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ADDRESSING ENVIRONMENTAL PROBLEMS: SUCCESSES AND CHALLENGES

I was telling governments what they should do. I was taking the stance that I am a civil servant. I am a citizen of the world. I'm not any human being; I'm a scientist, able to see the danger. My responsibility is to help protect the environment, so I'm defending it.

—Mostafa Tolba, UNEP executive director (1976–1992)¹

At inception, UNEP faced the challenges that come with being a startup institution with a big vision and modest resources. Undeterred, UNEP took risks and spurred governments to adopt agreements, commit funding, embrace ethical imperatives, and deliver on promises. Despite gaps in connectivity and communication, remoteness from the centers of political power, and growing competition with a range of existing and emerging institutions, UNEP persevered. Its work program encompassed natural resource and ecosystem management issues, including the protection of biodiversity and forests, the stemming and reversal of land degradation, reversal of the depletion of the ozone layer, and control of climate change. The standard UNEP procedure for addressing these challenges was to follow the core functions of its mandate and identify the problem based on scientific assessment, convene scientists and policymakers, and facilitate the development of the necessary legal, regulatory, and institutional mechanisms that set the goals and supported countries to achieve them. This model delivered results in marine pollution, ozone

depletion, and chemicals and waste management. During the first two decades, one long-term staff member remarked, UNEP's mandate and mission were clear to all staff; they were focused on work in pollution, waste, energy, climate change, ozone, desertification.² After the 1992 Rio Earth Summit, however, UNEP's leadership position shifted.

The Rio Earth Summit transformed the international environmental stage by catalyzing a wave of new norms, policies, and institutions for the global environment. The international environmental community, however, did not recognize the full impact of Rio. Assistant Secretary-General and UNEP Deputy Executive Director (1986–1992) Bill Mansfield remarked, “We were looking at Rio as an environmental success, and I don't think that in the end it was.”³ The conference established a new global paradigm—sustainable development—and created consensus around the need to resolve a range of environmental issues UNEP had brought to international attention. But as a result of the Rio summit, UNEP lost the leadership it had held on these issues. Originally created to be a catalyst in the environmental field, UNEP had to redefine its value proposition to better respond to the broader notion of balancing people, planet, and prosperity. As a 1997 report by the UN Office of Internal Oversight Services noted, UNEP was “de facto divorced from most of the operational activities carried out by the United Nations system related to environmental issues” and had difficulties demonstrating concrete results.⁴

The major success in global environmental governance at large—the reversal of the depletion of the ozone layer—is one of UNEP's landmark successes. The institution, and governments and other agencies alike, have, however, struggled with a range of other concerns, including biodiversity, forests, desertification, and resource efficiency. Difficulties arose when demands from member states increased but did not align, when financial support was absent, and when the tension deepened between priorities of member states and between normative and operational requests. The rift between the Global North and South seemingly lies at the core of many of these concerns. It stems from the fact that many of the environmental problems confronting developing countries are not necessarily transboundary or international but are urgent local problems such as clean water, sanitation, and air pollution. Global concerns about biodiversity, forests, and species have very concrete local repercussions

that governments would like to have control over. This chapter offers a nuanced story of what has worked and what hasn't—with views from a few, though not all, of the environmental issues UNEP has taken on—and provides insights into why, an issue that subsequent chapters will take on in greater depth.

OZONE DEPLETION

Reversal of the depletion of the ozone layer is perhaps UNEP's greatest achievement. The resolution of the ozone-depletion problem created “a model for effective multilateral action” for tackling major global problems, according to Ambassador Richard Benedick, chief US negotiator and a principal architect of the Montreal Protocol on depletion of the ozone layer.⁵ The ozone issue came onto the international political agenda in the mid-1970s when Mario Molina and Sherwood Rowland articulated a hypothesis that CFCs were destroying the stratospheric ozone layer. At the request of the Natural Resources Defense Council (NRDC), a major environmental NGO in the United States, UNEP took the lead on ozone and received approval from its Governing Council to launch an investigation and international discussions. In essence, UNEP's effective use of the science-policy-support trifecta led to action on ozone, in what has been recognized as a clear success.

This success has been explained by a range of factors, including the positive engagement by parties, especially the United States; the relatively narrow scope of the problem; the compelling science undergirding policy decisions; the leadership of industry, DuPont in particular; the existence of epistemic communities (expert networks); and the creation of human, social, and cultural capital (among negotiators).⁶ By all accounts, however, the common denominator was the leadership role of Mostafa Tolba, for whom ozone became a defining issue.⁷ Professors Penelope Canan and Nancy Reichman, scholars of the ozone regime, explain that Tolba “pushed UNEP to assume responsibility for getting a treaty because he felt so strongly that a formal agreement was essential for planetary survival”⁸ and demonstrated “the very model of how a UN agency should operate in a complex international negotiation.”⁹ The importance of Tolba's leadership is elaborated in box 4.1.¹⁰

Box 4.1

Mostafa Tolba's Leadership in Reversing Ozone Depletion

Policymakers credit UNEP, and in particular its executive director at the time, Dr. Mostafa Tolba, with the greatest success in global environmental governance, the resolution of the ozone problem in the late 1980s. "Tolba pleaded, provoked, cajoled, shamed, and sometimes bullied reluctant governments ever closer to the treaty provisions that he, as a scientist, knew were necessary for the world," wrote Richard Benedick, the chief US negotiator. "It was an unforgettable virtuoso performance, a role that he undertook with unflinching energy and with absolutely no consideration for his own personal popularity." Investing the entire energy of the institution he led was critical to the resolution of this global problem. So too was the engagement of the governments of all countries as part of one global team. "If the 'ozone story' can be likened to the preparation of a Michelin three-star feast," Benedick wrote, "then Dr. Tolba was the master chef: the rest of us were cook's apprentices—salad chefs, pastry chefs and onion peelers." A certain level of discomfort with the activist executive director, however, led many member states to pull back from UNEP subsequently as they became "gun shy and thought 'we can't leave it to Tolba who will push us,'" one member state representative recalled.

