

Nuclear Weapons, the Environment, and the Climate Crisis

Introduction

Climate change is one of the biggest threats facing humanity, and the threat of nuclear weapons is another. Nuclear weapons production, testing, and use all damage the environment and exacerbate the climate crisis. At the same time, the increase in extreme weather events and rising sea levels caused by the climate crisis accelerates the risks of radioactive contamination from nuclear weapons activities. Beyond production, testing, and use, nuclear war may become more likely due to a climate crisis driven rise of resource-scarcity and conflict.

The Treaty on the Prohibition of Nuclear Weapons (TPNW) is the first international agreement on nuclear weapons to recognize the impacts nuclear weapons have on the environment and to ban the use, production, and hosting of these weapons under international law. Further, Articles 6 and 7 of the TPNW create positive obligations to redress the environmental harms of nuclear weapons use and testing. Most importantly, the TPNW addresses the root of the problem, offering a solution to the environmental threats that nuclear weapons pose by banning all nuclear weapons activities.

Nuclear Weapons Production and the Environment

The production of nuclear weapons, from uranium mining to nuclear weapons production facilities, causes immense environmental harm.

The mining of uranium leeches radiation and radioactive materials into the environment leaving mining sites littered with hazardous materials which can further contaminate ecosystems.¹ This contamination can be extremely dangerous not only to humans, but plant and animal life as well and can remain for thousands of years. For example, uranium mining in Northern Saskatchewan has left 14.45 million tonnes of radioactive tailings in the local environment spanning up to 53 hectares.² These contaminant dumping sites will continue to be ecological hazards for at least one hundred thousand years to come.^{3,4} Radioactive tailings,

¹ "Nuclear Disarmament and Ecological Impacts of Nuclear Weapons," Geneva Environment Network, September 26, 2021, <https://www.genevaenvironmentnetwork.org/resources/updates/nuclear-disarmament-and-ecological-impacts-of-nuclear-weapons/>.

² "The Legacy of Uranium Mining in Saskatchewan: The Unacceptable Environmental Impacts of Uranium Mining," Saskatchewan Environmental Society, March 2015 <https://environmentalsociety.ca/wp-content/uploads/2015/08/The-Legacy-of-Uranium-Mining-in-Saskatchewan-FINAL.pdf>, 13.

³ "The Legacy of Uranium Mining in Saskatchewan: The Unacceptable Environmental Impacts of Uranium Mining," Saskatchewan Environmental Society, March 2015 <https://environmentalsociety.ca/wp-content/uploads/2015/08/The-Legacy-of-Uranium-Mining-in-Saskatchewan-FINAL.pdf>, 13.

⁴ OAR US EPA, "Radioactive Waste From Uranium Mining and Milling," Overviews and Factsheets, November 28, 2018, <https://www.epa.gov/radtown/radioactive-waste-uranium-mining-and-milling>.

the excess materials left behind from uranium mining, endanger ecosystems and communities that surround these mines.⁵ The radiation emanating from these tailings, including in the form of dust, can easily spread into surrounding environments, including groundwater.⁶ With the increase of flooding, forest fires, and other extreme weather events caused by the climate crisis, these tailing storage sites are vulnerable to becoming ground zero to mass contamination events.

Once the uranium has been mined, producing nuclear weapons at nuclear facilities continues to pose environmental risks. If a fire breaks out in a nuclear facility, not only is it a hazard to those immediately in the vicinity, but for years to come due to the radioactive contamination that may billow from the smoke or spread across regions. One historical example was the accident at the Sellafield nuclear facility in the United Kingdom. Fire from the facility spread radioactive contaminants into the Irish sea, leaving behind extremely hazardous radioactive sludge.⁷ Not only was this event harmful to the surrounding environment, but also extremely costly and lengthy to clean up, expecting to not be completed for 100 years and costing upwards of 91 billion pounds.⁸

The possibility of explosions at nuclear weapons production facilities also pose massive risks to surrounding environments. In Mayak, Russia, an explosion at a nuclear processing plant associated with USSR production of nuclear weapons in 1957 contaminated at least 20,000 square kilometers.⁹ This event left radioactive contaminants throughout the environment, including in rivers, soil, and fish, resulted in the permanent evacuation of 10,000 people,¹⁰ and is considered one of the largest nuclear disasters to date.¹¹

Nuclear Testing and the Environment

Nuclear weapon testing, whether underground, underwater, or above ground, has a detrimental effect on the environment and is representative of massive environmental

⁵ OAR US EPA, "Radioactive Waste From Uranium Mining and Milling," Overviews and Factsheets, November 28, 2018, <https://www.epa.gov/radtown/radioactive-waste-uranium-mining-and-milling>.

