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Promotion and protection of all human rights, civil, political, economic, social and cultural rights, including the right to development

The right to a clean, healthy and sustainable environment: non-toxic environment

Report of the Special Rapporteur on the issue of human rights obligations relating to the enjoyment of a safe, clean, healthy and sustainable environment

Summary

In the present report, the Special Rapporteur on the issue of human rights obligations relating to the enjoyment of a safe, clean, healthy and sustainable environment, David R. Boyd – with the collaboration of the Special Rapporteur on the implications for human rights of the environmentally sound management and disposal of hazardous substances and wastes, Marcos Orellana – identifies a non-toxic environment as one of the substantive elements of the right to a safe, clean, healthy and sustainable environment. The Special Rapporteur describes the ongoing toxification of people and the planet, which is causing environmental injustices and creating “sacrifice zones”, extremely contaminated areas where vulnerable and marginalized groups bear a disproportionate burden of the health, human rights and environmental consequences of exposure to pollution and hazardous substances. The Special Rapporteur highlights State obligations, business responsibilities and good practices related to ensuring a non-toxic environment by preventing pollution, eliminating the use of toxic substances and rehabilitating contaminated sites.

I. Introduction

1. On 8 October 2021, marking a turning point in the evolution of human rights, the Human Rights Council adopted an historic resolution recognizing, for the first time at the global level, the human right to a clean, healthy and sustainable environment (resolution 48/13). While this right is already recognized in law by more than 80 per cent of States Members of the United Nations,¹ the new resolution should be a catalyst for universal recognition in constitutions, legislation and regional human rights treaties, as well as for accelerated action to address the global environmental crisis.

2. As highlighted in the present report, the world is plagued by unconscionable environmental injustices, including “sacrifice zones”, where communities are exposed to extreme levels of pollution and toxic contamination. As stated by a resident of Quintero-Puchuncaví sacrifice zone in Chile: “They are giving us a bad life, every day they are sacrificing us, killing us slowly with cancer, with illness, and so on.” Urgent clean-up actions are required to protect people’s health and human rights in these extraordinarily hazardous places. Employing rights-based approaches to detoxify people’s bodies and the planet will require systemic and transformative changes to environmental law. States and businesses must vigorously pursue zero pollution and the elimination of toxic substances, rather than merely trying to minimize, reduce and mitigate exposure to these hazards. Prevention, precaution and non-discrimination must be the paramount principles in environmental policymaking.

3. The present report on the right to a non-toxic environment in which people can safely live, work, study and play is the sixth in a series of thematic reports addressing the substantive elements of the right to a safe, clean, healthy and sustainable environment, including clean air,² a safe climate,³ healthy ecosystems and biodiversity,⁴ safe and sufficient water⁵ and healthy and sustainable food.⁶

4. The present report was developed in collaboration with the Special Rapporteur on the implications for human rights of the environmentally sound management and disposal of hazardous substances and wastes. A call for input was circulated in January 2021. Submissions were received from Argentina, Austria, Azerbaijan, Brazil, Cambodia, Chile, Costa Rica, Côte d’Ivoire, El Salvador, Finland, Greece, Guatemala, Malta, the Marshall Islands, Mauritius, Mexico, Montenegro, the Niger, Poland, Qatar, Singapore, Switzerland and Togo, and from youth, Indigenous peoples, students, academics, civil society and human rights institutions.⁷

II. Pervasive pollution and toxic contamination of people and the planet

5. While the climate emergency, the global biodiversity crisis and the coronavirus disease (COVID-19) pandemic garner headlines, the devastating toll inflicted upon health, human rights and ecosystem integrity by pollution and hazardous substances continues to be largely overlooked. Yet pollution and toxic substances cause at least 9 million premature deaths, double the number of deaths inflicted by the COVID-19 pandemic during its first 18 months. One in six deaths in the world involves diseases caused by pollution, three times more than deaths from AIDS, malaria and tuberculosis combined and 15 times more than from all wars, murders and other forms of violence.⁸ Air pollution is the largest

¹ A/HRC/43/53, para. 13.

² A/HRC/40/55.

³ A/74/161.

⁴ A/75/161.

⁵ A/HRC/46/28.

⁶ A/76/179.

⁷ See <https://www.ohchr.org/EN/Issues/Environment/SREnvironment/Pages/ToxicFree.aspx>.

⁸ See Philip J. Landrigan and others, “The *Lancet* Commission on pollution and health”, *The Lancet*, vol. 391, No. 10119 (February 2018).

environmental contributor to premature deaths, causing an estimated 7 million annually.⁹ Low- and middle-income countries bear the brunt of pollution-related illnesses, with nearly 92 per cent of pollution-related deaths.¹⁰ Over 750,000 workers die annually because of exposure to toxic substances on the job, including particulate matter, asbestos, arsenic and diesel exhaust.¹¹

6. The toxification of planet Earth is intensifying. While a few toxic substances have been banned or are being phased out, the overall production, use and disposal of hazardous chemicals continues to increase rapidly. Hundreds of millions of tons of toxic substances are released into air, water and soil annually. Production of chemicals doubled between 2000 and 2017, and is expected to double again by 2030 and triple by 2050, with the majority of growth in non-members of the Organisation for Economic Co-operation and Development (OECD).¹² According to the United Nations Environment Programme (UNEP), the result of this growth will be increased exposure and worsening health and environmental impacts unless ambitious, urgent and worldwide collaborative action is taken by all stakeholders and in all countries.¹³

7. The world is struggling to address both old and new chemical threats. For example, lead is still widely used despite long-standing knowledge regarding its toxicity and devastating consequences for the neurological development of children. Lead causes close to 1 million deaths annually, as well as immense and irreversible damage to the health of millions of children.

8. Emerging issues of concern include per- and polyfluoroalkyl substances, endocrine disruptors, microplastics, neonicotinoid pesticides, polycyclic aromatic hydrocarbons, pharmaceutical residues and nanoparticles. Per- and polyfluoroalkyl substances are a group of thousands of chemicals widely used in industrial and consumer applications, such as firefighting foams and water- and grease-repellent coatings for textiles, paper and cookware. Known as “forever chemicals” owing to their persistence in the environment, they are also toxic and bioaccumulative, building up in the tissue of living organisms and increasing in concentration higher in the food chain. Virtually everyone in industrialized nations has per- and polyfluoroalkyl substances in their body. Exposure is linked to liver damage, hypertension, decreased immune response, decreased fertility, lower birth weight, and testicular and kidney cancer. In the European Union, the health-related costs of per- and polyfluoroalkyl substances range from 52 billion to 84 billion euros annually, while treatment and remediation costs for contaminated water and soil range from 10 billion to 170 billion euros.¹⁴

9. The extraction, processing, distribution and combustion of fossil fuels – coal, oil and natural gas – produces prodigious volumes of pollution and toxic chemicals. Fossil fuels are also the primary feedstock for the heavily polluting petrochemical and plastic industries. Industrial agriculture contaminates air, water, soil and the food chain with hazardous pesticides, herbicides, synthetic fertilizers and drugs.¹⁵ Other industries that produce immense volumes of pollution and toxic substances are mining and smelting, manufacturing, textiles, construction and transportation. Unsafe waste management, including dumping, open burning and informal processing of electronic waste, lead-acid batteries and plastic, exposes hundreds of millions of people in the global South to chemical cocktails, including brominated flame retardants, phthalates, dioxins, heavy metals, polycyclic aromatic hydrocarbons and bisphenol A.

⁹ Ibid., and https://www.who.int/health-topics/air-pollution#tab=tab_1.

¹⁰ Ibid., and [UNEP/EA.4/3](#).

¹¹ See <https://www.who.int/publications/i/item/9789240034945>.

¹² See United Nations Environment Programme (UNEP), *Global Chemicals Outlook II: From Legacies to Innovative Solutions – Implementing the 2030 Agenda for Sustainable Development* (Nairobi, 2019).

¹³ Ibid.

¹⁴ See Nordic Council of Ministers, *The Cost of Inaction: A Socioeconomic Analysis of Environmental and Health Impacts Linked to Exposure to PFAS* (Copenhagen, 2019).

¹⁵ See [A/76/179](#).

10. Chemical accidents can have a catastrophic impact on health human rights and the environment. A well-known example is the exposure in 1984 of more than half a million people in Bhopal, India, to methyl isocyanate gas released from a Union Carbide pesticide plant, causing thousands of deaths. Accidents at mining sites also cause massive releases of toxic substances, illustrated by the collapse of tailings ponds at Mariana and Brumadinho in Brazil (2015 and 2019 respectively) and the Baia Mare disaster in Romania (2000). Explosions of warehouses containing toxic substances have taken on greater prominence in the aftermath of the catastrophes in Beirut (2020) and Tianjin, China (2015).