Tolba's leadership translated into UNEP taking a lead in managing the agreement and creating the institutional structures to support it. The Multilateral Fund was created to finance member-state actions, national ozone units were set up within governments to support the implementation of the treaty, and the ozone secretariat was created within UNEP to support international collaboration. These institutional structures facilitated a nearly 100 percent level of compliance with the reporting obligations and an equally high implementation rate over the years the Protocol has been in force. This can be explained by the work of the national ozone units in collecting data on the production, export, and import of groups of substances regulated by the Protocol and submitting the information to the Ozone Secretariat and to the funding mechanism, the Multilateral Fund.¹¹

Scientific knowledge was an important foundation for the political process that led to this success. In 1976, UNEP called for an international conference, and in 1977, scientists from thirty-two countries convened in Washington, DC, and established a "world plan of action" for

the ozone layer. That year UNEP created the first official expert panel on the ozone layer. This panel established a common body of data and analysis and diminished the degree of data uncertainty. It also provided a basis for influencing public opinion; clear scientific evidence of a hole in the ozone layer over Antarctica motivated action on the issue. Environmental organizations linked the ozone hole to an increased risk of skin cancer and made the issue personal. In 1978, the United States banned the non-essential use of CFCs as aerosol propellants. In 1980, UNEP's Governing Council requested that it "undertake measures to protect the ozone layer from modifications due to human activities, and in 1981 [it] called for a convention."¹² The Governing Council also noted that "the progressive development of environmental law is necessarily a slow process [and] negotiating a new instrument takes a long time. Nevertheless, considerable progress has been made towards the achievement of this goal," governments emphasized, "in spite of the fact that as originally conceived the goal was over-optimistic considering the delicate nature of some of the subject areas chosen."¹³

Working with scientists and national academies, UNEP was instrumental in creating public awareness about the causes and consequences of ozone depletion. It performed a catalytic role in building a consensus on the science, the policy, and potential implementation strategies. It continued to keep the problem of stratospheric ozone depletion on the international agenda and to work with governments to devise the legal regime for collective action. Science provided a "major turning point in the negotiations," Professor Ernst Haas wrote in 1990, when Mostafa Tolba convened "atmospheric modelers and instructed them to compare their models and assessments of ozone depletion." The report from the meeting, Haas explained, provided support for measures advocated by the United States and UNEP and "given the authority of the scientists involved, this report was sufficient to compel the recalcitrant European nations to accept the need for speedy controls over a wide variety of CFCs—a position which they had previously opposed."¹⁴ In 1985, governments signed the Vienna Convention, the framework convention on ozone-depleting substances. The Vienna Convention promoted international cooperation on the protection of the ozone layer through systematic scientific observations and research, information exchange, and public awareness. It obligated parties

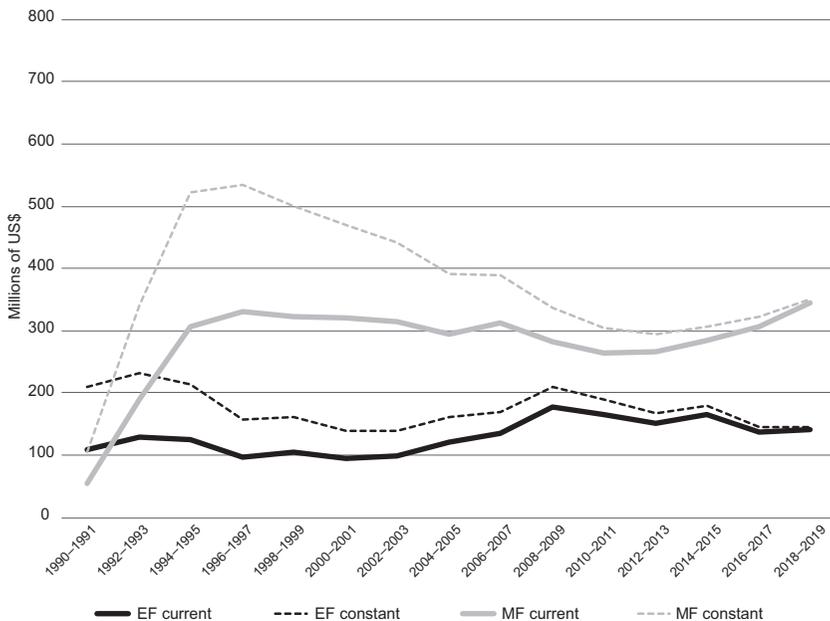
to create legislation to regulate activities with potentially harmful effects on the ozone layer. However, Tolba saw this as insufficient, remarking that “these framework conventions are nothing but governments saying, ‘Oh, we love one another, we have to protect the environment, but we need more resources.’” He also pointed out that he asked the government of Canada to continue the negotiations for a protocol. “And to my great surprise,” he exclaimed, “the Canadians jumped at this, and they said—it was 1985—‘We are ready to host the ministerial conference to adopt a protocol in Montreal in 1987’—that’s a two-year period.”¹⁵

Mostafa Tolba—and thus UNEP—led the difficult negotiations during the following two years. Initially, the various negotiation positions differed widely. There were seven mathematical models—from UNEP, from the United States, and from the Soviet Union—and each had different assumptions and different projected results. UNEP convened the modelers in Germany for a week in 1986 to compare their assumptions and adjust their models. Tolba recalled, “six of them ended up with the same result: that stratospheric ozone is depleting and fast and it cannot recover in less than seventy years, even if we stop everything tomorrow. The only exception was the Soviet Union; they did not think that they would suffer from the ozone depletion and that they were receiving more pollution than they were sending. But when they looked back into what was actually happening, it turned out that they were exporting more pollution than they were receiving. So, they started changing their position. That meeting was really crucial.”¹⁶ While agreement on the problem was attained, there were certainly wide disagreements on how it could be resolved. Since the political positions of governments were widely divergent, as Lee Thomas, then Administrator of the US Environmental Protection Agency, remarked, the adoption of the Montreal Protocol showed an “unprecedented degree of cooperation among nations of the world in balancing economic development and environmental protection.”¹⁷