⁶ OAR US EPA, "Radioactive Waste From Uranium Mining and Milling," Overviews and Factsheets, November 28, 2018, <https://www.epa.gov/radtown/radioactive-waste-uranium-mining-and-milling>.

⁷ "The Environmental Legacy of Nuclear Weapons Production: Five Case Studies," International Campaign to Abolish Nuclear Weapons, April 21, 2022, https://www.icanw.org/the_environmental_legacy_of_nuclear_production_five_case_studies.

⁸ "The Environmental Legacy of Nuclear Weapons Production: Five Case Studies," International Campaign to Abolish Nuclear Weapons, April 21, 2022, https://www.icanw.org/the_environmental_legacy_of_nuclear_production_five_case_studies.

⁹ "The Environmental Legacy of Nuclear Weapons Production: Five Case Studies," International Campaign to Abolish Nuclear Weapons, April 21, 2022, https://www.icanw.org/the_environmental_legacy_of_nuclear_production_five_case_studies.

¹⁰ Sabra Ayres, "Radiation Levels near This Siberian Village Were 1,000 Times above Normal Last Fall. But No One Worried Much," *Los Angeles Times*, February 16, 2018, <https://www.latimes.com/world/europe/la-fg-russia-mayak-20180216-story.html>.

¹¹ "The Environmental Legacy of Nuclear Weapons Production: Five Case Studies," International Campaign to Abolish Nuclear Weapons, April 21, 2022, https://www.icanw.org/the_environmental_legacy_of_nuclear_production_five_case_studies.

injustice. Nuclear-armed countries have tested nuclear weapons disproportionately on Indigenous and colonized peoples' lands, further destroying important cultural connections to lands and waters.

Nuclear fallout from atmospheric testing has significantly contaminated the environment, including by accumulating in plant and animal life.¹² Testing in the 1960s and the nuclear disaster of Chernobyl resulted in higher levels of radionuclides in lichen leading to high levels of radioactive contamination in reindeer and caribou which cultivate important livelihoods and essential sources of protein for many northern communities in Eurasia and North America.¹³ Tests underground or underwater can lead to landslides and radioactive waste contamination entering water systems.¹⁴ Venting from underground nuclear tests can also release radioactive gasses into environments.¹⁵

Nuclear testing leaves some environments uninhabitable due to long-lasting radioactive contamination.¹⁶ In Maohi Nui/ French Polynesia, France carried out nearly 200 tests causing catastrophic health impacts and disruption of the population's connections to their land.¹⁷ Furthermore, the existential threat of rising sea levels caused by the climate crisis contributes to harm done to these communities and contamination.¹⁸

In Algeria, 17 nuclear weapons tests were carried out by the French colonial government between 1960 and 1966.¹⁹ When France ceased nuclear testing and left the region, they buried

¹² Remus Prävälje, "Nuclear Weapons Tests and Environmental Consequences: A Global Perspective," *Ambio* 43, no. 6, (2014), <https://www.jstor.org/stable/24709066>, 732; Bo Jacobs, *Nuclear Bodies: Global Fallout*, 2022, <https://vimeo.com/676724714>.

¹³ Bliss L. Tracy, "Radiation Effects on Caribou and Reindeer Effects on Caribou and Reindeer | SpringerLink," in *Encyclopedia of Sustainability Science and Technology* (Springer: New York, NY) 2012, https://link.springer.com/referenceworkentry/10.1007/978-1-4419-0851-3_283; Amos Chapple, "Chernobyl's Reindeer: The Norwegian herders still living in the shadow of nuclear disaster." *Radio Free Europe*, May 30, 2019, <https://www.rferl.org/a/the-norwegian-reindeer-impacted-by-the-chernobyl-disaster/29971904.html>.