11. Toxic contaminants are ubiquitous today, from the highest Himalayan peaks to the depths of the Mariana Trench. Humans are exposed to toxic substances through breathing, eating and drinking, through skin contact and via the umbilical cord to the unborn child. Biomonitoring studies reveal pesticide residues, phthalates, flame retardants, per- and polyfluoroalkyl substances, heavy metals and microplastics in our bodies. Toxic substances can even be found in newborn infants.¹⁶

12. Exposure to toxic substances raises the risks of premature death, acute poisoning, cancer, heart disease, stroke, respiratory illnesses, adverse effects on the immune, endocrine and reproductive systems, birth defects and lifelong negative impacts on neurological development. One quarter of the total global burden of disease is attributed to preventable environmental risk factors, the overwhelming majority of which involve exposure to pollution and toxic substances.¹⁷

13. It is important to highlight the connections between toxic substances and the other two aspects of the world's triple environmental crisis (the climate emergency and the decline in biodiversity). The chemical industry exacerbates the climate emergency by consuming more than 10 per cent of fossil fuels produced globally and emitting an estimated 3.3 billion tons of greenhouse gas emissions annually. Global warming contributes to the release and remobilization of hazardous pollutants from melting glaciers and thawing permafrost.¹⁸ Pollution and toxic substances are also one of the five main drivers of the catastrophic decline in biodiversity, with particularly negative impacts on pollinators, insects, freshwater and marine ecosystems (including coral reefs) and bird populations.¹⁹

14. At the World Summit on Sustainable Development in 2002, States committed to minimizing the adverse effects of chemicals and waste on human health and the environment by 2020. This pledge informed the overall objective of the Strategic Approach to International Chemicals Management, adopted in 2006. However, the goal was clearly not fulfilled.²⁰ The post-2020 framework for chemicals and waste offers an opportunity to rethink the global goal, since the goal of minimizing adverse effects implies that people will continue to be harmed by exposure to pollution, toxic chemicals and waste. Instead, the right to a non-toxic environment requires a focus on preventing exposure to pollution and toxic substances.

15. An extensive body of international law addresses pollution and toxic substances, including the following instruments:

- (a) Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter;
- (b) International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto;
- (c) Montreal Protocol on Substances that Deplete the Ozone Layer;

¹⁶ See [A/HRC/33/41](#).

¹⁷ See Annette Prüss-Ustün and others, *Preventing Disease through Healthy Environments: A Global Assessment of the Burden of Disease from Environmental Risks* (Geneva, World Health Organization, 2016).

¹⁸ See UNEP, *Global Chemicals Outlook II*.

¹⁹ See Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, *Global Assessment Report on Biodiversity and Ecosystem Services: Summary for Policymakers* (Bonn, 2019).

²⁰ See UNEP, *Global Chemicals Outlook II*.

- (d) Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal;
- (e) International Labour Organization (ILO) Chemicals Convention, 1990 (No. 170);
- (f) ILO Prevention of Major Industrial Accidents Convention, 1993 (No. 174);
- (g) Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade;
- (h) Stockholm Convention on Persistent Organic Pollutants;
- (i) International Health Regulations (2005);
- (j) Minamata Convention on Mercury.

16. Several voluntary instruments adopted by international organizations also address pollution and toxic chemicals. Prominent examples include the World Health Organization (WHO) air quality guidelines, the International Code of Conduct on Pesticide Management and the Globally Harmonized System of Classification and Labelling of Chemicals.

17. The effectiveness of these instruments is undermined by many major gaps and weaknesses, including the fact that none of them mention human rights, the vast majority of toxic substances are not controlled and few nations are fulfilling all of their obligations. For example, OECD estimates that between 20,000 and 100,000 existing chemicals have not been adequately assessed to determine their risks because of information gaps.²¹ Fewer than half of States have implemented the Globally Harmonized System of Classification and Labelling of Chemicals and fewer than half compile and publish data on pollutant releases and transfers. Many parties to the Basel, Rotterdam and Stockholm Conventions are not fulfilling their reporting obligations.²²

18. While most nations have laws and policies intended to protect human and ecosystem health from toxic substances the focus is on reduction, not elimination. Many gaps remain, and institutions often lack the expertise and resources to carry out their duties. Laws, policies, implementation and enforcement are highly inconsistent across the world. Permitted levels of sulfur in diesel fuel range from fewer than 10 parts per million in some high-income States to more than 10,000 parts per million in some low-income States, meaning that fuel can be 1,000 times dirtier in the latter. Most countries still lack legally binding limits for lead in paints, yet where limits do exist, they range from 90 to 20,000 parts per million.²³

19. Preventing exposure to toxic substances is vital to fulfilling many of the Sustainable Development Goals, including those related to health (Goal 3), clean water (Goal 6) and sustainable consumption and production (Goal 12). Key targets include target 3.9, on substantially reducing the number of deaths and illnesses from hazardous chemicals and pollution; target 6.3, on improving water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals; and target 12.4, on achieving the environmentally sound management of chemicals and all wastes throughout their life cycle and significantly reducing their release to air, water and soil. Effectively managing chemicals and waste is necessary for many other Goals, including those related to biodiversity, climate action and clean energy.

20. Overall, while progress has been made in certain areas, the goal of protecting all humans and ecosystems from the adverse effects of chemicals has not been achieved.²⁴ States are not on track to achieve the above-noted Sustainable Development Goals. The costs associated with pollution and toxic chemicals are trillions of dollars annually.

²¹ Ibid.

²² Ibid.

²³ See UNEP, "Update on the global status of legal limits on lead in paint", September 2019.

²⁴ See UNEP, *Global Chemicals Outlook II*.

III. Environmental injustices and sacrifice zones

A. Environmental injustices

21. While all humans are exposed to pollution and toxic chemicals, there is compelling evidence that the burden of contamination falls disproportionately upon the shoulders of individuals, groups and communities that are already enduring poverty, discrimination and systemic marginalization. Women, children, minorities, migrants, Indigenous peoples, older persons and persons with disabilities are potentially vulnerable, for a variety of economic, social, cultural and biological reasons. Workers, especially in low- and middle-income nations, are at risk because of elevated exposures on the job, poor working conditions, limited knowledge about chemical risks and lack of access to health care. Millions of children are employed in potentially hazardous sectors including agriculture, mining and tanning. Low-income housing may contain asbestos, lead, formaldehyde and other toxic substances.

22. The disturbing phenomenon of poor and marginalized communities being more heavily affected by pollution is a form of environmental injustice. Environmental injustices related to pollution and the production, export, use and disposal of toxic substances are rooted in racism, discrimination, colonialism, patriarchy, impunity and political systems that systematically ignore human rights.²⁵

23. Contaminated sites are usually found in disadvantaged communities. It is estimated that there are 2.8 million contaminated sites in Europe,²⁶ while the United States of America has identified more than 1,000 national priority sites for remediation, out of hundreds of thousands of contaminated sites. In low- and middle-income countries, new contaminated sites are being created through industrialization (for example, coal-fired power plants) and extractivism (for example, artisanal and small-scale gold mining). In many States, clean-up and remediation are delayed by a lack of available funds.

24. Many environmental injustices are transnational, with consumption in wealthy States resulting in severe impacts on health, ecosystems and human rights in other States. High-income States continue to irresponsibly export hazardous materials such as pesticides,²⁷ plastic waste,²⁸ electronic waste, used oil and derelict vehicles, along with the associated health and environmental risks, to low- and middle-income countries, taking advantage of the fact that these countries often have weaker regulations and limited enforcement.²⁹ Businesses in the European Union planned to export more than 81 thousand tons of banned pesticides in 2018.³⁰ Approximately 80 per cent of shipbreaking occurs on the beaches of Bangladesh, India and Pakistan, exposing unprotected workers to toxic chemicals.³¹ In some countries, up to 95 per cent of electronic waste is processed informally by untrained workers lacking appropriate equipment, resulting in significant releases of heavy metals, polychlorinated biphenyls, brominated flame retardants, polycyclic aromatic hydrocarbons and dioxins.³²

25. Poor, vulnerable and marginalized communities are less likely to enjoy access to environmental information, to participate in decision-making related to the environment or to have access to justice and effective remedies when their rights are jeopardized or violated by pollution and toxic chemicals. While the Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters (Aarhus Convention) and the Regional Agreement on Access to Information, Public Participation and Justice in Environmental Matters in Latin America and the Caribbean (Escazú Agreement)

²⁵ See [A/75/290](#).

²⁶ See European Court of Auditors, *The Polluter Pays Principle: Inconsistent Application across EU Environmental Policies and Actions* (Luxembourg, 2021).