With leadership from UNEP, in 1987, twenty-four countries convened in Montreal and “promised to halve the production and use of ozone-destroying chemicals by 1999.”¹⁸ The Montreal Protocol committed countries to specific actions to control ozone-depleting substances, including banning the use of and trade in these chemicals. It contained economic

incentives for participation and compliance, provisions for technology transfer, and stipulations for assessment of efficacy and for readjustment.¹⁹ The financing mechanism to support the implementation of the convention was a substantial institutional innovation, which was critical to ensuring collaboration from developing countries and in practice has proven significant to the successful implementation of the treaty. Since its inception, the Multilateral Fund has received more, and more stable, funding than UNEP's Environment Fund. Since 1990, countries have contributed an average of \$275 million per biennium, for a total of \$3.85 billion in the period 1990–2017 (see figure 4.1).²⁰

Scientific evidence is now sufficient to show that “the Montreal Protocol is working.”²¹ A January 2018 study by scientists at NASA confirms that chlorine from CFCs “is decreasing in the Antarctic stratosphere and the ozone destruction is decreasing along with it.” The Antarctic ozone hole is expected to continue to progressively recover, although complete closing of the hole will take decades. “CFCs have lifetimes from 50 to 100 years, so they linger in the atmosphere for a very long time,” noted



4.1 The Environment Fund and the Multilateral Fund from 1990 to 2019.

Anne Douglass, an atmospheric scientist at NASA and one of the study's two authors. "As far as the ozone hole being gone, we're looking at 2060 or 2080."²² Scientific assessment, public awareness and outcry, individual and institutional leadership with financial incentives and governance mechanisms all came together to shape this successful environmental regime.

MARINE POLLUTION

The health and productivity of marine ecosystems were among the first of UNEP's topic-specific initiatives and continue to be an emphasis for its work, with the goal of supporting countries in maintaining and restoring their long-term functioning. This work began in 1974 with the Regional Seas Programme, which mobilized the power of science and the authority of the new institution to convene various actors. Eventually, the program included fourteen regions and over 140 states. Responding to concerns about marine pollution in the Mediterranean, UNEP convened governments in Mediterranean coastal states to develop an action plan for the protection of the marine environment and ensured a balance between scientific investigation and legal commitment. As a result, it launched the Mediterranean Sea Programme and facilitated the creation of a regional network of over eighty laboratories and research institutions from fifteen coastal states to share data for baseline studies, pollution source determination, and research. Through these efforts UNEP enabled the states bordering the Mediterranean—often antagonistic to each other in other international fora—to collaborate to an unprecedented degree to limit pollution of their shared sea.²³

In 1981, the *New York Times* shined a spotlight on the leadership of Dr. Stjepan Kečkeš, the Director of UNEP's Regional Seas Program and the "principal optimist" behind the Mediterranean Action Program. Kečkeš convened governments at a six-day UN conference that "showed that the nations involved recognize the problem and are determined to do something about it," generating \$13 million to support activities.²⁴ Under his leadership, countries adopted a range of legal instruments, including the Barcelona Convention in 1976 and several subsequent protocols, which established standards for discharge levels and criteria for the treatment of industrial wastes, municipal sewage, and runoff of agricultural pesticides

and fertilizers, and committed parties to reporting on implementation.²⁵ As Kečkeš remarked, “We have had complete agreement on an agenda from a group that includes Israel, Syria, Lebanon, Libya and Tunisia—countries that agree with each other on very little else.”²⁶

The Regional Seas program catalyzed science and convened, guided, and shaped policy direction for technical programs, which made it highly influential and successful in initiating and shaping treaty negotiations.²⁷ While some of the Regional Seas conventions have struggled with funding and the challenge of elevating environmental issues on governments’ agendas,²⁸ UNEP generally considers the Regional Seas agreements “extraordinarily effective” in engaging governments in environmental protection.²⁹ Scholars agree with this assessment, and many have pointed to the Regional Seas Programme as one of UNEP’s most successful undertakings, exemplifying the catalytic role that international organizations can play in resolving environmental problems.³⁰

DESERTIFICATION

Desertification came onto the international agenda after a series of droughts afflicted the Sahel³¹ in the late 1960s, causing famine in several countries between 1968 and 1972 and spurring intense humanitarian, political, and scientific concern.³² In 1975, UNEP and UNESCO co-sponsored a study of the status of desertification in northwestern Sudan.³³ Hugh Lamprey, an ecologist and bush pilot, carried out the study and noted that the desert in the Sudan had moved southward by ninety to one hundred kilometers over a period of seventeen years.³⁴ Based on the urgency and importance of the issue, desertification became one of UNEP’s core program areas. UNEP invested considerable resources into continued research and scientific assessment of the gravity of the problem, deployed its convening and awareness-raising power to elevate the issue politically, and created the necessary policy and legal framework at the international and national levels.

In its 1979 annual report, UNEP emphasized that “the loss of arable soil is probably the greatest single environmental threat to the future well-being of the planet.”³⁵ Two years earlier, UNEP put the issue on the international political agenda when it hosted the first UN Conference on

Desertification in Nairobi. The scientific basis for the conference included four extensive reviews of existing knowledge about desertification and its relationship to climate, ecological processes, society, and technology, as well as a number of case studies and a set of desertification maps.³⁶ The conference triggered greater scientific interest and catalyzed the development of national policies. The policy outcome was the United Nations Plan of Action to Combat Desertification (PACD) that was to be implemented at the national level with the goal of preventing and halting desertification. The Plan provided the framework for policy action and remained the main policy instrument from 1977 to 1992, yet little implementation took place. UNEP submitted annual reports to the UN General Assembly on implementation of the Plan and the status of desertification and the challenges in addressing it. Scientific assessments in 1984 and 1991, as Mohammed Kassas, former President of the International Union for the Conservation of Nature (IUCN), wrote in 1994, showed the worldwide advance of desertification and that “efforts undertaken since 1977 were too modest to be effective.”³⁷

UNEP harnessed scientific knowledge of the complexity of desertification as a “crisis narrative”³⁸ and made desertification a truly international concern at the 1992 Rio Earth Summit.³⁹ The first edition of UNEP’s *World Atlas of Desertification*, published in 1992, summarized scientific knowledge showing that large areas of the world and large populations were experiencing soil degradation.⁴⁰ Desertification, however, has been a disputed topic, as it highlighted the tension between scientific concerns and political priorities (see box 4.2).⁴¹ The calls for global political action and an international legal instrument continued and, in 1994, governments signed the United Nations Convention to Combat Desertification (UNCCD). They located its secretariat in Geneva, Switzerland, and, in 1999, the secretariat moved to Bonn. The Global Environment Facility provides the convention’s financing mechanism.