¹⁴ "The Environmental Legacy of Nuclear Weapons Production: Five Case Studies," International Campaign to Abolish Nuclear Weapons, April 21, 2022, https://www.icanw.org/the_environmental_legacy_of_nuclear_production_five_case_studies.

¹⁵ "Stages of an Underground Nuclear Test," *BBC News*, January 6, 2016, <https://www.bbc.com/news/world-asia-35244474>.

¹⁶ Michelle Keown, "Waves of Destruction: Nuclear Imperialism and Anti-Nuclear Protest in the Indigenous Literatures of the Pacific," *Journal of Postcolonial Writing* 54, no. 5, (February 7, 2019) <https://www.tandfonline.com/doi/full/10.1080/17449855.2018.1538660>.

¹⁷ "Nuclear Testing Legacy Is 'Cruellest' Environmental Injustice, Warns Rights Expert," *UN News*, July 16, 2020, <https://news.un.org/en/story/2020/07/1068481>; "Moruroa Files: Investigation into French nuclear tests in the Pacific," Interpret, Disclose, and Program on Science and Global Security, Princeton University, accessed February 17, 2023, <https://moruroa-files.org>.

¹⁸ Michelle Keown, "Waves of Destruction: Nuclear Imperialism and Anti-Nuclear Protest in the Indigenous Literatures of the Pacific," *Journal of Postcolonial Writing* 54, no. 5, (February 7, 2019) <https://www.tandfonline.com/doi/full/10.1080/17449855.2018.1538660>; "NEWS RELEASE: Nuclear Legacy Must Not Endanger Rights of Future Generations, UN Human Rights Office Says," *United Nations Human Rights Office of the High Commissioner: South-East Asia Regional Office*, August 28, 2020, <https://bangkok.ohchr.org/news-release-nuclear-legacy/>.

¹⁹ "Home | ICANW Nuclear Test Impacts," International Campaign to Abolish Nuclear Weapons, accessed February 17, 2023, <https://www.nucleartestimpacts.org/>.

copious amounts of radioactive military equipment and materials below the sand at the testing sites.²⁰ Numerous reports have since found many individuals digging up these radioactive materials at and near the sites to use in their homes and communities thus further spreading the radiological footprint and nuclear legacies of these tests having negative ecological and health impacts.²¹

Nuclear Winter: Famine and Climate Catastrophe

While the current impacts of nuclear testing and production add to the climate crisis, these do not compare to the climatological disaster that would follow even a “limited” nuclear war. The launch of just 100 Hiroshima-sized nuclear weapons — less than 10% of global arsenals — would release 5 billion kilograms of soot into the atmosphere, blocking out the sun, devastating agriculture around the world and causing millions to starve in the years following the explosions.²² This phenomenon of global cooling caused by mass fires from nuclear explosions is called nuclear winter.

The notion of nuclear winter, first theorized by atmospheric scientist Richard P. Turco in the 1980s, comes from the premise that soot from a radioactive mushroom cloud associated with nuclear war would enter the atmosphere and stay there, potentially catastrophically blocking out the sun and impacting regions around the world.²³ ²⁴ This devastating global cooling caused by nuclear war would cause entire regions within continents to rapidly drop below freezing temperatures and further lead to massive crop failure.²⁵ A group of researchers who published a 2022 study in *Nature Food*²⁶ found that even a limited nuclear war²⁷ between India and Pakistan could result in severe surface and sea surface cooling, mass reduction in crop

²⁰ Jean-Marie Collin and Patrice Bouveret, “Radioactivity Under the Sand: Analysis with Regard to the Treaty on the Prohibition of Nuclear Weapons,” *Heinrich Böll Foundation*, July 2020, https://www.boell.de/sites/default/files/2020-08/Under%20the%20Sand_english.pdf?dimension1=division_asp.

²¹ Jean-Marie Collin and Patrice Bouveret, “Radioactivity Under the Sand: Analysis with Regard to the Treaty on the Prohibition of Nuclear Weapons,” *Heinrich Böll Foundation*, July 2020, https://www.boell.de/sites/default/files/2020-08/Under%20the%20Sand_english.pdf?dimension1=division_asp.