²⁷ See [A/HRC/34/48](#).

²⁸ See [A/76/207](#).

²⁹ Submissions by Costa Rica and Cote d'Ivoire.

³⁰ See Swagata Sarkar and others, *The Use of Pesticides in Developing Countries and Their Impact on Health and the Right to Food* (Brussels, European Union, 2021).

³¹ See [A/HRC/12/26](#).

³² See UNEP, *Global Chemicals Outlook II*.

focus on rectifying these injustices and ensuring that everyone enjoys their right to a clean, healthy and sustainable environment, fewer than 60 States are parties to these treaties and implementation challenges are ongoing.

B. Sacrifice zones

26. Some communities suffer from environmental injustices whereby the exposure to pollution and toxic substances is so extreme in the areas in which they live that they are described as “sacrifice zones”.³³ The phrase originated in the cold war era, when it was used to describe areas rendered uninhabitable by nuclear experiments, conducted by the United States, the Soviet Union, France and the United Kingdom of Great Britain and Northern Ireland, that caused high and lasting levels of radiation.

27. Today, a sacrifice zone can be understood to be a place where residents suffer devastating physical and mental health consequences and human rights violations as a result of living in pollution hotspots and heavily contaminated areas. The climate crisis is creating a new category of sacrifice zones as a result of unabated greenhouse gas emissions, as communities have become, and are becoming, uninhabitable because of extreme weather events or slow-onset disasters, including drought and rising sea levels.

28. The most heavily polluting and hazardous facilities, including open-pit mines, smelters, petroleum refineries, chemical plants, coal-fired power stations, oil- and gas fields, steel plants, garbage dumps and hazardous waste incinerators, as well as clusters of these facilities, tend to be located in close proximity to poor and marginalized communities. Health, quality of life and a wide range of human rights are compromised, ostensibly for “growth”, “progress” or “development” but in reality to serve private interests. Shareholders in polluting companies benefit from higher profits, while consumers benefit through lower-cost energy and goods. Prolonging the jobs of workers in polluting industries is used as a form of economic blackmail to delay the transition to a sustainable future, while the potential of green jobs is unjustifiably discounted.

29. The continued existence of sacrifice zones is a stain upon the collective conscience of humanity. Often created through the collusion of Governments and businesses, sacrifice zones are the diametric opposite of sustainable development, harming the interests of present and future generations. The people who inhabit sacrifice zones are exploited, traumatized and stigmatized. They are treated as disposable, their voices ignored, their presence excluded from decision-making processes and their dignity and human rights trampled upon. Sacrifice zones exist in States rich and poor, North and South, as described in the examples below. Descriptions of additional sacrifice zones are contained in annex I.³⁴

Africa

30. In Kabwe, Zambia, 95 per cent of children suffer from elevated blood lead levels caused by lead mining and smelting.³⁵ Experts described the situation as a severe environmental health crisis,³⁶ and Kabwe was named as one of the most polluted places on Earth. Exposure to lead during childhood impairs neurological development, causing lifelong cognitive deficits. Extremely high levels of exposure, such as those seen in Kabwe, can cause blindness, paralysis and death.

31. The people of the Niger Delta in Nigeria have lived with oil pollution and gas flaring for decades, resulting in extensive physical and mental health problems caused by

³³ See Steve Lerner, *Sacrifice Zones: The Front Lines of Toxic Chemical Exposure in the United States* (Cambridge, Massachusetts, MIT Press, 2010).

³⁴ The annexes will be made available at <https://www.ohchr.org/EN/Issues/Environment/SREnvironment/Pages/AnnualReports.aspx>.

³⁵ See Human Rights Watch, “*We Have to Be Worried*”: *The Impact of Lead Contamination on Children’s Rights in Kabwe, Zambia* (New York, 2019).

³⁶ Stephan Bose-O’Reilly and others, “Lead intoxicated children in Kabwe, Zambia”, *Environmental Research*, vol. 165, 2018, pp. 420–424.

contaminated air, water and food.³⁷ Adverse health effects of exposure to oil pollution include abnormalities in blood, liver, kidney, respiratory and brain functions, as well as asthma attacks, headaches, diarrhoea, dizziness, abdominal pain and back pain.³⁸ Average life expectancy for residents of the Niger Delta is only 40 years, compared to 55 years for Nigeria as a whole.³⁹

32. In 2006, thousands of people in Abidjan, Côte d'Ivoire, were harmed and 15 killed by the illegal dumping of toxic waste containing high levels of hydrogen sulfide offloaded from the vessel *Probo Koala*.⁴⁰ A review of the hospital records of more than 10,000 patients determined that the main impacts included respiratory problems (such as coughs and chest pains) and digestive symptoms (such as abdominal pain, diarrhoea and vomiting).⁴¹

Asia and the Pacific

33. Astronomical levels of air pollution have harmed the health of billions of people in Asia. The majority of the world's most polluted cities are in China and India. In New Delhi, thick smog provoked a weeks-long closure of all schools in November 2021, with levels of fine particulate matter (PM_{2.5}) 20 times higher than the maximum daily limit recommended by WHO.⁴²

34. China extracts the majority of the world's rare earth minerals, elements used in products including electric vehicles, wind turbines and mobile phones. These minerals are mined in Bayan Obo and processed in Baotou, a nearby city. Air quality is very poor, and toxic emissions cause a substantial lifetime risk of lung cancer for local residents, especially children.⁴³ Residents have elevated levels of rare earth minerals (lanthanum, cerium and neodymium) in their blood, urine and hair.⁴⁴ Elevated concentrations of heavy metals in dust and soil threaten people's health.⁴⁵

35. People in the Marshall Islands, in Kazakhstan, in Chernobyl, Ukraine, and in Fukushima, Japan,⁴⁶ continue to suffer the adverse effects of radiation from nuclear tests and disasters at nuclear reactors. Between 1946 and 1958, the United States tested more than 60 nuclear weapons on or near Bikini and Enewetak atolls in the Marshall Islands, resulting in elevated levels of cancer, birth defects and psychological trauma that continue to this day.⁴⁷ Marshallese women and girls suffer disproportionately from thyroid and other cancers and

³⁷ Jerome O. Nriagu, "Oil industry and the health of communities in the Niger Delta of Nigeria", in *Encyclopedia of Environmental Health*, Jerome O. Nriagu, ed. (Amsterdam, Elsevier B.V., 2011), pp. 240–250.

³⁸ Jerome O. Nriagu and others, "Health risks associated with oil pollution in the Niger Delta, Nigeria", *International Journal of Environmental Research and Public Health*, vol. 13, No. 3 (March 2016), art. No. 346.

³⁹ Orish Ebere Orisakwe, "Crude oil and public health issues in Niger Delta, Nigeria: much ado about the inevitable", *Environmental Research*, vol. 194, March 2021, art. no. 110725.

⁴⁰ See [A/HRC/12/26/Add.2](#).

⁴¹ Boko Kouassi and others, "Manifestations cliniques chez les sujets exposés à un accident toxique environnemental (Abidjan, Côte d'Ivoire 2006)", *Revue des Maladies Respiratoires*, vol. 32, No. 1 (January 2015), pp. 38–47.

⁴² See <https://www.aljazeera.com/news/2021/11/13/delhi-shuts-schools-as-government-considers-pollution-lockdown> and <https://www.theguardian.com/world/2021/nov/16/soaring-pollution-has-delhi-considering-full-weekend-lockdown>.

⁴³ Kexin Li and others, "Risk assessment of atmospheric heavy metals exposure in Baotou, a typical industrial city in northern China", *Environmental Geochemistry and Health*, vol. 38, No. 3 (June 2015), pp. 843–853.

⁴⁴ T.M. Bao and others, ["An investigation of lanthanum and other metals levels in blood, urine and hair among residents in the rare earth mining area of a city in China"] (article in Chinese; abstract available in English), *Zhonghua Lao Dong Wei Sheng Zhi Ye Bing Za Zhi*, vol. 36, No. 2 (February 2018), pp. 99–101.

⁴⁵ Xiufeng Han and others, "Health risks and contamination levels of heavy metals in dusts from parks and squares of an industrial city in semi-arid area of China", *International Journal of Environmental Research and Public Health*, vol. 14, No. 8 (August 2017), art. No. 886.

⁴⁶ [CEDAW/C/JPN/CO/7-8](#), paras. 36–37.