Despite increased political attention, scientific studies, and regulatory approaches, desertification—or land degradation, as it is now known—“still remains a largely unresolved issue,” Steve Lonergan, director of the science division at UNEP, wrote in 2005.⁴² And, fifteen years later, the problem has only been exacerbated. The journal *Nature* reported that over 70 percent of Africa is impacted by drought, and scientists from

Box 4.2

Desertification Disputes

Desertification was among UNEP's early priorities that presented challenges to its scientific reputation and political clout. Scholars criticized UNEP for unsubstantiated science, an alarmist political stance, and inability to deliver on a solution to the environmental problem at hand. The methodologies for the monitoring and assessment of desertification that FAO and UNEP had employed in the 1980s and early 1990s were disparaged as imprecise, mixing quantitative and qualitative measurements and having a large number of implicit assumptions. UNEP's scientific assessment of the early 1990s estimated that 70 percent of all drylands had been affected by desertification and that "at least one third of the present global deserts are man-made, [and] the result of human misuse of the land."

Ultimately, scholars noted, "although large amounts of resources were invested to inventory desertification during the 1980s and early 1990s, these did not translate into a significant increase in our knowledge of desertification status." The global assessments revealed that basic knowledge about desertification was insufficient and that the methodologies used were "more like an autopsy than a preventive diagnostic: once soil is lost, the chances of preventing further desertification and the economic feasibility of restoration are almost nil."

Without clear scientific grounding, it has been difficult to create, support, and implement the policy framework for action. National development plans did not integrate anti-desertification measures, and legislation to stop human-induced drivers was lacking. Despite the personal interest and investment of Executive Director Mostafa Tolba, who felt compelled to press for action, desertification did not become a priority for African governments or donor countries. The Inter-Agency Working Group on Desertification that governments created generated little interest and attracted a mere \$167,000 in the ten-year period of 1978–1988, prompting the UN General Assembly to close the account.

the continent are turning to the UN Convention to Combat Desertification to assist them with research and data.⁴³ While there is a need for improved data and methodologies in environmental monitoring, more rigorous assessment models, accurate databases, and integrated information systems, desertification is no longer a part of UNEP's program of work.⁴⁴ The desertification convention is independent, with its own COP, Secretariat, and institutional and administrative mechanism in Bonn,

Germany, and relies on the GEF for its finances. The Executive Secretary, Ibrahim Thiaw, assumed office in 2018 after serving as deputy executive director of UNEP under Achim Steiner and Erik Solheim.

CHEMICALS AND HAZARDOUS WASTE

Much of the original impetus for the modern environmental movement came from the realization of the harmful effects of chemicals on the environment and human health. These effects came into sharp focus in the early 1960s with the publication of Rachel Carson's book *Silent Spring*, which presented a compelling case about the danger of pesticides, DDT in particular. The book catalyzed an environmental movement and led to a ban on the use of DDT in agriculture in the United States, enabling the recovery of endangered species like the bald eagle. It also triggered the creation of the US Environmental Protection Agency in December 1970 and the establishment of an environmental regulatory system. In light of this timing, the issue of chemicals featured prominently on the agenda of the Stockholm Conference and in the Stockholm Action Plan.

As with other international challenges, UNEP began its work on chemicals through the lens of scientific assessment. In response to Recommendation 74 of the Stockholm Action Plan on addressing the effects of "man-made pollutants," UNEP first took action on chemicals in 1976 when it set up the International Registry of Potentially Toxic Chemicals (IRPTC) to ensure the "most appropriate and least damaging use of chemicals and to provide a global early-warning system concerning undesirable environmental side effects."⁴⁵ IRPTC was to use information collected by other UN agencies such as FAO, UNESCO, WHO, IARC, IMCO, and ILO,⁴⁶ as well as from governments and NGOs. Other agencies were also engaging in this field, and in 1979 countries signed the Convention on Long Range Transboundary Air Pollution, which had been developed by the UN Economic Commission for Europe. They had also recently modified MARPOL, the International Convention for the Prevention of Pollution from Ships, developed under the aegis of the International Maritime Organization. In 1980, WHO, UNEP, and ILO established an International Programme on Chemical Safety.⁴⁷ By 1992, the register of that program

contained data profiles for over eight hundred chemicals and special files on about eight thousand others that were subject to national regulation.

New, more stringent environmental regulations in the 1970s increased disposal costs and heightened public resistance to disposal of hazardous wastes, leading to a rise in NIMBY (Not In My Back Yard) actions. The result was a pressure to dispose of waste beyond the borders of the countries where it was produced, and companies sought cheap disposal options in Eastern Europe and the developing world, where environmental awareness was nascent and regulation absent. In only a couple of years, as the *Christian Science Monitor* reported, "Western industrial nations ha[d] shipped more than 3.5 million metric tons of toxic waste" because the cost differential was enormous. "Treatment and disposal costs in many industrial countries can hit \$1,250 a ton," the *Monitor* reported in 1988. "In Africa, where debt-ridden countries have tended to be short on expertise and on regulations governing toxic wastes, such materials can be dumped for as little as \$3 a ton."⁴⁸ The exported waste was disposed of in flimsy or corroded containers and leached into the soil, causing serious health damage (see box 4.3). This "garbage imperialism" prompted the development of a convention on the movement of hazardous wastes, the Basel Convention.

Environmental NGOs launched campaigns around this movement of hazardous waste. They sought to raise awareness, stop waste traders by publicly shaming them, and influence the negotiations of an inter-governmental treaty. The intergovernmental process for regulating the trade of toxic waste had begun in the early 1980s when UNEP drafted the Cairo Guidelines on the Environmentally Sound Management of Hazardous Wastes, which the Governing Council approved in 1987. In the mid-1980s, the European Community and the OECD had also established regulations on the trans-frontier movement of hazardous wastes among their member states and amended them in 1986 to include third parties. UNEP played an important role in leading the negotiations for a formal convention. After an intense and politically charged negotiation period of just over a year, governments adopted the convention in 1989.