²² Lilia Xia, Alan Robock, Kim Scherrer, et al. “Global food insecurity and famine from reduced crop, marine fishery and livestock production due to climate disruption from nuclear war soot injection.” *Nature Food* 3, (August 2022): 586–596 <https://www.nature.com/articles/s43016-022-00573-0>.

²³ Alan Robock, “Nuclear Winter: Nuclear Winter,” *Wiley Interdisciplinary Reviews: Climate Change* 1, no. 3 (May 2010): 418–27, <https://doi.org/10.1002/wcc.45>.

²⁴ Lilia Xia, Alan Robock, Kim Scherrer, et al. “Global food insecurity and famine from reduced crop, marine fishery and livestock production due to climate disruption from nuclear war soot injection.” *Nature Food* 3, (August 2022): 586–596 <https://www.nature.com/articles/s43016-022-00573-0>.

²⁵ Lilia Xia, Alan Robock, Kim Scherrer, et al. “Global food insecurity and famine from reduced crop, marine fishery and livestock production due to climate disruption from nuclear war soot injection.” *Nature Food* 3, (August 2022): 586–596 <https://www.nature.com/articles/s43016-022-00573-0>; Alan Robock, “Nuclear Winter: Nuclear Winter,” *Wiley Interdisciplinary Reviews: Climate Change* 1, no. 3 (May 2010): 418–27, <https://doi.org/10.1002/wcc.45>.

²⁶ Lilia Xia, Alan Robock, Kim Scherrer, et al. “Global food insecurity and famine from reduced crop, marine fishery and livestock production due to climate disruption from nuclear war soot injection.” *Nature Food* 3, (August 2022): 586–596 <https://www.nature.com/articles/s43016-022-00573-0>.

²⁷ “Nuclear Famine: Climate Effects of Regional Nuclear War,” *International Physicians for the Prevention of Nuclear War*, July 8, 2020, <https://www.ippnw.org/programs/nuclear-weapons-abolition/nuclear-famine-climate-effects-of-regional-nuclear-war>

precipitation, and the deaths of two billion people, and extreme climatological shift affecting the entire globe.

Climate Change Exacerbates Nuclear Dangers

The climate crisis' potential to indirectly increase global conflict also further exacerbates the threat of potential nuclear use and resulting impact on our planet. Climate change, linked to insecurity of resources and increased instances of extreme weather events worsening crises, is connected to a foreseeable rise of conflicts, which in any moment increases the risks of nuclear war.²⁸ Climatic anomalies such as rising sea levels, forest fires, and other extreme weather can further put already treacherous nuclear waste, storage, and production facilities at risk, acting as a “threat multiplier.”^{29 30} In the Marshall Islands, where the United States conducted numerous nuclear tests, a massive dome exists full of radioactive waste left over from testing. The Runit dome which holds 35 olympic-sized swimming pools worth of radioactive materials and some of the most hazardous materials from the days of US testing in the Marshall Islands is under siege by rising sea levels.³¹ The dome is at risk of collapsing which could be a devastating point of global contamination as massive amounts of radioactive materials could leak into the ocean.³² Additionally, increased spending on nuclear weapons can contribute further to the climate crisis³³ by diverting funds from climate solution spending while military emissions continue to soar.^{34 35}

TPNW and Environmental Remediation

The Treaty on the Prohibition of Nuclear Weapons (TPNW) is groundbreaking for a nuclear weapons treaty in its acknowledgment of and efforts to redress the environmental harms caused by nuclear weapons.

The TPNW preamble recognizes how nuclear weapons have scarred environments and understands that the effects of nuclear weapons “transcend national borders, pose grave

²⁸ “Conflict and Climate,” *United Nations Framework Convention on Climate Change*, July 12, 2022, <https://unfccc.int/blog/conflict-and-climate>.

²⁹Susanne Rust, “How the U.S. Betrayed the Marshall Islands, Kindling the next Nuclear Disaster,” *Los Angeles Times*, November 10, 2019, <https://www.latimes.com/projects/marshall-islands-nuclear-testing-sea-level-rise/>.