⁴⁷ Submission by the Marshall Islands.

from reproductive health problems.⁴⁸ The former Soviet Union conducted 456 nuclear testing explosions in the former Semipalatinsk region (now Semey, Kazakhstan). People in the region, living in poverty and not informed about the tests, were exposed to high levels of radiation, leading to large numbers of birth defects, elevated rates of cancer and extensive psychological trauma.⁴⁹

Eastern Europe

36. Bor, Serbia, is one of the most polluted European cities, largely because of a huge copper mining and smelting complex that emits massive amounts of sulfur dioxide, particulates, arsenic, lead, zinc and mercury.⁵⁰ UNEP described a devastating legacy of environmental problems, with sulfur dioxide concentrations occasionally exceeding the measuring range of monitoring equipment.⁵¹ The Borska Reka River is so contaminated with heavy metals that experts described it as without any trace of life.⁵² Metallurgical workers have high levels of arsenic in their hair and urine, with nearly 80 per cent suffering from an average of two chronic diseases.⁵³

37. Norilsk is among the most polluted cities in the Russian Federation, suffering very high levels of air pollution, acid rain, water pollution and soil contamination.⁵⁴ The main source of pollution is the mining and smelting company Norilsk Nickel, which caused a catastrophic diesel spill in 2020 affecting the Pyasina River. Very high levels of heavy metals have been found in fish, moss, soil and snow in the region.⁵⁵ The most adversely affected communities are Indigenous peoples from Taymyr, who face high rates of respiratory diseases, cancer, weakened immune system, premature births, reproductive failure, increased childhood morbidity and life expectancy 10 years below the national average.⁵⁶

38. Although the Pata Rât landfill in Cluj-Napoca, Romania, closed in 2015, thousands of marginalized Roma people still live in the area, regarded as one of the worst waste dumps in Europe. They lack access to safe drinking water, sanitation or decent housing, leading researchers to describe Pata Rât as a desolate scenario of dehumanization.⁵⁷ People are exposed to arsenic, benzene, cadmium, chromium, creosote, dioxins, hexane, hydrogen sulfide, lead, mercury, styrene and zinc. Residents report suffering from infections of the ears, eyes and skin, asthma, bronchitis, high blood pressure, cancer, and heart, liver and stomach ailments.⁵⁸

⁴⁸ CEDAW/C/MHL/CO/1-3, para. 8.

⁴⁹ “Four decades of nuclear testing: the legacy of Semipalatinsk”, editorial, *EClinicalMedicine*, vol. 13, August 2019, p. 1.

⁵⁰ Snežana M. Šerbula and others, “Extreme air pollution with contaminants originating from the mining–metallurgical processes”, *Science of the Total Environment*, vol. 586, May 2017, pp. 1066–1075.

⁵¹ UNEP, *From Conflict to Sustainable Development: Assessment of Environmental Hot Spots – Serbia and Montenegro*, (Nairobi, 2004), pp. 49–50.

⁵² Jovana Brankov, Dragana Milijašević and Ana Milanović Pešić, “The assessment of the surface water quality using the Water Pollution Index: a case study of the Timok River (Danube River Basin), Serbia”, *Archives of Environmental Protection*, vol. 38, No. 1 (January 2012), pp. 49–61.

⁵³ UNEP, “Municipality of Bor, Serbia-Montenegro: Local Environmental Action Plan – booklet (draft summary)”, March 2003.

⁵⁴ Alexander V. Kirilyanov and others, “Ecological and conceptual consequences of Arctic pollution”, *Ecology Letters*, vol. 23, No. 12 (September 2020), pp. 1827–1837.

⁵⁵ Alexander Zhulidov and others, “Long-term changes of heavy metal and sulphur concentrations in ecosystems of the Taymyr Peninsula (Russian Federation) north of the Norilsk industrial complex”, *Environmental Monitoring and Assessment*, vol. 181, Nos. 1–4 (January 2011), pp. 539–553.

⁵⁶ See Brian Walsh, “Urban wastelands: the world’s 10 most polluted places”, *Time*, 4 November 2013.

⁵⁷ Ruxandra Mălina Petrescu-Mag and others, “Environmental equity through negotiation: a case study on urban landfills and the Roma community”, *International Journal of Environmental Research and Public Health*, vol. 13, No. 6 (June 2016), art. No. 591.

⁵⁸ Jennifer L. Hall and Catherine Zeman, “Community-based participatory research with the Roma of Pata Rât, Romania: exploring toxic environmental health conditions”, *Journal of Ethnographic and Qualitative Research*, vol. 13, No. 2 (2018), pp. 92–106.

Latin America and the Caribbean

39. Quintero-Puchuncaví, the most notorious sacrifice zone in Chile, is home to the Ventanas industrial complex, comprising more than 15 industrial businesses (oil refineries, petrochemical facilities, coal-fired power plants, gas terminals and a copper smelter). In 2018, a major air pollution incident in Quintero-Puchuncaví made hundreds of schoolchildren ill. In the universal periodic review process, the United Nations country team recommended that Chile investigate the negative effects on the inhabitants of sacrifice zones, accelerate the implementation of remediation programmes and develop environmental quality standards in accordance with WHO international standards.⁵⁹ The Supreme Court of Chile concluded that the egregious air pollution in Quintero-Puchuncaví violated the right to a pollution-free environment and ordered the Government to take steps to address the problem.⁶⁰

40. In La Oroya, Peru, generations of children have been poisoned by a huge lead smelter. A shocking 99 per cent of children have levels of lead in their blood that exceed acceptable limits. Despite interventions by the Constitutional Court of Peru and the Inter-American Commission on Human Rights, levels of contamination in La Oroya remain hazardous. Also located in Peru, in Cerro de Pasco, is a massive open-pit mine adjacent to an impoverished community exposed to elevated levels of heavy metals. In 2018, the Government of Peru declared a state of emergency in Cerro de Pasco because of the pollution, but children in the region continue to suffer adverse health effects.⁶¹

41. Water and soil in Guadeloupe and Martinique, France, are contaminated by unsafe levels of the pesticide chlordecone. Although the manufacturing and use of this pesticide was banned in the 1970s in the United States, it continued to be used in the West Indies into the 1990s. Residents are still exposed to chlordecone through drinking water and the food that they grow because of the pesticide's persistence in the environment. Ninety per cent of people living in Guadeloupe and Martinique have been found to have chlordecone in their blood, raising their risk of cancer.⁶²

42. Garbage dumps in numerous Caribbean nations are regularly set on fire, despite the presence of plastics, used tyres and other items that generate extremely hazardous chemicals when burned. This practice creates massive, lingering clouds of toxic smoke that envelope neighbouring residents and jeopardize their health. Examples include the landfills at Parkietenbos in Aruba, (Netherlands), Riverton (Jamaica) and Truitier (Haiti). A major fire at the Riverton dump in Jamaica in 2015 led to 50 schools being closed and hundreds of persons hospitalized.

Western Europe and North America

43. One of the most notorious pollution hotspots in Canada – “Chemical Valley”, in Sarnia, Ontario – has disturbing health effects on the Aamjiwnaang First Nation. There are more than 40 large petrochemical, polymer, oil-refining and chemical facilities in close proximity to Aamjiwnaang, as well as a coal-fired power plant. This Indigenous community endures some of the worst air quality in Canada. Physical and psychological health problems are common, including high rates of miscarriages, childhood asthma, and cancer.⁶³

44. In the United States, cancer rates are far higher than the national average in predominantly Black communities such as Mossville, St. Gabriel, St. James Parish and St. John the Baptist Parish, located in Louisiana's “Cancer Alley”, which is home to more than 150 refineries and petrochemical plants, including the world's largest producer of

⁵⁹ A/HRC/WG.6/32/CHL/2, para. 16.

⁶⁰ *Francisco Chahuan contra Empresa Nacional de Petróleos, ENAP S.A.*, Case No. 5888-2019, Judgment, 28 May 2019.

⁶¹ Xulia Fandiño Piñeiro and others, “Heavy metal contamination in Peru: implications on children's health”, *Scientific Reports*, vol. 11, November 2021, art. No. 22729.

⁶² Luc Multigner and others, “Chlordecone exposure and adverse effects in French West Indies populations”, *Environmental Science and Pollution Research International*, vol. 23, No. 1 (January 2016), pp. 3–8.

⁶³ Deborah Davis Jackson, “Shelter in place: a First Nation community in Canada's Chemical Valley”, *Interdisciplinary Environmental Review*, vol. 11, No. 4 (January 2010), pp. 249–262.