The convention was hard-fought because a deep division emerged from the start on how to reconcile the principle of free trade with the

Box 4.3

Hazardous Waste in the Village of Koko, Nigeria

In the 1980s, the discovery of dumped toxic waste in African countries awakened environmental awareness in new ways. The fishing village of Koko, Nigeria, made international headlines in 1988 when a Nigerian newspaper, the *Daily Times*, published reports about “over 2,000 drums, sacks, and containers” that were leaking hazardous waste in a vacant residential lot. Reporters had discovered that two Italian firms had negotiated the storage of 18,000 drums of toxic chemicals disguised as building materials for the price of \$100 per month. Sitting in the hot sun, the barrels burst open and released the industrial waste contaminated with polychlorinated biphenyls (PCBs) and asbestos. Several people in the village became seriously ill because some had used the barrels to store drinking water. The incident caused an international scandal, and the Nigerian government compelled Italy to take back the waste, which spent many months at sea as no port would accept the toxic-waste barge.

The village of Koko was not an isolated case—there were hundreds of cases of hazardous-waste exports around the world. Western media followed such stories and prompted increased concern about the plight of countries in Africa and Eastern Europe that had nothing to do with the waste generation, were unaware or unable to deal with the environmental and health consequences, and received little or nothing in exchange. The waste trade was therefore labeled “toxic colonialism” and “garbage imperialism.”

movement of hazardous waste across borders. Prompted by the private companies that produced and managed the waste, industrialized countries argued for legalized trade with certain regulations. Developing countries, on the other hand, argued for a global ban on waste exports from rich to poor states because they considered regulation as “merely legalizing of a conspicuously unjust practice” and simply a new means of exploitation.⁴⁹ Greenpeace actively supported and lobbied for a ban and worked closely with developing-country negotiators. The sharp divisions threatened the demise of the negotiation process that UNEP was shepherding, and Mostafa Tolba worked hard to ensure that the process concluded with the adoption of a convention.

UNEP had committed to the stance that trade should be regulated, not banned completely, taking into account the interests of developing

countries. The argument was that some states could not dispose of their toxic materials safely and had to export them to countries where disposal could be carried out in a safe manner. Such trade would happen from countries with low capacity to countries with higher capacity. UNEP recognized the right of developing countries to refuse the import of waste, and as Professor Jennifer Clapp explains, UNEP “saw the main purpose of the [Basel] convention as protecting the rights of developing countries to refuse waste imports.”⁵⁰ Just like with the Montreal Protocol, agreement on the text of the convention was only achieved in the very last hours of negotiation, in no small measure because of Tolba’s “determination and skill in negotiating delicate political issues interspersed with some judicial browbeating.”⁵¹ However, as Gerry Cunningham recalls, the intensive process had strained Tolba, and he was hospitalized. After being discharged, he returned immediately to the conference. He donned his suit over his striped pajamas and pulled down the leg of the pajamas over his shoes so delegates could see it, and he made an emotional plea to them: “I had to get out of my sick bed to come and convince you to come to a close.”⁵² The Basel Convention was adopted on March 22, 1989, and entered into force in May 1992 after ratification from twenty member states.

The Basel negotiations had been extremely difficult and confrontational, as states held widely divergent positions. The Convention got off to a fragile start, as disappointment with the outcome was prevalent, though for opposite reasons, both among industrialized countries and their industries, and among developing countries and environmental NGOs. Developing countries and Greenpeace continued to lobby for a ban to the transport of hazardous waste and, in 1995, the Ban Amendment to the Basel Convention was adopted.⁵³ The Ban prohibits the export of hazardous waste for any reason, including recycling, from a list of mostly OECD countries to developing countries. The Basel Ban amendment entered into force in December 2019. The European Union, Norway, and Switzerland had already fully implemented the Basel Ban through their own legislation.

In 2019, parties to the Basel Convention adopted an amendment that adds plastic waste to the scope of regulated wastes subject to prior

notification and consent as established under the convention. In establishing a Partnership on Plastic Waste, parties committed to public-private cooperation, exchange of best practices, and technical assistance to minimize and manage plastic waste. The amendment will make it harder for developed countries to export plastic waste for processing in developing countries, which, the *Guardian* stated, mismanage more than 70 percent of their own plastic waste.⁵⁴

UNEP has undertaken scientific assessments of chemicals and produced two editions of a comprehensive *Global Chemicals Outlook* (in 2015 and 2019). It has actively engaged and collaborated with other UN agencies, including FAO and WHO, and worked on a range of chemical regulations, many of which resulted in international treaties, including the 1989 London Guidelines for the Exchange of Information on Chemicals in International Trade, the 1998 Rotterdam Convention on Prior Informed Consent promoting shared responsibility between exporting and importing countries of hazardous chemicals, the 2001 Stockholm Convention on Persistent Organic Pollutants, and the 2013 Minamata Convention on Mercury. It also provides administrative support and hosts the secretariat of the Strategic Approach to International Chemicals Management (SAICM), a policy framework that promotes chemical safety around the world. These treaties and instruments were the result of multi-year science and policy collaborations that both responded to and generated increased international concern about pollution and hazardous waste.⁵⁵

With the proliferation of regulatory instruments and conventions, UNEP has sought to step into its coordination role and created a joint secretariat for the three chemicals conventions it manages—Basel, Rotterdam, and Stockholm. Rolph Payet, the executive secretary of the joint secretariat, noted that the “synergies [processes] brought scientists together and the secretariat became more effective.” However, he warns, “negotiations became more challenging” since the issues are now joint, making them more complex and engaging more actors. “Cooperation with other agreements, however, is limited,” Payet remarked, and “at UNEA, there is not enough representation.”⁵⁶ Moreover, the UN Environment Assembly (UNEA), as chapter 7 explains, is a political forum where discussions are broad and not as specific as they are during the conferences of the parties to the various multilateral environmental agreements.

