of Pollution in International Law' (Chapter 3, Volume I), no single legal definition of pollution evolved during the post-Stockholm era, that is, the period following the 1972 UN Conference on the Human Environment (UNCHE), convened in Stockholm, Sweden. Springer adopted the view that pollution is an indication of 'a threshold level of damage or interference *which is legally significant*' (emphasis added). Bourne expanded Springer's observations in his recommendations to proceed with caution when using the word 'pollution', for it 'is a slippery word', he wrote, 'especially when used in relation to water resources':

It denotes nothing precise about the state of any given waters; it is thus capable of meaning different things to different people. Moreover, it is an emotional word, full of unpleasant connotations; and, of course, it is a key word in the rhetoric of all those who now labour in the cause of saving mankind from self-destruction by environmental pollution. It is a term that should be avoided by lawyers. Its use obscures the real issues raised by the utilisation of water resources and thus hinders fruitful legal analysis; it tends to lead one to think that any act that renders water impure is wrong and ought to be illegal. (Bourne, 1971, p. 194)

Certainly, from an international legal perspective the term 'pollution' has evolved in accordance with Springer's opinion: activities that create pollution that in turn cause damage to the environment will trigger responsibility for environmental damage at different levels, measured according to prescribed rules and norms of domestic and international law (Francioni and Scovazzi, 1991, pp. ix-x). Decades before Springer's essay was published, when emissions from a Canadian smelter in Trail, British Columbia, caused damage to farmland via air pollution in the US State of Washington, the arbitration panel concluded in the *Trail Smelter* case that 'no state has the right to use or permit the use of its territory in such a manner as to cause injury by fumes in or to the territory of another'.¹⁶ This decision is said to have evolved into the customary international law principle of harm prevention, expressed as a state's duty to control and