Styrofoam.⁶⁴ Large polluting industrial facilities in the United States are disproportionately located in communities with the highest percentages of persons of African descent, the lowest household incomes and the highest proportion of residents who did not graduate from high school. A leading scholar wrote that, “[e]nabled by state zoning, a wave of chemical plants dropped on African American communities like a bomb”.⁶⁵ Cancer Alley contains 7 of the 10 United States census tracts with the highest risk of cancer from air pollution.⁶⁶ In 2020, air concentrations of cancer-causing chloroprene in St. John the Baptist Parish were 8,000 times higher than the acceptable level established by the United States Environmental Protection Agency.⁶⁷

45. The Ilva steel plant in Taranto, Italy, has compromised people’s health and violated human rights for decades by discharging vast volumes of toxic air pollution.⁶⁸ Nearby residents suffer from elevated levels of respiratory illnesses, heart disease, cancer, debilitating neurological ailments and premature mortality. Clean-up and remediation activities that were supposed to commence in 2012 have been delayed to 2023, with the Government introducing special legislative decrees allowing the plant to continue operating.⁶⁹ In 2019, the European Court of Human Rights concluded that environmental pollution was continuing, endangering the health of the applicants and, more generally, that of the entire population living in the areas at risk.⁷⁰

46. The foregoing examples of sacrifice zones represent some of the most polluted and hazardous places in the world, illustrating egregious human rights violations, particularly of poor, vulnerable and marginalized populations. Sacrifice zones represent the worst imaginable dereliction of a State’s obligation to respect, protect and fulfil the right to a clean, healthy and sustainable environment.

IV. Human rights obligations related to pervasive pollution and toxic substances

47. United Nations treaty bodies, regional courts, national courts, national human rights institutions and special procedure mandate holders have expressed concerns about the impacts of pollution and toxic substances upon the enjoyment of a wide range of human rights, including the rights to life, health, water, food, housing, cultural rights and an adequate standard of living, the rights of the child and the rights of Indigenous peoples.⁷¹ The recent recognition of the right to a clean, healthy and sustainable environment should mark a turning point in society’s approach to managing pollution and toxic substances. From a human rights perspective, achieving a non-toxic environment is a legally binding obligation rather than a policy option.

48. As a corollary to the right to a clean, healthy and sustainable environment, States and businesses have a comprehensive suite of corresponding obligations and responsibilities. States should apply a human rights-based approach to all laws, regulations, policies and actions governing the production, import, sale, use, release and disposal of substances that may harm human health or the environment, in order to eliminate negative impacts on human

⁶⁴ See communication AL USA 33/2020, available at <https://spcommreports.ohchr.org/TMResultsBase/DownloadPublicCommunicationFile?gId=25814>.

⁶⁵ Oliver Houck, “Shintech: environmental justice at ground zero”, *Georgetown Environmental Law Review*, vol. 31, No. 3 (2019), p. 455.

⁶⁶ See <https://www.epa.gov/national-air-toxics-assessment/2014-nata-assessment-results>.

⁶⁷ See https://earthjustice.org/sites/default/files/files/ccsj_petition_for_emergency_action_petition_for_rule_making_05-06-2021_1.pdf.

⁶⁸ See <https://www.ohchr.org/EN/NewsEvents/Pages/DisplayNews.aspx?NewsID=27957&LangID=E>. <https://www.ohchr.org/EN/NewsEvents/Pages/DisplayNews.aspx?NewsID=27607&LangID=E>.

⁶⁹ Roberta Greco, “Cordella *et al.* v. Italy and the effectiveness of human rights law remedies in cases of environmental pollution”, *Review of European, Comparative and International Environmental Law*, vol. 29, No. 3 (2020), pp. 491–497.

⁷⁰ *Cordella et al. v. Italy*, applications No. 544141/13 and No. 54624/15, Judgment, 24 January 2019, para. 172.

⁷¹ See [A/HRC/25/53](#).

rights. A rights-based approach should also govern clean-up, remediation, restoration and, where necessary, relocation of affected communities. The rights-based approach clarifies the obligations of States and responsibilities of businesses, prioritizes the most disadvantaged and catalyses ambitious action.

49. The framework principles on human rights and the environment⁷² clarify three categories of State obligations: procedural obligations, substantive obligations, and special obligations towards those in vulnerable situations. In terms of procedural obligations regarding pollution and toxic substances, States must:

- (a) Establish monitoring programmes, assess major sources of exposure and provide the public with accurate, accessible information about risks to health;
- (b) Ensure meaningful, informed and equitable public participation in decision-making;
- (c) Use the best available scientific evidence to develop laws, regulations, standards and policies;⁷³
- (d) Enable affordable and timely access to justice and effective remedies for all;
- (e) Assess the potential environmental, social, health, cultural and human rights impacts of all plans, policies, projects and proposals that could foreseeably result in exposure to pollution or toxic substances;
- (f) Integrate gender equality into all plans and actions and empower women to play leadership roles at all levels;
- (g) Provide strong protection for environmental human rights defenders, vigilantly protect defenders from intimidation, criminalization and violence, diligently investigate, prosecute and punish the perpetrators of these crimes, and address the root causes of social-environmental conflict.

50. Regarding substantive obligations, States must not cause pollution or exposure to toxic substances that violates the right to a clean, healthy and sustainable environment; protect this right from being violated by third parties, in particular businesses; and take positive actions to fulfil this right. Given that current efforts to minimize or mitigate pollution and waste are grossly inadequate, States should establish or strengthen legislation, regulations, standards and policies to prevent exposure to toxic substances, and develop action plans for preventing pollution, eliminating toxic substances and rehabilitating contaminated sites.

51. Under framework principle 11, States should establish and maintain substantive environmental standards that are non-discriminatory and non-retrogressive and otherwise respect, protect and fulfil human rights. National standards must take into consideration the best interests of children.⁷⁴ States should incorporate, as legally binding national standards, WHO guidelines on ambient air quality (updated in 2021), indoor air quality, drinking water quality and toxic chemicals.⁷⁵ From the perspective of the right to a clean, healthy and sustainable environment, it is unacceptable that 80 States have no air quality standards.⁷⁶

52. The Human Rights Committee has made it clear that States must investigate situations of serious pollution or release of toxic substances and impose sanctions where violations occur.⁷⁷ Failing to prevent foreseeable human rights harms caused by exposure to pollution and toxic substances, or failing to mobilize the maximum available resources in an effort to do so, could constitute a breach of States' obligations. States must also make full reparation to victims and other community members for harms suffered, including through adequate

⁷² A/HRC/37/59, annex.

⁷³ See A/HRC/48/61.

⁷⁴ Convention on the Rights of the Child, art. 3.

⁷⁵ See WHO, *Compendium of WHO and Other UN Guidance on Health and Environment* (Geneva, 2021).

⁷⁶ Meltam Kutlar Joss and others, "Time to harmonize national ambient air quality standards", *International Journal of Public Health*, vol. 62, No. 4 (May 2017), pp. 453–462.

⁷⁷ See *Portillo Cáceres et al. v. Paraguay* (CCPR/C/126/D/2751/2016).

compensation, take all necessary measures – in close consultation with the community – to remedy the environmental degradation, and prevent similar transgressions in the future. According to the Supreme Court of Mexico, it is indispensable that the State monitor compliance with environmental norms and, if necessary, sanction or limit the actions of private individuals; otherwise, the human right to a healthy environment would be void of content.⁷⁸

53. States can no longer countenance the creation of sacrifice zones, nor allow existing sacrifice zones to continue. Immediate action must be taken to eliminate residents' exposure to environmental hazards. It is unacceptable for States to exacerbate ongoing human rights violations in sacrifice zones by approving additional sources of pollution and toxic substances. For example, St. James Parish, Louisiana, is one of the most polluted communities in the United States. Yet in 2018, the government approved a massive new \$9.4 billion chemical plant by Formosa Plastics Group in this community that would discharge vast volumes of toxic substances. Fortunately, in 2020, the United States Army Corps of Engineers rescinded a permit that it had granted for the project, citing errors in the review process and the need for a comprehensive environmental impact assessment.⁷⁹

54. The Human Rights Committee has clarified that States' obligation to respect and ensure the right to life should inform their obligations under international environmental law, and vice versa.⁸⁰ The application and interpretation of the right to a safe, clean, healthy and sustainable environment in the context of pollution and toxic substances should be guided by the principles of prevention, precaution, non-discrimination and non-regression, and the polluter pays principle.