CLIMATE CHANGE

Climate change had been on the international agenda even before the Stockholm Conference. General Assembly Resolution 1721 (xvi) on international cooperation of the peaceful uses of outer space, adopted in 1961, triggered the establishment of the World Weather Watch program at the World Meteorological Organization (WMO) and the joint Global Atmospheric Research Programme of WMO and the International Council for Science.⁵⁷ The evolution of the climate change regime illustrates the importance of the sequential arrangement of initiatives—a scientific conference that issues a joint call for action, the creation of an international legal instrument and institutional arrangements, and their subsequent implementation. Member states are not the only actors within this progression but certainly hold the power to create legal arrangements and ensure their operation. It also evidences the dynamics between international institutions and member states, the importance of the geopolitical context at the time, and the influence of individuals.⁵⁸

The sixth special session of the UN General Assembly in 1974 set up the WMO Executive Committee Panel of Experts on Climate Change, which collaborated with UNEP and other UN agencies and scientific organizations to convene “a world conference of experts on climate and mankind”—the first World Climate Conference—in 1979 in Geneva. Over 350 specialists from fifty-three countries and twenty-four international organizations participated, representing a wide range of disciplines.⁵⁹ The conference called for the “urgent development of a common strategy for a greater understanding of the climate system and a rational use of climate information, and proposed the establishment of the World Climate Programme.”⁶⁰ The World Meteorological Congress established the World Climate Programme in 1979 with the aim of developing scientific knowledge and understanding of the climate system for the benefit of societies dealing with climate change.⁶¹ The program was an inter-agency, interdisciplinary effort among WMO, UNEP, and ICSU, with a mandate to collect and assess climate-related data, conduct research, evaluate impacts and response systems, and operationalize climate action.⁶² Under this umbrella, the international and scientific institutions worked together and engaged the research community in understanding and

communicating the role of increasing greenhouse gas concentrations in the atmosphere on global warming. In the process, they applied the sequence that had worked so well for ozone: conference, call for action, legal instrument, and/or institutions.

In October 1985, UNEP, WMO, and ICSU convened the Villach Conference for an assessment of the role of greenhouse gases on climate change. The conference produced a highly influential statement noting the risk of global warming in the first half of the twenty-first century, calling on the three institutions to carry out periodic assessments of the state of scientific understanding and its practical implications, and to begin the development of a global convention.⁶³ As a result, in 1988, UNEP and WMO initiated the creation of the Intergovernmental Panel on Climate Change (IPCC) to provide policymakers with regular assessments of the scientific basis of climate change, its impacts and future risks, and response strategies for mitigation and adaptation. It was at this point that discussions about a global climate convention began. More than 300 scientists and policymakers gathered at the World Conference on the Changing Atmosphere: Implications for Global Security, held in 1988 in Toronto, Canada. The Toronto Conference Statement called upon governments, the United Nations and its specialized agencies, industry, educational institutions, NGOs, and individuals “to take specific actions to reduce the impending crisis caused by the pollution of the atmosphere.”⁶⁴ It also advocated support for the proposed IPCC and for the development of a comprehensive global framework convention on climate change.⁶⁵ UNFCCC would be signed several years later, in 1992 at the Rio Earth Summit.

UNEP—in collaboration with WMO and the scientific community—was instrumental and highly influential in the creation of the international climate regime. It collaborated effectively with agencies in the UN system to raise awareness about the risks of climate change and linked it to health, agriculture, food security, and natural disasters. For example, the findings of a 1996 study on climate and health that UNEP, WHO, and WMO conducted established that climate change would affect the health of a large number of people across the world. The study warned of a multitude of new and reemergent diseases, including a resurgence of infectious diseases such as malaria.⁶⁶ With strong scientific evidence and active political pressure, countries came to a strategic judgment that the

climate issue was important and that it was much bigger than the classic pollution issues. Governments, however, also began to move climate out of UNEP's orbit.

Michael Zammit Cutajar noted that "governments were not looking for a secretariat that would lead the negotiations, headed by a strong, assertive leader, as had been the case with earlier convention negotiations under UNEP auspices."⁶⁷ The driver for moving climate into UN central as opposed to UNEP, he argued, was also the fact that some governments—initially Brazil and Mexico—having analyzed the first assessment of the IPCC, concluded that climate change was a serious economic issue, much more important than the classic pollution issues, and their political judgment was that it was central to economic strategy. Such governments, therefore, had to keep the issue under their own control, and began taking the negotiations out of UNEP.

Even so, currently climate change shapes much of UNEP's substantive work, and one of its seven subprograms is on climate change. The two large divisions—economy and ecosystems—each have full-fledged programs on climate change. About half of the work for the ecosystems division is on climate change, as is about a quarter of the economy division's. UNEP also hosts the secretariat of the Green Climate Fund with over \$40 million in project funds. Climate change is thus bigger than all the other subprograms.⁶⁸ Some of UNEP's achievements in climate-change mitigation include the launch of the UN Secretary-General's global initiative Sustainable Energy for All, which UNEP helped to shape, and the creation of the UNFCCC Climate Technology Centre and Network, which UNEP hosts collaboratively with UNIDO.

Ultimately, UNEP's key goal is a transition to low carbon, resource-efficient, equitable, sustainable development. This broad goal, an internal evaluation states, "doesn't pin down the changes UNEP hopes to contribute to in the longer term in terms of impact on the environment and human well-being," but it provides a clear vision for the trajectory of the organization's work.⁶⁹ UNEP's assessment work is instrumental in moving toward this goal, including the influential black carbon assessment, emissions gap report, and the assessment of short-lived climate pollutants, among others.⁷⁰ Climate, however, is an overarching concern and has a strong convention secretariat in Bonn, where powerful executive

secretaries have carved out discrete institutional space. “The distance from New York allowed the UNFCCC secretariat to develop its own corporate culture,” remarked Christiana Figueres, Executive Secretary from 2010 to 2016.⁷¹ The climate convention engages actively with stakeholders, and its annual conferences of the parties held around the world have become convening platforms for individuals and institutions, not just bully pulpits for governments. Climate change has indeed mobilized an engaged global constituency of activists.