³⁰Robert Blecher, Champa Patel, and Ulrich Eberle, “Climate, Environment and Conflict,” *International Crisis Group*, accessed February 17, 2023, <https://www.crisisgroup.org/future-conflict/climate-environment-and-conflict>.

³¹Susanne Rust, “How the U.S. Betrayed the Marshall Islands, Kindling the next Nuclear Disaster,” *Los Angeles Times*, November 10, 2019, <https://www.latimes.com/projects/marshall-islands-nuclear-testing-sea-level-rise/>.

³²Susanne Rust, “How the U.S. Betrayed the Marshall Islands, Kindling the next Nuclear Disaster,” *Los Angeles Times*, November 10, 2019, <https://www.latimes.com/projects/marshall-islands-nuclear-testing-sea-level-rise/>.

³³ Kjølv Egeland, “Climate Security Reversed: The Implications of Alternative Security Policies for Global Warming,” *Environmental Politics*, (November 2022): 1–20 <https://www.tandfonline.com/doi/full/10.1080/09644016.2022.2146934?scroll=top&needAccess=true&role=tab>.

³⁴ Kjølv Egeland, “Climate Security Reversed: The Implications of Alternative Security Policies for Global Warming,” *Environmental Politics*, (November 2022): 1–20 <https://www.tandfonline.com/doi/full/10.1080/09644016.2022.2146934?scroll=top&needAccess=true&role=tab>.

³⁵John Mecklin (eds.), “2023 Doomsday Clock Statement: Nuclear Risk,” *Bulletin of the Atomic Scientists* (blog), January 24, 2023, <https://thebulletin.org/doomsday-clock/current-time/nuclear-risk/>.

implications for human survival, the environment, socioeconomic development, the global economy, food security and the health of current and future generations.”³⁶ At the First Meeting of States Parties (1MSP) in June 2022, states further emphasized that nuclear weapons “inflict destruction, death and displacement, as well as profound long- term damage to the environment.”³⁷

Article 6 of the TPNW requires each state party to take steps towards remediating environments contaminated by nuclear weapons use and testing. At 1MSP, states parties further committed to “closely consult with, actively involve, and disseminate information to, affected communities at all stages of the victim assistance and environmental remediation process,” an important step to involve communities disproportionately harmed by nuclear weapons in the process to address their environmental harms.³⁸

Indigenous communities have been deeply involved in the creation of the TPNW and delivered a joint statement to the treaty’s negotiation in July 2017 declaring: “The nuclear tests permanently dislocated us from our homes and disconnected us from our traditional way of life. Future generations will never be able to enjoy and live off the land and the ocean in the way that our ancestors had done for thousands of years before the mushroom clouds descended...Our suffering cannot be undone. Our lands can never be fully restored. Some of our customs will never be revived and will forever remain disrupted. But we hope that, in this new treaty to ban nuclear weapons, governments will at last acknowledge and make reparations for the harm inflicted upon Indigenous peoples, communities, lands and sea.”³⁹

Just as importantly, Article 1 of the TPNW bans all nuclear weapons activities that have caused environmental harm and that continue to pose an additional threat to the environment, including exacerbating the climate crisis. These activities include the production and manufacturing of nuclear weapons as well as their testing, stockpiling and use.

Further Reading

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³⁶ Treaty on the Prohibition of Nuclear Weapons, New York, 7 July 2017 (entered into force 22 January 2021).

³⁷ First Meeting of States Parties to the Treaty on the Prohibition of Nuclear Weapons: Declaration of the first Meeting of States Parties to the Treaty on the Prohibition of Nuclear Weapons, UN Doc. TPNW/MSP/2022/6, 21 July 2022.

³⁸ First Meeting of States Parties to the Treaty on the Prohibition of Nuclear Weapons: Vienna Action Plan, UN Doc. TPNW/MSP/2022/6, 21 July 2022, Action 19.

³⁹ “Indigenous Statement to the U.N. Nuclear Weapons Ban Treaty Negotiations,” *International Campaign to Abolish Nuclear Weapons*, accessed February 17, 2023, <https://icanw.org.au/wp-content/uploads/Indigenous-Statement-June-2017.pdf>.

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