Prevention

55. Prevention is paramount. States should enact measures to achieve zero pollution and zero waste. States should eliminate the production, use and release of toxic substances, except for essential uses in society. States must prevent exposure, by regulating industries, emissions, chemicals and waste management, and promote innovation and acceleration of safe substitutes.⁸¹ The Inter-American Commission on Human Rights has found that for States to fulfil the right to a non-toxic environment, compliance with the duty of prevention is closely linked to the existence of a robust regulatory framework and a coherent system of supervision and oversight.⁸² The Human Rights Committee reached a similar conclusion.⁸³ States should enact legislation requiring businesses that generate pollution or use toxic substances to conduct human rights due diligence.⁸⁴

Precaution

56. Knowledge about pollution and toxic substances will never be complete, necessitating recourse to the precautionary principle, which holds that where there are threats of harm to human health or the environment, lack of full scientific certainty must not be used as a reason for postponing preventive action. Application of the precautionary principle in the context of human rights obligations related to a healthy environment has been endorsed by the Inter-American Court of Human Rights.⁸⁵

Non-discrimination

57. Non-discrimination requires States to avoid exacerbating, and actively improve, existing situations of environmental injustice, with special urgency in sacrifice zones. The

⁷⁸ *Amparo* review No. 641/2017, 18 October 2017.

⁷⁹ Rick Mullin, "Community groups score against Formosa in St James Parish, Louisiana", *Chemical and Engineering News*, 19 August 2021.

⁸⁰ General comment No. 36 (2018), para. 62.

⁸¹ See [CRC/C/KOR/CO/5-6](#).

⁸² Inter-American Commission on Human Rights, "Caso No. 12.718: Comunidad de La Oroya, Perú – informe No. 330/20", September 2021, para. 169.

⁸³ See *Portillo Cáceres et al. v. Paraguay*.

⁸⁴ Inter-American Commission, "La Oroya".

⁸⁵ See Inter-American Court of Human Rights, advisory opinion OC-23/17, 15 November 2017.

principle of non-discrimination also requires States to prioritize clean-up and restoration measures for disadvantaged communities that bear a disproportionate burden of exposure to pervasive pollution and toxic contamination.

Non-regression

58. States must adopt science-based standards for pollution and toxic substances, based on international guidance from organizations including WHO, the Food and Agriculture Organization of the United Nations (FAO) and UNEP. Once these standards are in place, the principle of non-regression means the State cannot ignore them or establish levels that are less protective without adequate justification, which would compromise its obligation to ensure the progressive development of the rights to health and the environment.⁸⁶ The weakening by Peru of national air quality standards was identified by the Inter-American Commission on Human Rights as unjustified and inconsistent with its human rights obligations.

Special duties towards vulnerable populations

59. Children are uniquely vulnerable to the adverse health effects of exposure to pollution and toxic substances. Under the Convention on the Rights of the Child (art. 24), States parties are required to provide adequate nutritious foods and clean drinking water, taking into consideration the dangers and risks of environmental pollution. Yet more than 1 million premature deaths among children under the age of 5 are caused by pollution and toxic substances annually. According to the Committee on the Rights of the Child, if children are identified as victims of environmental pollution, immediate steps should be taken by all relevant parties to prevent further damage to the health and development of children and repair any damage done.⁸⁷ States have a duty to consider the best interests of the child when making decisions that could affect them, and a non-toxic environment is unequivocally a fundamental element of all children's best interests.

60. It is important to consider the perspectives of children and youth themselves. Statements gathered for the present report by the Children's Environmental Rights Initiative include the following:

- (a) "The field of grass where I once used to run around is now an industrial complex. The sky full of stars that I once used to look up to is now full of smoke."
- (b) "Boys and girls have the right to live on a planet free from pollution."
- (c) "World leaders need to be responsible for their countries' health and attempt to decrease pollution levels, which will save lives."

61. In addition to children, States should give special attention to other vulnerable or marginalized groups whose rights are jeopardized by pervasive pollution and toxic contamination, including women, Indigenous peoples, minorities, refugees, migrants, persons with disabilities, older persons, people living in protracted armed conflicts, and people living in poverty. These groups are often disproportionately affected, have fewer resources, and have less access to health-care services, increasing the risk of illness or death.

Progressive realization

62. The right to a clean, healthy and sustainable environment is subject to progressive realization, although States are obligated to use the maximum available resources to realize it. However, some specific obligations flowing from this right, such as non-discrimination and non-regression, are of immediate effect. According to the Inter-American Commission on Human Rights, the obligation of progressive development requires the State to develop strategies, plans or policies with indicators and criteria that allow for strict monitoring of the progress made. This requires ensuring that the State carries out actions to advance or take steps (obligation of immediate enforceability) with a view to achieving the full and effective enjoyment of the right involved (obligation of result conditioned to a gradual and continuous

⁸⁶ Inter-American Commission, "La Oroya", para. 188.

⁸⁷ General comment No. 16 (2013), para. 31.

materialization).⁸⁸ In 2017, the Supreme Court of Mexico concluded that the Government had failed to take all possible measures, to the maximum of available resources, to prevent and control processes of water degradation, to monitor compliance of wastewater discharges with current regulations in quantity and quality, and to carry out the necessary corrective actions to clean up the water.⁸⁹ As a result, the Government had violated the right to a healthy environment.

63. In some sacrifice zones, pollution or contamination is so extreme that relocation of residents or communities may be contemplated. Relocation processes must employ a rights-based approach so that affected persons are involved in planning from the outset, are engaged throughout the process and provide informed consent. In Fiji, the guidelines for relocating communities affected by the climate crisis are an exemplary good practice.

Business responsibilities related to pollution and toxic substances

64. Businesses should conduct human rights and environmental due diligence and respect human rights in all aspects of their operations, yet there are countless examples of businesses violating the right to a clean, healthy and sustainable environment by generating pollution or causing exposure to toxic substances. For example, some businesses sell extremely dirty diesel and gasoline in West Africa, containing sulfur levels hundreds of times higher than European law permits.⁹⁰ Some vehicle manufacturers fraudulently sold millions of vehicles equipped with “defeat devices” that enabled vehicles to pass emission tests but produced illegal quantities of pollution under normal driving conditions. Some businesses continue to add millions of kilograms of lead to paint every year. In terms of their environmental impacts, businesses should comply with the Guiding Principles on Business and Human Rights and the Children’s Rights and Business Principles.

65. Businesses have a disturbing track record of lobbying against the enactment or strengthening of environmental standards, limits on pollution, and prohibition or restriction of the production, sale and use of toxic substances.⁹¹ Using their power and influence, businesses have undermined science, denied and fraudulently misrepresented the adverse health and environmental impacts of their products and misled Governments about the availability of solutions and substitutes.⁹² Businesses should not lobby against stronger environmental laws and policies and must refrain from publishing or supporting inaccurate, false or misleading information about the risks posed by toxic substances.

66. Large businesses contributing to the burden of pollution and toxic exposure in sacrifice zones are not meeting their human rights responsibilities. In sacrifice zones there is a catastrophic market failure, as businesses maximize profits while externalizing health and environmental costs onto vulnerable and marginalized communities. Businesses operating in sacrifice zones should install pollution-abatement equipment, switch to clean fuels, change processes, reduce production and, if necessary, relocate. Businesses are also responsible for cleaning up and rehabilitating communities, lands, waters and ecosystems polluted or contaminated by their operations.

V. Implementation of the right to a clean, healthy and sustainable environment

67. After decades of recognition at the regional and national levels, there is a substantial track record of implementation of the right to a clean, healthy and sustainable environment by national human rights institutions, regional courts and tribunals and national courts in cases involving pollution and toxic substances.

⁸⁸ Inter-American Commission, “La Oroya”, para. 186.

⁸⁹ *Amparo* review No. 641/2017.

⁹⁰ See Public Eye, *Dirty Diesel: How Swiss Traders Flood Africa with Dirty Fuel* (Lausanne, 2016).

⁹¹ See David Michaels, *Doubt Is Their Product: How Industry’s Assault on Science Threatens Your Health* (Oxford, Oxford University Press, 2008).

⁹² See [A/HRC/48/61](#).

68. National human rights institutions play a vital role in defending the right to a clean, healthy and sustainable environment. Those in Chile, Colombia, Costa Rica, Croatia, France, Hungary, India, Kenya, Mexico, Norway, the Philippines and South Africa, among others, have been active in addressing threats to people's right to a healthy and non-toxic environment.

69. In 2018, the National Human Rights Commission of Mexico published the results of an extensive investigation into air quality in Mexico. It determined that there were systemic and ongoing violations of the constitutional right to a healthy environment regarding air quality, including inadequate monitoring, failure to update standards, lack of timely public information and failure to take effective actions to ensure clean air.⁹³

70. The African Commission on Human and Peoples' Rights issued a ground-breaking decision in 2001 in a case involving toxic pollution caused by the oil industry in Nigeria. It determined that pollution violated the Ogoni people's right to a healthy environment under the African Charter on Human and Peoples' Rights and held that Governments had clear obligations to take reasonable and other measures to prevent pollution and ecological degradation.⁹⁴

71. In 2021, the Inter-American Commission on Human Rights determined that catastrophic pollution from a lead smelter in La Oroya, Peru, was responsible for pollution that caused virtually every child in the community to have blood lead levels far above levels considered safe by WHO. Children suffered developmental setbacks, cancer, anaemia, depression and other ailments as a result. The Inter-American Commission concluded that the Government of Peru had deliberately prioritized the economic benefits that could be obtained, ignoring its primary responsibility to enforce domestic environmental regulations and to adopt regulatory provisions that corresponded to its international human rights obligations.⁹⁵ Putting economic considerations ahead of human rights is precisely the kind of fundamentally flawed decision-making that creates sacrifice zones.