The youth movement Fridays for Future, the international movement Extinction Rebellion, and Fire Drill Fridays, led by Jane Fonda in Washington, DC, starkly illustrate the power of civil society in climate activism. During COP25 in Madrid, Spain, in December 2019, half a million people participated in a climate strike led by Greta Thunberg. Climate activists protested and urged ambitious action from industrialized states, and over three hundred people were banned from the venue.⁷² By not allowing activists in the plenary, member states rolled back the slim progress the UN had made over the last years in engaging civil society.

BIODIVERSITY

Biological diversity is being depleted and degraded faster than ever before in human history. Much like with climate change, “humans are the main culprit in biodiversity loss.”⁷³ Conservation of wildlife was one of the central topics of the Stockholm Conference in 1972, and biodiversity was a priority for UNEP from the outset. An international legal regime for biodiversity, however, was already in existence and comprised a range of long-standing legal instruments and institutions. One of the first biodiversity treaties, the Convention for the Regulation of Whaling, was signed in 1946. The Ramsar Convention on International Wetlands and the World Heritage Convention were adopted in 1971 and 1972, respectively, and are administered by the International Union for the Conservation of Nature and by UNESCO. Two other conventions followed—the Convention on the International Trade in Endangered Species of Wild Fauna and Flora (CITES) in 1973 and the Convention on the Conservation of Migratory Species (CMS) in 1979—and UNEP assumed their administration.

UNEP became a key player in international biodiversity research and conservation.⁷⁴ It served as a convening agency of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), the intergovernmental body which, in response to requests from decision makers, assesses the state of biodiversity and of the ecosystem services it provides to society. IPBES seeks to harness expertise across scientific disciplines and knowledge communities, provide relevant and timely knowledge to decision makers, and facilitate implementation of policies. In 2019, its first *Global Assessment Report on Biodiversity and Ecosystem Services*, prepared by 145 leading experts from fifty countries, stated unequivocally that one million species are at risk of extinction. The unraveling of the planetary web of life threatens the survival of humanity. Tom Lovejoy, the conservation biologist known as “the Godfather of Biodiversity,” warns that “we now sit at the fail-safe point and must decide what to do.”⁷⁵ The assessment articulates the challenges and urges action to ensure a viable future for humanity and the rest of the species on earth. But former Director General of IUCN Julia Marton-Lefèvre argues that there is hardly a need for two separate intergovernmental panels on biodiversity and climate change. “Healthy ecosystems have a huge role in both adaptation and mitigation. And so why do we need to address this in two different ways, in two different places on the planet? In 1992 many of us said at least put them in the same city, so they could help each other.”⁷⁶ The institutional landscape for biodiversity itself is complex, with about a dozen conventions and protocols, many focused on different species and ecosystems. In 1989, governments requested that UNEP lead negotiations for a new legal instrument, a framework convention with the purpose of rationalizing existing activities in the rather crowded institutional landscape for biodiversity.⁷⁷

From the early stages of the negotiation process for the Convention on Biological Diversity (CBD), UNEP faced several challenges. Some came from UN agencies, others from member states. During the initial rounds of negotiations, FAO was “reluctant to shed parts of its turf”⁷⁸ and share authority. It was concerned that CBD would interfere with its newly established International Undertaking on Plant Genetic Resources.⁷⁹ The other conservation conventions also valued their independence and were

not enthusiastic about a framework convention. In addition to feelings of mistrust, the negotiations for the CBD were fraught with vagueness and political strife. Unlike with ozone or climate change, a strong body of scientific evidence was lacking for the protection of species, which was part of the difficulty the biodiversity convention had in capturing the attention of the world community. Climate change was an issue with a long tradition of scientific research which connected to the public. Biodiversity was not. As Professor Calestous Juma remarked, "CBD was really negotiated purely as a consolidation of existing instruments, and so it was more of an administrative convention as opposed to being a substantive convention. Even when I was in CBD," Juma recalled, "and I knew it was driven by lawyers rather than scientists, I never thought of the consequences." An important issue, he noted, was the difficulty of having a discussion on technology in the CBD. While the climate convention endorsed the role of emerging renewable energy technologies as a solution, "CBD became hostile to biotechnology by negotiating the biosafety protocol to regulate GMOs, and anyone who had any idea about how technology could be used in conservation just never went to the CBD."⁸⁰

Biodiversity negotiations were strenuous and divergent because of the persistent conflict between developing and developed countries. The natural resource endowments of the Global South generally outweigh those of the North, and attempts to regulate them echoed the debates about environment and development that had happened in the buildup to the Stockholm Conference. Developed countries saw biodiversity as a common heritage, while developing countries perceived it as an attempt to implement nature conservation outside developed countries' own territory. Developing countries sought to protect their sovereignty over the biological resources within their borders; to provide settlements, food, transport, and raw materials for their people; and to receive a fair share of the benefits from the use of genetic resources. They also wanted developed countries to limit demand for resources and to help finance biodiversity protection in the South.⁸¹ Over time, these divides seemed insurmountable, and "the Convention's detractors dismiss[ed] it as a prisoner of its own politics rather than being based on sound science."⁸² The signing and ratification of the CBD, therefore, was another environmental achievement against long odds.

The tensions between the Global North and South were real, however, and extended into the CBD's implementation phase. For example, UNEP had launched the *Global Biodiversity Assessment* in 1993 and completed it in 1995 when results were presented at a meeting of the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) to the biodiversity convention. Some delegates declared the assessment illegitimate, however. As one of the national delegates put it "we didn't ask for it, we don't want it, and if it is produced we won't use it!"⁸³ The assessment was science-driven, engaging more than 1,550 scientists across the world, and confirmed that "biodiversity is especially important to provide resilience to ecosystems, enabling them to adapt to changing conditions."⁸⁴

Given these enduring political tensions, the biodiversity regime has faced structural challenges and has become highly fragmented.⁸⁵ There are tensions within the scientific community, as Ehsan Masood explained in *Nature*. "The world of biodiversity research is like an extended family that has split into feuding factions. Scientists from less-prosperous southern countries have squared off against colleagues from the wealthier north, and researchers from more empirical disciplines are arguing with those from humanities and the social sciences."⁸⁶ Even UNEP, a driving force behind IPBES, also runs a somewhat competing study on The Economics of Ecosystems and Biodiversity (TEEB).