72. The Inter-American Commission recently requested that Mexico take precautionary measures to address severe pollution affecting the right to a healthy environment in two cases. The first case involved contamination from a notorious landfill and the second industrial water pollution from more than 300 facilities that had caused alarming levels of toxicity in the Santiago River.⁹⁶

73. In a landmark 2008 decision, the Supreme Court of Argentina found that severe air, water and soil pollution in a poor area of Buenos Aires bearing the hallmarks of a sacrifice zone violated the constitutional right to a healthy environment. The Court ordered State and local governments to cooperate to produce public information about the state of the environment and threats to health, control industrial pollution, clean up unauthorized garbage dumps, improve water services infrastructure, restore the health of the watershed and prevent future damage.⁹⁷ Since the Court's decision, millions of people have gained access to safe drinking water and sanitation, hundreds of polluting businesses and illegal garbage dumps have been closed, parks and riverside pathways have been built and thousands of people have acquired new homes in social housing developments. Implementation is ongoing, but the progress is significant in remediating a former sacrifice zone and fulfilling people's human rights.

74. In 2019, the Supreme Court of Chile issued a strong decision, rooted in the constitutional right to live in a pollution-free environment, regarding the air pollution crisis in the Quintero-Puchuncaví sacrifice zone.⁹⁸ The Court held that economic development,

⁹³ General recommendation No. 32/2018, July 2018, paras. 445–459.

⁹⁴ See *Social and Economic Rights Action Centre and Centre for Economic and Social Rights v. Nigeria*, communication No. 155/96, October 2001.

⁹⁵ Inter-American Commission, "La Oroya", para. 175.

⁹⁶ *Marcelino Díaz Sánchez y otros respecto de México*, resolution 24/2019, precautionary measure No. 1498-18, 23 April 2019; and *Inhabitants of the areas near the Santiago River regarding Mexico*, resolution 7/2020, precautionary measure No. 708-19, 5 February 2020.

⁹⁷ *Mendoza, Beatriz Silvia y otros c/ Estado Nacional y otros*, Case No. M.1569.XL, Ruling, 8 July 2008.

⁹⁸ *Francisco Chahuan contra Empresa Nacional de Petróleos*.

such as that represented by the creation of Ventanas industrial complex, even when it legitimately aimed to improve the quality of life of people, including those who lived in Quintero, Ventanas and Puchuncaví, could not be implemented by ignoring or abandoning the conservation and protection of the environment, and could not compromise the expectations of future generations.⁹⁹ This is tacit recognition that sacrifice zones cannot be reconciled with human rights obligations, even if there are purported economic benefits. In another case, the Supreme Court of Chile ruled that legal recognition of the right to a healthy environment required the Government to consider WHO guidelines when establishing air quality standards.¹⁰⁰

75. In 2008, the Supreme Court of the Philippines ruled that environmental degradation in Manila Bay violated the right to a healthy environment and ordered 13 government agencies to take remedial action.¹⁰¹ In 2021, the Supreme Court of India ordered government officials to institute emergency actions to address the air pollution crisis in New Delhi, improve air quality and protect human rights. The Administrative Court of Thailand plays a vital role in protecting the right to a healthy environment in cases brought by citizens and local communities, having issued orders in more than 65 cases involving human rights harmed by pollution and toxic substances.¹⁰²

76. In a case brought by the South African Human Rights Commission, a court found that air and water pollution caused by a poorly managed landfill violated the constitutional right of nearby residents to a healthy environment.¹⁰³ The court ordered the municipal government to develop an action plan within one month to address the problem, and to report back to the court monthly on the implementation of the plan.

77. The foregoing cases illustrate the potential for the right to a clean, healthy and sustainable environment to be used to prevent and rehabilitate sacrifice zones and environmental injustices. As the Supreme Court of Mexico recently acknowledged, courts are obligated to ensure that the authorities comply with human rights, such as the right to a healthy environment, so that these fundamental rights have a real impact and are not reduced to mere ideals or good intentions.¹⁰⁴

VI. Good practices

78. It is encouraging to recognize that there are examples of both the prevention of future environmental injustices and the remediation of past and current ones, including some sacrifice zones. Dozens of additional good practices are highlighted in annex II.¹⁰⁵

79. Important global treaties that control certain toxic substances and wastes include the Basel Convention, the Stockholm Convention, the Rotterdam Convention and the Minamata Convention. Exposure to persistent organic pollutants covered by the Stockholm Convention declined substantially in many countries following its adoption. Important regional treaties include the Bamako Convention on the Ban of the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa, the Aarhus Convention, the Escazú Agreement and the Convention on Long-range Transboundary Air Pollution. The effective implementation of these treaties contributes to realizing the right to a clean, healthy and sustainable environment.

⁹⁹ *Ibid.*, para 34.

¹⁰⁰ *Fernando Dougnac y otros*, Case No. 1119-2015, Judgment, 30 September 2015. See also UNEP, 2021, *Regulating Air Quality: The First Global Assessment of Air Pollution Legislation* (Nairobi, 2021), p. 52.

¹⁰¹ *Metropolitan Manila Development Authority and others v. Concerned Residents of Manila Bay*, General Register Nos. 171947-48, Decision, 18 December 2008.

¹⁰² See A/HRC/43/53, annex II.

¹⁰³ High Court of South Africa, *South African Human Rights Commission v. Msunduzi Municipality et al.*, Case No. 8407/2020P, Order, 17 June 2021.

¹⁰⁴ Amparo review No. 610/2019, 22 January 2020.

¹⁰⁵ The annexes will be made available at

<https://www.ohchr.org/EN/Issues/Environment/SREnvironment/Pages/AnnualReports.aspx>.

80. Consistent with WHO recommendations, more than 60 States have prohibited all uses of all types of asbestos, which causes mesothelioma, lung cancer and asbestosis. Estimated worldwide consumption of asbestos fell from approximately 2 million tons in 2010 to 1.4 million tons in 2016. Unfortunately, parties to the Rotterdam Convention have repeatedly failed to establish the controls necessary to prevent harm to human health from chrysotile asbestos.¹⁰⁶

81. The European Union has a relatively strong regulatory framework for toxic substances, involving approximately 40 instruments. A hazard-based approach to chemical management is adopted in the regulations on the registration, evaluation, authorization and restriction of chemicals and on the classification, labelling and packaging of chemical substances and mixtures.¹⁰⁷ It is estimated that European regulations have prevented more than one million cancer cases in the past 20 years.¹⁰⁸ However, the European Union acknowledges that this regulatory framework must be strengthened to protect human and environmental health. As a result, it is implementing the European Green Deal, to achieve a circular economy, and a strategy entitled “Chemicals strategy for sustainability: towards a toxic-free environment”. These ambitious policies aim to maximize the contribution of safe chemicals to society while achieving zero pollution and a non-toxic environment for the benefit of current and future generations.¹⁰⁹

82. Sustainable remediation of contaminated sites involves cleaning up sacrifice zones and alleviating environmental injustices.¹¹⁰ In the United States, the Comprehensive Environmental Response, Compensation and Liability Act and the Superfund Redevelopment Initiative have transformed some of the nation’s most contaminated sites (former mines, smelters and landfills) into residential developments, recreation areas, renewable energy projects and commercial properties such as shopping centres.¹¹¹ Similar legislation in British Columbia, Canada, authorizes the provincial government to apply the polluter pays principle by seeking payments for contaminated site remediation from a “responsible person”, including present and past owners and operators of a property, creditors and persons who produced or transported the substances that caused a site to become contaminated.¹¹²

83. The closure of coal-fired power plants can contribute to dramatic improvements in air quality and reductions in mercury emissions, preventing premature deaths, reducing cases of respiratory illness, cardiovascular disease and cancer, and spurring progress in fulfilling the right to a healthy environment. More than 40 States have committed to eliminating coal-fired power production by 2030.¹¹³ Ten OECD members plus the European Union pledged to end financial support (including export credits and tied aid) for unabated coal-fired power plants from November 2021.¹¹⁴

84. FAO assists States in eliminating the use of highly hazardous pesticides. Mozambique cancelled the registrations of 61 such pesticides. Botswana, Malawi, Tanzania and Zimbabwe have developed shortlists and started to phase them out. China banned the use of 23 highly hazardous pesticides. After Bangladesh and Sri Lanka banned them, suicides declined and agricultural productivity was unaffected.¹¹⁵

¹⁰⁶ A/HRC/48/61, para. 71.