UNEP has undertaken efforts aimed at enhancing coherence and coordination and has initiated a process of harmonizing reporting requirements for the five biodiversity-related conventions—the Convention on Biological Diversity, CITES, the Convention on Migratory Species, the Ramsar Convention on Wetlands, and the World Heritage Convention—and the two regional seas conventions with biodiversity-related protocols—the Barcelona and Cartagena Conventions.⁸⁷ While a common website and a biodiversity clearinghouse mechanism have been established, there has been little substantive progress toward the practical implementation of a common reporting framework.⁸⁸ The various conventions have different institutional homes, making synergies difficult to achieve. UNEP also recently launched initiatives to identify options that enhance synergies among biodiversity conventions toward the implementation of the Sustainable Development Goals, though that effort is too nascent to assess.⁸⁹

FORESTS

Deforestation emerged as an important concern in the mid-1970s, when scientific assessments pointed to a pressing problem. In 1979, the US Department of State held an international conference on tropical forests, and in 1980 UNEP organized an expert meeting on the topic.⁹⁰ A decade later, in 1990, the United States proposed the negotiation of a global forest convention, and UNEP received a mandate to lead this process for developing new international environmental law. Despite prolonged negotiations on a legal instrument, however, no international convention for forests could be established because of the deep divide between the Global North and South. Like biological resources more generally, most forests are located in the Global South, and developing countries have been protective of their sovereignty and their development agendas.⁹¹ In addition, deforestation is driven by a growing demand for timber from industrialized countries, making the negotiations politically combustible.

As a result, in 1992, governments negotiated and adopted non-binding Forest Principles rather than a forest convention, yet left a window open for a binding agreement at a later stage.⁹² To date, multiple attempts to bring this question back onto the agenda have not succeeded, and the forest-related institutional framework remains divided and contested.⁹³ With a relatively modest work program on forests, UNEP plays a catalytic role and has to undertake activities in partnership with a number of other organizations, including UNDP, FAO, UNESCO, the World Bank, and other development banks.⁹⁴ UNEP is also part of the UN's Inter-Agency Task Force on Forests, where it plays a leading role and, jointly with UNDP and FAO, established the UN Collaborative Program on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (UN-REDD). In 2000, UNEP produced a scientific assessment to again underscore the importance of deforestation and in 2008 facilitated the creation of the governance structure of the Congo Basin Forest Fund to mobilize resources to support the equitable and sustainable use, conservation, and management of Congo Basin forests and ecosystems. Professor Wangari Maathai of Kenya co-chaired the Fund, along with Canadian Prime Minister Paul Martin. Despite its relevant work in the global forest regime, however, UNEP never became the driver or center of gravity in this space.⁹⁵

UNEP engages in activities across a range of environmental concerns, but it acts as one among many institutions. What is missing in global environmental governance is the space for all institutions to come and piece together the larger puzzle. UNEP's governing body, the universal UN Environment Assembly, could possibly provide such an opportunity, as chapter 7 explains.

CONCLUSION

Ultimately, UNEP is a small organization with a large mandate and an expectation that it will address global environmental problems. Resolving the depletion of the ozone layer is perhaps UNEP's most successful achievement. The institution effectively deployed all of its functions—scientific assessment, policy development, and coordination of actions across the UN system and across governments—and its leadership committed fully to addressing this global problem. It developed the capacity—human, institutional, and financial—connected to the relevant constituencies, and gained authority as it delivered a solution. Over the years, UNEP identified a range of other environmental problems, developed scientific knowledge about them, informed and developed policy, and prompted governments to act upon assessments by creating international environmental law. It set in place scientifically rigorous systems for environmental assessments, raised awareness, created legal regimes, and developed policy instruments. Indeed, because of its work, governments created a range of multilateral environmental agreements and a range of new institutions.

In the first two decades, commanding leadership by Executive Director Mostafa Tolba elevated UNEP's authority. Inevitably, however, the commanding style alienated some governments. Desertification, biodiversity, forests, and climate change were all concerns that UNEP had been working on for years before the 1992 Rio Earth Summit. It had engaged scientists, raised awareness, and appealed to enlightened self-interest and the common public good. It had produced studies and reports, convened conferences, created networks, and harnessed public opinion. However, serious commitment to action remained hamstrung by tensions between the priorities and expectations of industrialized and developing countries.

Developed countries promised financing but did not deliver, and developing countries had difficulty utilizing resources effectively. Fundamental difficulties arose in conceptualizing and operationalizing economic, political, and social models that could maintain essential ecological processes and life support systems in the face of excessive exploitation to satisfy growing consumption needs. As environmental problems grew ever more complex and global, and as the geopolitical reality shifted toward heightened tensions and increased conflict, UNEP found it challenging to exhibit the requisite authority.

Rapid worldwide expansion of economic activity relying on extraction of natural resources, destruction of habitats, and growing consumption was a major cause of environmental decline. “Yet,” Gus Speth warned, “the world economy, now increasingly integrated and globalized, is poised for unprecedented growth” that would prove damaging to the natural capital upon which all life on Earth depends.⁹⁶ With the dichotomy between economic growth and environmental protection deeply lodged in the outlook of individuals and governments worldwide, UNEP has been close to powerless to change behavior considerably, and its achievements have been hard-won.

The geographic dispersion of the convention secretariats has taxed UNEP’s ability to administer, manage, and coordinate. Meanwhile, the emergence of sustainable development as the new paradigm that subsumed environment affected UNEP’s standing and authority. “The flourishing of new international institutions,” UN Secretary-General Kofi Annan noted in 1998, “pose[d] problems of coordination, eroding responsibilities and resulting in duplication of work as well as increased demand upon ministries and government.”⁹⁷ Without the ease of communication—in person and virtually—that is necessary to connect with organizations, governments, groups, and individuals, collaboration has been difficult. Connectivity requires functional and affordable infrastructure. Communication also hinges on leadership and the skills to convey a message in a relevant, relatable manner. The next two chapters turn to the impacts of location and leadership.