¹⁰⁷ Regulations (EC) No. 1907/2006 and No. 1272/2008.

¹⁰⁸ European Commission, “Chemicals strategy for sustainability: towards a toxic-free environment”, communication, 14 October 2020.

¹⁰⁹ See European Commission, “Pathway to a healthy planet for all – EU Action Plan: towards zero pollution for air, water and soil”, communication, 12 May 2021.

¹¹⁰ See <https://www.sustainableremediation.org>.

¹¹¹ See <https://www.epa.gov/superfund-redevelopment>.

¹¹² Contaminated Sites Regulation, B.C. Reg. 375/96, 16 December 1996 (as amended).

¹¹³ See <https://poweringpastcoal.org>.

¹¹⁴ See communication AL OTH 249/2021 and the reply, available at <https://spcommreports.ohchr.org/TMResultsBase/DownloadPublicCommunicationFile?gId=26751> and <https://spcommreports.ohchr.org/TMResultsBase/DownloadFile?gId=36695>.

¹¹⁵ See UNEP, *Global Chemicals Outlook II*.

85. There is a compelling economic case for eliminating pollution and exposure to toxic substances. For example, air pollution costs 330 billion to 940 billion euros annually in the European Union, including lost workdays, health-care costs, crop-yield losses and damage to buildings,¹¹⁶ whereas measures to improve air quality cost an estimated 70 billion to 80 billion euros annually.¹¹⁷

VII. Conclusions and recommendations

86. Current approaches to managing the risks posed by pollution and toxic substances are clearly failing, resulting in widespread violations of the right to a clean, healthy and sustainable environment. The deeply disturbing evidence – millions of premature deaths, impaired health for billions of people and lives lived in the purgatory of sacrifice zones – demonstrates a systematic denial of dignity and human rights. The substantive obligations stemming from the right to a non-toxic environment require immediate and ambitious action to detoxify people’s bodies and the planet. States must prevent toxic exposure by eliminating pollution, terminating the use or release of hazardous substances, and rehabilitating contaminated communities.

87. If the promises of the 2030 Agenda for Sustainable Development are to have any real meaning, people living in sacrifice zones must be prioritized, not left behind. A zero-pollution, non-toxic environment must be more than a slick slogan. It must be the vision that inspires Governments, businesses and citizens to make the systemic and transformative changes required to create a new generation of rights-based environmental laws, fulfil the Sustainable Development Goals and achieve a cleaner, greener, healthier future for all. Today’s environmental injustices must be rectified, and tomorrow’s prevented.

88. A human rights-based approach to preventing exposure to pollution and toxic chemicals could save millions of lives every year, while avoiding billions of episodes of illness. The costs of prevention will be billions of dollars, but the benefits will be measured in the trillions. Safe chemicals will play an important role in the transition to a sustainable, low-carbon, zero-pollution future and a circular economy. Society has the requisite knowledge and ingenuity to fulfill the right to a clean, healthy and sustainable environment, but must overcome powerful vested interests in order to do so.

89. To fulfil their obligations related to ensuring a non-toxic environment, States should:

- (a) Urgently detoxify sacrifice zones and eliminate environmental injustices:
 - (i) Take immediate action to address human rights violations occurring in sacrifice zones by dramatically reducing pollution to levels that meet international standards, closing polluting facilities, remediating contaminated sites, providing medical treatment and, where necessary, relocating affected communities (with informed consent and adequate compensation);
 - (ii) Prevent the creation of new sacrifice zones and prohibit new sources of pollution in areas where a disadvantaged population already endures a disproportionate burden of pollution, in part by amending environmental impact assessment legislation to require consideration of environmental justice issues;
 - (iii) Produce a national report on environmental injustices and, where relevant, sacrifice zones, ideally by the national human rights institution, and update it regularly;
 - (iv) Establish or strengthen laws and policies to establish liability (based on the polluter pays principle) for the clean-up and restoration of contaminated sites, including retroactive liability for all responsible parties;

¹¹⁶ See https://ec.europa.eu/governance/impact/ia_carried_out/docs/ia_2013/swd_2013_0531_en.pdf.

¹¹⁷ See https://ec.europa.eu/environment/air/pdf/clean_air_outlook_economic_impact_report.pdf.

- (b) **Strengthen national efforts:**
 - (i) **Incorporate an enforceable right to a safe, clean, healthy and sustainable environment in constitutions and legislation;**
 - (ii) **Reform environmental laws and policies to achieve a non-toxic environment, rather than merely reducing some types of pollution and restricting some toxic substances;**
 - (iii) **Apply the principles of prevention, precaution, non-discrimination and non-regression, the polluter pays principle and the best interests of the child;**
 - (iv) **Prohibit the production and use of substances that are highly toxic, bioaccumulative and persistent (including carcinogens, mutagens, endocrine disruptors, reproductive toxins, immune system toxins and neurotoxins) with limited exemptions where uses are essential for society; eliminate all uses of highly hazardous pesticides; ban all uses of per- and polyfluoroalkyl substances; and phase out the manufacture, sale and use of lead in paint, toys, cosmetics, costume jewellery, glassware, cooking equipment and other consumer items;**
 - (v) **Establish or strengthen national air and water quality standards, giving effect to WHO guidelines;**
 - (vi) **Prohibit the export of toxic substances that are banned domestically;**
 - (vii) **Require businesses to warn regulators and the public about accidents, spills, pollutant releases and toxic chemicals in products;**
 - (viii) **Require businesses to post mandatory bonds or insurance of sufficient magnitude to cover future pollution and contamination liabilities;**
 - (ix) **Strengthen regulatory requirements and institutional capacities for solid, liquid and hazardous waste collection, treatment and management, financed by implementation of the polluter pays principle;**
 - (x) **Implement policies to reduce the risk of chemical accidents;**
 - (xi) **Take steps to prepare for natural disasters and climate impacts that could trigger chemical accidents;¹¹⁸**
- (c) **Fulfil the right to information:**
 - (i) **Fill knowledge gaps through independent research, with an emphasis on understanding the health and environmental effects of chemical mixture;**
 - (ii) **Share knowledge about pollution and toxic chemicals through accessible platforms, recognizing that human rights, public health and environmental protection must take priority over business confidentiality;**
 - (iii) **Implement worker, community and citizen right-to-know laws and policies, to ensure that relevant and complete information concerning chemical hazards, risks and possible exposure is available and easily accessible;**
- (d) **Accelerate the transition to a circular economy:**
 - (i) **Require businesses to redesign products so that they can be safely repaired, repurposed, reused, recycled or composted;**
 - (ii) **Employ market-based regulations, including extended producer responsibility, to internalize the health and environmental costs of pollution and toxic contamination, recognizing that if health or environmental risks are high, bans are more appropriate;**
 - (iii) **Redirect subsidies away from activities and products that produce pollution and release toxic substances, to support non-toxic and sustainable products;**

¹¹⁸ See UNEP, *Global Chemicals Outlook II*.

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- (iv) **Invest in innovation to identify safe substitutes, accelerate the elimination of the most hazardous chemicals, advance green and sustainable chemistry and spur sustainable remediation;**
 - (e) **Take international action:**
 - (i) **Support United Nations resolutions recognizing the right to a safe, clean, healthy and sustainable environment;**
 - (ii) **Ratify and fully implement international treaties, such as the Basel Convention, the Rotterdam Convention, the Stockholm Convention, the Minamata Convention, the Aarhus Convention and the Escazú Agreement;**
 - (iii) **Support new treaties on the prevention of plastic pollution and on human rights due diligence for transnational businesses;**
 - (iv) **Implement a global tax on chemical feed stocks to support low- and middle-income countries in developing the capacity to effectively eliminate pollution, toxic substances and waste;¹¹⁹**
 - (v) **Establish an international science-policy body to synthesize evidence about pollution, toxic substances and waste, similar to the Intergovernmental Panel on Climate Change and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services;¹²⁰**
 - (vi) **Create a global pollutant release and transfer registry, or an internationally harmonized network of national registries.**

¹¹⁹ See https://www.ciel.org/wp-content/uploads/2020/09/ipen-ciel-producer-responsibility-vf1_9e-web-en.pdf.

¹²⁰ [A/HRC/48/61](#), para. 110; and Zhanyun Wang and others, “We need a global science-policy body on chemicals and waste”, *Science*, vol. 371, No. 6531 (February 2021), pp. 774–776.